

**Assessing health worker performance  
in assisting a mother to learn  
the skills of hand expression of breast milk**

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## Abstract

Breastfeeding is important in the health of children and their mothers, and expressed milk is particularly important when the infant is ill or unable to breastfeed. Mothers may not receive effective assistance to learn skills of milk expression. This study was undertaken to examine if a mother-centred framework could be used to develop a method to assess a lactation consultant student's performance in assisting a mother in learning skills for hand expression.

As there was no apparent research on techniques of hand expression, a three-round Delphi exercise was conducted with experts from three continents, in conjunction with a review of educational materials and observation of mothers expressing. This resulted in a composite list of knowledge and skills that a mother needed. A review of educational methods indicated that adult learning and self-efficacy techniques could be used effectively for assisting the mother's learning. These techniques were in line with expected professional practice of student lactation consultants.

The skills of expression were blended with the skills of assisting learning to develop an instrument to facilitate assessment by observation in a real workplace encounter. Gathering the views of the mother, of the student assisting, and of an examiner, facilitates feedback to the student as well as an assessment score. The instrument and assessment process underwent a validation process involving panels composed of students, mothers and examiners and educators. The evidence from this validation indicated that the instrument was representative and relevant to the expected behaviours of assisting the mother, that it was useable by the three groups, and that it was likely to pick up a poorly performing student. The three panels' views indicated that all items should meet a minimum level to pass, that the views of the mother, the student and the examiner should all have value, and that a visual analogue scale provided an acceptable means to mark the performance. A passing standard was determined that can be used for pilot testing of the instrument and process, and for testing of reliability.

The instruments and assessment process are brought to readiness for pilot testing with students to determine their performance as well as the feasibility of multi-source assessment that is mother-centred and values the views of the mother. It potentially provides a means of effectively assessing one area of clinical practice and could be extended to assess other areas.

## Publications and presentations related to this thesis

### Publications

Becker GE, McCormick FM, Renfrew MJ. Methods of milk expression for lactating women. Cochrane Database of Systematic Reviews, 2008 Issue 4. Art. No.: CD006170. DOI: 10.1002/14651858.CD006170.pub2.

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Becker GE, Roberts TE. Do we agree? Using a Delphi technique to develop consensus on skills of hand expression. *Journal of Human Lactation* 25: 2, 2009

### Conference posters

What are the skills of hand expression? Becker G, Woolridge, M, Roberts TE. *Journal of Human Lactation* 21(4), 491, 2005. Poster abstract at the Annual Conference of the International Lactation Consultant Association, 2005. Poster also displayed at Association of Lactation Consultants in Ireland Annual Conference 2005.

Assisting mothers to develop skills of milk expression – is there agreement on what are these skills? Becker G, Woolridge, M, Roberts TE. Faculty of Medicine Research Poster event, University of Leeds, 2005. Poster also displayed at Association of Lactation Consultants in Ireland Annual Conference 2006, and BFHI Coordinators International meeting, WHO, Geneva June 2008.

Methods of Milk Expression for lactating women - Protocol for a Cochrane Systematic Review Third Annual Cochrane Collaboration in Ireland, Dublin City University. February 2007, and BFHI Coordinators International meeting, WHO, Geneva June 2008.

Assisting mothers to develop skills of breast milk expression. Becker GE. Irish Nutrition and Dietetic Institute, Paediatric Study Day, Dublin. September 2008

Valuing views of clients in setting standards and assessing performance of students. Becker GE. Irish Nutrition and Dietetic Institute, Paediatric Study Day, Dublin. September 2008

### Contributions to educational materials

Focus on expression of milk, *BFHI Link* Issue 25, January 2006. Baby Friendly Hospital Initiative in Ireland [http://www.ihph.ie/babyfriendlyinitiative/bfhi\\_link.htm](http://www.ihph.ie/babyfriendlyinitiative/bfhi_link.htm)

If baby cannot feed at the breast, Section 3.2, Session 11, and Clinical Practice 3: Observing Hand Expression. *Breastfeeding Promotion and Support in a Baby-friendly hospital: a course for maternity staff*. UNICEF/WHO 2006 [http://www.unicef.org/nutrition/index\\_24850.html](http://www.unicef.org/nutrition/index_24850.html)

## Presentations

All-Ireland Breastfeeding Conference, Belfast. October 2008 (National)

Hand expression, are we teaching mothers or assisting their learning?

Health Promotion Research Centre Conference: Capacity Building for the Future: Health Promotion Competencies and Professional Standards, National University of Ireland, Galway, June 19th & 20th June 2008 (International)

Valuing views of service-users in setting standards and assessing performance.

e-health-learning GOLD 08 – Global On-line Lactation Discussion, May 16-26th, 2008 (International)

How's your performance? Workplace assessment

Hand expression of milk, why it is worth learning and how to assist learning

Faculty of Nursing, Wichita State University, Kansas, April 2008 (University)

But can they do it? Performance assessment of trainee lactation consultants

International Lactation Consultant Association Annual Conference

San Diego, August 2007 (International)

Methods of Assessing LC Clinical Competence after pre-service and in-service training

Association of Lactation Consultants in Ireland Study Day Dublin, March 2007 (National)

Assisting learning versus teaching patients – what is the difference?

Midwifery Education Research Group, University of York. Jan 2007 (University)

Assessing performance in assisting a mother to learn skills of hand expression of breast milk

University of Leeds Social Sciences Institute Seminar Series Jan 2007: (University)

Visualisation of change in responses between Delphi Rounds to indicate the movement towards consensus and stability

Association of Lactation Consultants in Ireland Masterclass for Trainers

Cork City, March 2006 (National)

Assessing learning and competence related to breastfeeding

Association of Lactation Consultants in Ireland Study Day, Cavan, April 2005 (National)

Research Update: What are the skills of hand expression?

Mother and Infant Research Unit, University of Leeds, Oct 2004 (University)

Research on Hand Expression of Breast Milk

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## Glossary of terms and abbreviations used in this thesis

Assessor	Anyone who is giving a view on the practice of the student, and in its generic use does not denote specific training or position
BFHI	Baby Friendly Hospital Initiative, a global programme of the World Health Organization and UNICEF
Examiner	Teachers, clinical mentors and others who are assumed to have greater knowledge and skill than the student
Expression	Milk removal by hand expression of the breast
Health worker	Person working in health services at any level, whether professionally qualified, as paid employee, independent contractor or volunteer
IBCLC	International Board Certified Lactation Consultant
IBLCE	International Board of Lactation Consultant Examiners, Inc
ILCA	International Lactation Consultant Association, the professional body for IBCLCs.
IQR	Inter Quartile Range
LC	Lactation consultant who may or may not be certified
Mini-CEX	Mini clinical encounter exercise
Mother	Term is used also to include pregnant women
OSCE	Objective Structured Clinical Examination
Performance	Actual situated behaviour reflecting what is done in practice
Pumping	Milk removal using a mechanical pump
Service-user	Refers to a current user, not a representative of service users
Student	The person being assessed and could apply to those preparing for practice or to those seeking to improve their practice through continuing education.
VAS	Visual Analogue Scale

# Chapter 1: Background and outline of the thesis

## 1.1 Background

This study examines what the skills of hand expression are and develops a process of assessing the performance of health workers in assisting mothers to learn to hand express their milk. The starting point of this journey was my belief that children are valuable, that breastfeeding and human milk make a difference to their health and wellbeing, and that the assistance their mothers received in acquiring skills related to breastfeeding was often less than optimal, in particular skills related to hand expression of milk. This belief was coupled with my experience in providing in-service training to health workers whose pre-service training had devoted far more time and assessment to scientific and theoretical knowledge about breastfeeding than to the practical skills of assisting mothers to breastfeed.

### 1.1.1 Breastfeeding makes a difference

Thousands of years of use has shown that breastfeeding nourishes and protects children, and decades of empirical scientific evidence for the importance of human milk for short and long-term health is well-recognised (AAP 2004; Horta et al. 2007). The World Health Organization (2002) recommends that all infants should be fed exclusively on human milk from birth to six months of age, continuing thereafter with appropriate complementary foods. This recommendation is widely accepted.

#### 1.1.1.1 Why express milk?

Unfortunately, not all babies are able to feed at the breast due to illness, abnormalities, prematurity or separation, and expressed milk is needed for these babies. Mothers may express their milk for their own comfort if they have sore nipples (Buchko et al. 1994) or engorgement (Meserve 1982); to increase milk supply (Chapman et al. 2001), to leave milk if they are away from their baby (Hills-Bonczyk et al. 1993), to donate to a milk bank (COMA 1981) or to encourage the infant to attach to the breast (Anderson 1992). When colostrum is expressed and stored in the last few weeks of pregnancy it can provide an immediately available supply if the baby is at risk of hypoglycaemia (Oscroft 2001). Though there is a risk of HIV transmission via breast milk, expressing and heat-treating the milk will destroy the HIV, thereby providing a nutrient source to infants, particularly in resource-poor areas (Newell 2004). In addition, the ability to express milk may increase the duration of breastfeeding (Valdés et al. 2000; Win et al. 2006). Thus for many reasons a mother may find it useful to learn to express her milk.

### **1.1.2 Why hand expression?**

The Baby Friendly Hospital Initiative (BFHI) is a global programme to implement practices that are supportive of breastfeeding. The external assessment criteria requires that mothers are offered assistance to learn the skills of hand expression before discharge from maternity services (WHO/UNICEF 1989). Reasons for the recommendation to learn the skill of expressing by hand rather than by mechanical pump include:

- no equipment to purchase or replace and thus no economic barrier for any mother to provide expressed milk (Philipp et al. 2000);
- it is always accessible with no parts to sterilise, lose, or break;
- there is no time, water, or fuel needed to clean pump parts;
- hand expression may be more effective, particularly for small amounts, such as colostrum, a few drops as lubricant or to encourage baby to attach to the breast;
- it is natural and can empower women as self-sufficient producers rather than consumers of manufactured products;
- mothers may prefer hand expression to mechanical pumping (Slusher et al. 2007);
- there may be adverse effects from expressing milk using a pump, including injury to the mother (Williams et al. 1989; Brown et al. 2005).

#### **1.1.2.1 Is hand expression valued?**

Hand expression appears to have fallen out of practice from the early 1970s onwards in North America, the UK, Ireland and some other western European countries. This may reflect the low breastfeeding rates during this period, increased availability and marketing of infant formulae, the rise in marketing of breast pumps (including the funding of research into their use), and the beliefs of health professionals. As a result breast pumps came to be the accepted method with authors tending not to distinguish between hand expression or pumping and using the term ‘expression’ frequently for both methods (Terry 2004; Geraghty et al. 2005; Binns et al. 2006; Jones and Spencer 2007).

Morse & Bottorff (1988), in the only research article found which looks at mothers’ experiences of milk expression, explored the views of 61 Canadian breastfeeding mothers who used either or both hand expression and mechanical methods when they returned to work. Many of the mothers found the information provided on expressing was of little help and that learning was by trial and error. The mothers stressed the individuality of expressing, rather than following set instructions. Morse & Bottorff discuss the implications of this research on the way expression is taught, suggesting that information needs to be less prescriptive and to include discussion on feelings about expression. The researchers gave specific suggestions for further research on the ability to express and attitudes to expressing. Personal communication with Dr Morse (March

2005) indicated that she had not done any further work on this topic and was not aware that any other researcher had taken up any of their suggestions for future research.

Drane et al (1994) carried out a USAID-funded literature review on milk expression and pumping, storage and feeding, for Wellstart International. In the conclusion of this review, they presented suggestions for further research in this area. Personal communication with one of the authors and the Wellstart director indicated they were not aware of any research that followed from their publication.

A Cochrane systematic review to assess the acceptability, effectiveness, safety, effect on milk composition, bacterial contamination and cost implications, of a range of methods of milk expression including hand expression and pumps, included 12 studies from 1985 and 2007 (Becker et al 2008). Three studies included hand expression in comparison with pumping (Zinaman et al. 1992; Boo et al. 2001; Slusher et al. 2007). One of these studies referred to mothers being taught the Marmet technique of milk expression (Zinaman et al. 1992). The other studies did not mention what techniques or instruction was provided, and contact with the authors did not result in any additional details. Eight of the twelve studies received financial support from the manufacturers of the products studied.

### **1.1.2.2 Literature search on learning hand expression**

A literature search was undertaken for articles on milk expression that focused on skills of hand expression and automatic monthly alerts were set up. See Appendix A1 for the search details. Opinion pieces on choosing and using pumps were common and research papers most frequently related to the development of commercial pumps. Four items were found that directly referred to learning to hand express. These were information materials with lists of pointers such as to wash hands, express frequently, store correctly and similar directions (Riordan and Countryman 1980; Auerbach 1990; Terry 2004; Glynn and Goosen 2005). An announcement for a hand expression educational video was also found in the electronic search (Frantz 1988). These five items related to learning the skills are addressed in detail in Chapter 2. My literature search found no published research on comparison of methods of hand expressing or of ways of learning this skill.

There are many published articles related to assisting mothers to learn breastfeeding skills effectively; many of them resulting from efforts to implement practices of the BFHI.

Considering that the BFHI has been active since 1989 in over 19,000 maternity facilities around the world and that assisting mothers to learn to hand express is one of the criteria (WHO 2007), it is surprising that more research or even descriptive articles were not found. This may reflect a situation that in less industrialised countries, hand expression is common practice and mothers

do not need formal assistance to learn, and that in more industrialised countries, which also have less facilities that have met the global BFHI criteria, pumps are easily available and hand expression is less visible and less valued. Alternatively, it may reflect that hand expression is not seen as a topic worth researching or publishing.

Breastfeeding rates are lower than ideal in many areas and attention is being directed towards increasing the rates, with attitudes, education, and practices being explored. In order to explore the practice of hand expression, it is necessary that mothers are effectively expressing in sufficient numbers. For this to occur there needs to be health workers able to assist the mothers in learning the skills.

### **1.1.3 Is skilled assistance available?**

Breastfeeding and hand expression of milk are normal processes, but this does not mean that they come naturally. They need to be learnt either informally by growing up in a breastfeeding society and by learning through observation and family support, or formally taught when the society does not provide these opportunities. In the past, hand expressing appears to have been taught to women during the antenatal period, particularly following on the work of Waller (1946) who thought there was not enough time on the postnatal ward to learn to express proficiently. Dykes (2005), sixty years later, also considers lack of time on the post-natal ward to be a constraint to learning breastfeeding skills. Thus, if there is little informal learning about hand expression and little time on the post-natal ward, it is important that health workers are skilled in assisting the mother to learn to express in the limited time that is available.

Research across many countries indicates deficits in knowledge, attitudes and skills of health workers for breastfeeding support in general (Becker 1992; Labarere et al. 2003; Cantrill et al. 2004; Hellings and Howe 2004; Dykes 2006). Health workers' skills in assisting mothers to learn the skill of expression have been reported to be below standard in Ireland, the UK, and the USA, both by national BFHI programmes (BFHI 2002) and independent reports (Jaeger et al. 1997; Dodds 1999; Welford 1999; Dykes 2006).

A needs assessment of approximately 800 multi-disciplinary health workers in England and Wales identified learning deficits related to breastfeeding in general and also found that current training was not sufficient to remedy the deficits. It included among its recommendations for further research, the suggestion that "objective assessment of learning achieved should be evaluated" (Renfrew et al. 2006). This is similar to another recommendation that national training standards be set including measurement of learning outcomes (Dykes 2006). In another report from the same project (Wallace and Kosmala-Anderson 2007), 575 health workers self-rated in 26 breastfeeding support skills, with 76% (out of 423) rating themselves as competent or expert in teaching hand expressing, in contrast to 54% (out of 501) giving the same answer

for positioning and attachment. The authors point out that more experience of working with breastfeeding mothers was not consistently associated with high self-ratings of competence and recommend “evaluation of skills and knowledge achieved from training completed.” I find it surprising that one of the highest ratings of competence/expertise would be for teaching hand expression, but if teaching hand expression is seen as telling mothers a list of techniques to do and giving them a leaflet, then this may be perceived as expertise. It is also possible that self-report of competence without a benchmark against which to calibrate may not be an accurate indication of actual performance. It may be that those respondents with less experience are less aware of what they do not know. It is also noticeable that many of the respondents did not rate themselves regarding hand expression. Therefore, a means to assess the existing skills and knowledge in order to identify training needs and thus target training effectively, may be of use.

#### **1.1.4 What is the role of assessment?**

Assessment can serve a number of purposes. It can:

- guide student learning, ascertain what has been learnt and what needs to be learnt, and build student confidence to undertake new practices;
- provide validation of a teacher, course, institution, or award;
- protect service users and the wider community by serving as a gate-keeping measure to ensure standards are met;
- provide information to employers for job suitability;
- assist in evaluating the needs and outcomes of training, and if it provided value for money.

Assessment can involve multiple aspects of knowledge, skills and attitudes and be carried out by a number of means. Alternatively, it can refer to a single activity using one method to assess for a specific purpose, e.g. a multiple-choice test to assess knowledge. Ideally, an educational assessment process is developed as part of the overall curriculum design and is reflected in all the teaching and learning activities, rather than appearing at the end of a course with a separate existence. Attendance at a training course does not guarantee that knowledge and skills are acquired and can be used. Assessment of observed performance is increasingly used in training health workers, as well as in many other occupations, as there is a move from a teacher-led process-based systems (e.g. x hours teaching on topic y) to a learner-focused system driven by competency based outcomes.

### 1.1.4.1 Levels of assessment

Miller (1990) provides a model with four levels of assessment with different assessment methods suiting different purposes (Figure 1.1). The levels of *Knows* and *Knows How* are assessments of cognition; however knowledge alone does not ensure effective action and Miller distinguishes between competence as the potential or prediction for appropriate action and the demonstrated behaviour in a real situation. Assessment of behaviours includes the levels *Shows How* which assesses the application of knowledge in simulated settings and the level *Does* assessing the application of that knowledge to action in routine work.



**Figure 1.1: Framework for clinical assessment** (Miller 1990)

Norman (2005) questions the evidence underpinning the perception that assessing performance with simulations, situated higher up the pyramid, is any better at predicting actual performance than is a test of knowledge with multiple choice questions; a question that can only be answered by further educational research. Rethans et al (2002) view Miller's Pyramid as useful in educational settings as a means to conceptualise progress through assimilating knowledge to functioning in real practice, though they suggest inverting the pyramid to show performance as a product of competence and to assess it in real-life situations. For the purpose of this thesis Miller's Pyramid is used to illustrate that what the student does in a real-life setting is underpinned and supported by other aspects, and all the aspects have a place in the overall structure.

### 1.1.4.2 Assessment in health professions

There are many commonalities in approaches to the development of assessment processes used by a range of health professions in their move to outcomes based education that helped to inform this project. In particular, the approaches in relation to physical therapists (Roach et al. 2002; Fitzgerald et al. 2007), paramedics (Regener 2005), speech pathologists (McAllister 2005), as well as in medicine (Friedman Ben-David 1999; Carraccio et al. 2002), nursing (Norman et al. 2002) and general education (Balla and Boyle 1994).

Many assessment processes already exist in different professions and within specialties and these are discussed in the Chapter 4, which focuses on assessment. Though the general principles of assessment are similar across most professions, there will be some aspects specific to each profession and the next section describes the specific health workers that this thesis focuses on.

### **1.1.5 Which health workers are to be assessed?**

A variety of health workers could assist a mother including lactation consultants, midwives, nurses, doctors, dietitians, breastfeeding counsellors and peer supporters, and others. An assessment of performance could apply to any or all of these health workers; however, the group specifically examined in this study are International Board Certified Lactation Consultants (IBCLC). The IBCLC credential signifies a member of the health care team who has prepared for and passed an exam and possesses a specialised knowledge and skill with a primary focus on breastfeeding. Founded in 1985, in December 2007 there were over 17,000 IBCLCs currently certified in 75 countries across the world, with nearly 4,000 in the Europe, the Middle East and North Africa area (IBLCE 2007). There are IBCLC eligibility pathways both for direct entry and as an add-on to an existing health worker qualification. Competency statements identify the knowledge and skills expected and a clinical competencies checklist gives examples of how an entry-level IBCLC might demonstrate these skills (IBLCE 2007). In addition, the International Lactation Consultant Association (ILCA) provides a Standards of Practice document. Relevant excerpts from these documents can be found in Appendix B.

IBCLC candidates are required to have education courses specific to human lactation and practice experience of 500 - 6000 hours, depending on prior qualifications, before taking an exam composed of 200 multiple-choice questions testing knowledge and application of knowledge. At present the practice experience does not need to be assessed as a prerequisite for taking the exam or as a requirement for certification. I am a member of the Professional Development Committee of the International Lactation Consultants Association and am involved in the development of a model curriculum, including expected outcomes and methods of assessment, for direct-entry training of IBCLCs. The assessment process developed in this thesis may contribute to an evidence base for that curriculum in relation to hand expression specifically and as a model for other topics. Assessment of performance in assisting a mother's learning of hand expression might take place as part of initial training or as part of the mandatory continuing professional development for IBCLCs, or could be used by other health workers developing their skills in this topic.

So far, there is a purpose and group defined and a case can be made for the value in carrying out the assessment. The next step is to ascertain if other researchers have examined a similar assessment.

### **1.1.6 What is known already about assessing this topic?**

Firstly, a literature search for existing tools/methods of assessment of lactation consultants was conducted and automatic monthly alerts were set up; this yielded no relevant research articles. Therefore, a literature search for existing tools/methods of assessment of any health workers related to milk expression and to breastfeeding was conducted in a similar manner. When articles were excluded that reported questionnaire surveys of only knowledge, eight articles remained for in-depth review of the methods of assessment used, and none were specific to milk expression. One of these studies included an element of self-assessment by the student (Haughwout et al. 2000); none of these studies reported seeking the mother's view of the assistance received. Search details are in Appendix A and the research on assessment is reviewed in Chapter 4. Thus, I concluded that there is little research published on performance assessment of health workers' assisting breastfeeding mothers to learn skills.

### **1.1.7 What are the gaps on this topic?**

Based on literature searches, discussions with practitioners and other researchers, my experience in providing breastfeeding training, and my previous work on the topic it appears that the gaps include a lack of published work on:

- skills and attitudes required by the health worker, and the ways to effectively assist mothers to learn about hand expression;
- assessment tools related to assisting mothers to learn about hand expression;
- assessment tools related to breastfeeding in general that use methods assessing real-life performance;
- assessment of performance specifically related to IBCLCs;
- assessment of the health worker with regard to assisting breastfeeding that takes into account the viewpoint of the mother being assisted and if her needs were the focus;
- assessment of the health worker with regard to assisting breastfeeding that included the health worker's viewpoint so as to develop their life-long learning skills.

Writing in relation to medical training, Carraccio (2002) points out that though there is widespread support for the idea of competency-based education including assessment, it will not become a reality unless educators and other stakeholders can see a direct link between the broad level competencies and the objectives of the curricula, and can access effective tools to measure outcomes of the training. This is likely to be true in relation to training those who assist breastfeeding mothers also.

### **1.1.8 Thesis objectives**

These perceived gaps led to my decision to examine if a mother-centred framework can be used to develop a method to assess a lactation consultant student's performance in assisting a mother in learning skills for hand expression of her milk.

The objectives of this work were to develop an assessment tool that:

- would be mother-centred reflecting the skills the mother needed;
- focused on assisting the mother's learning;
- included the mother's viewpoint as well as that of the faculty or other examiner;
- included the viewpoint of the student so as to assist in developing their lifelong learning skills;
- valued workplace based performance as a method of assessment
- provided evidence to support a judgement of fit for practice, for award, and for purpose;
- had utility and feasibility in diverse health settings;
- used assisting learning of hand expression as an example, though with the intention that the method of development could in future be applied to other areas of assisting learning related to breastfeeding or other topics;
- contributed to the research base related to training and assessment of IBCLC and other health workers, and to hand expression.

Thus, this assessment may assist infants to receive mothers' milk, and contribute to the health and well-being of children and their mothers.

## **1.2 Outline of this thesis**

### **1.2.1 Framework**

As there was little research found on hand expression and assisting mothers to learn skills, this thesis is an exploratory, descriptive study and may form the basis for further research, generating questions for explanatory surveys, experimental research, or other quantitative or qualitative approaches. However, I hope that it will also provide guidance for practice in the near future.

One approach to this thesis would have been to make a list of actions the mother should follow in order to hand express and then assess if the student accurately told the mother to carry out these actions and the mother complied. However, each mother is an individual with her own situation, needs and values and therefore a behavioural approach to learning skills of hand expression may not be the most effective; this is discussed further in Chapter 3. Breastfeeding and learning skills of expression are not illnesses or problems needing treatment in a bio-medical model; they are not ‘done to’ the mother; rather she ‘does it herself’ with assistance if needed.

#### **1.2.1.1 Mother-centred**

Thus a holistic concept of mother-centredness underlies this thesis building on Epstein’s (2005) operational definition of patient centred care which includes:

- “Eliciting and understanding the patient’s perspective” - seeking the mother’s views.
- “Understanding the patient within their unique psychosocial context” - viewing the mother as an individual and in her own unique context.
- “Reaching a shared understanding of the problem and its treatment ... that is concordant with the patient’s values” - ensuring the assistance and suggestions are acceptable to the mother.
- “Helping patients to share power and responsibility by involving them in choices ...” – remembering that it is the mother’s choice if she expresses or not and that compliance is not the goal.

Figure 1.2 shows how the concept of “mother centred” is linked with both the structure of the study and the flexible or situated behaviours expected of the student being assessed. The mothers’ perspective was sought, as well as that of “experts” and published materials, in determining what the skills of hand expression are. The principles of adult learning and communication assist in keeping the focus on the mother’s individual needs as regards the assistance with skills of hand expression. The mother is placed as a central source in the assessment, which also includes the views of the student and the examiner. A key outcome of the assistance with learning is that the mother feels confident she has the skills to express her milk in a manner that is suitable for her if she chooses to do so.

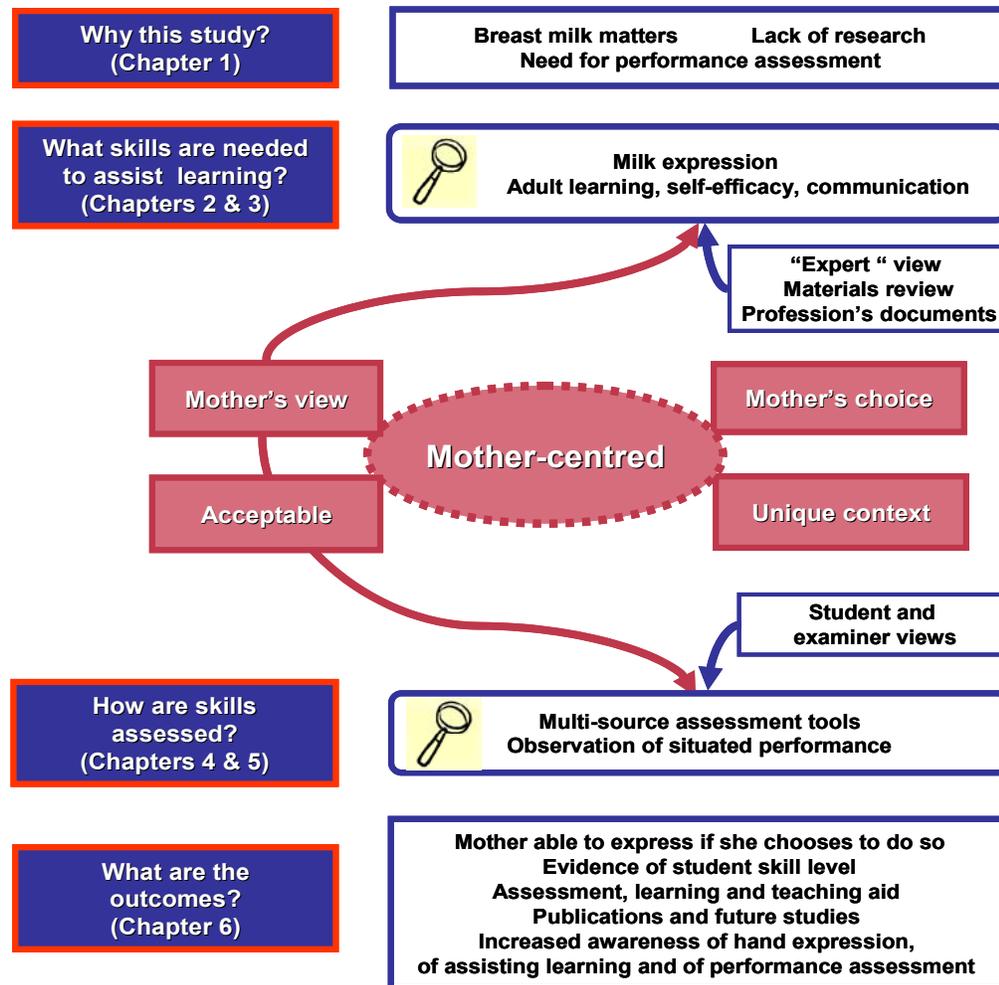


Figure 1.2: Study framework

### 1.2.2 Thesis structure

This Chapter 1 has provided the background to the study and outlined the reasons why it was undertaken.

Chapter 2 examines the skills needed to hand express addressing the existing knowledge and starts to fill knowledge gaps through a set of studies gathering data from three sources – ‘experts’, published educational materials and mothers who are hand expressing. These findings are reported and discussed.

Chapter 3 discusses the theories and skills of assisting learning and the relevant results from the empirical studies described in Chapter 2 are discussed in relation to those theories. These methods, theories and skills are then linked with the practice statements of the International Board of Lactation Consultant Examiners and the International Lactation Consultant Association to develop a framework and guidance in assisting learning skills of hand expression.

Chapter 4 uses a model of enquiry to explore the methods of assessing health worker performance in a real situation with particular reference to valuing the views of the mothers and students as well as the examiners. A performance assessment tool is developed.

Chapter 5 presents a study to validate this assessment tool by panels composed of mothers, students and educators/examiners. The findings of this validation process are then discussed.

Chapter 6 concludes and brings together the thesis, discussing overall strengths and limitations, implications of this work, and areas for future work.

The Appendices contain details of literature searches; the instruments used, and selected results in more detail.

### **1.2.3 Intended audience**

Any writing must be done with an intended audience in mind. It is hoped that this work will be read by a wide range of people. However, throughout the course of this study, the main audience envisaged has primarily been those involved in the preparation for practice and assessment of readiness for practice of International Board Certified Lactation Consultants, as well as academic colleagues in related areas.

### **1.2.4 Writing style**

First person narrative has been used where this is appropriate. This is in keeping with the underlying concept that each person is an individual and constructs their own meaning in a situation. A third person style might be taken as implying there are disembodied facts about something as individually unique as hand expression of milk. In addition, first person writing serves to distinguish my interpretations from those of other researchers referred to in the thesis.

### **1.2.5 Terminology**

The term “mother” is generally used rather than “patient” to highlight the normality of hand expression, that the skills may be learnt outside a formal health care setting or when it is the child that is the recipient of health care rather than the mother. The terms “client” or “service-user” were considered also and are used at times where the person referred to is not specifically a mother. The term “mother” is used also to include pregnant women.

The term “health worker” is used to cover the generic group of people who work in health services at any level, whether professionally qualified, as paid employees, independent contractors or volunteers, unless identification of a specific expertise or profession is needed.

For ease and clarity, the person being assessed is referred to as a “student” though the work in this thesis could apply to those preparing for practice or to those seeking to improve their

practice through continuing education. As noted earlier the specific focus is student International Board Certified Lactation Consultants.

The term “assessor” denotes anyone who is giving a view on the practice of the student and in its generic use does not denote specific training or position.

Though Miller (1990), shown in Figure 1.1, used the term “performance” for the level of *Shows How*, which could include assessment in simulated situations, I am using “performance” to mean the situated behaviour of the lactation consultant in assisting a real mother.

### 1.2.6 Boundaries of this study

Investigations related to breastfeeding are very wide reaching as they can encompass social constructs of motherhood and the position of women in society, the value of children, constituents of milk, health effects of breastfeeding or not, attitudinal studies, marketing of breast milk substitutes, economics and much more. Teaching, learning and assessment are also multi-faceted and inter-linked areas. This thesis only explored one facet of assisting learning and about a specific topic – whether or not the student lactation consultant’s skill in assisting the mother’s learning of skills of hand expression is measurable (Figure 1.3).



**Figure 1.3: Focus of this thesis**

The health workers’ engagement with the activity may be affected by their personal beliefs, attitudes and knowledge regarding the value of breast milk, the dual functions of breasts linked to motherhood and to sexuality, and the supports or constraints of health care system in which they are working (Turnbull and Roberts 2004). Motivation, attitude regarding breastfeeding and milk expression, support to carry out behaviours and other variables could affect the mother’s learning and use of the skill of hand expression. Investigations of these other variables might be beneficially undertaken and use other research methodologies and techniques than those used in this study.

## **Chapter 2: The skills of hand expression**

This chapter reports on the process of establishing the skills of hand expression that a mother may need to learn. Firstly, existing knowledge on the skills is reviewed and discussed, and then a study is described that I carried out to fill some of the gaps by gathering data from three sources: “experts”, published materials, and mothers who were hand expressing. This data is discussed by each source and then combined for further examination.

### **2.1 Existing knowledge on the skills of hand expression**

#### **2.1.1 Literature search and findings**

A literature search for articles related to skills of hand expression of milk was carried out via the on-line databases and automatic monthly alerts set up. The search strategy and results are in Appendix A1. This literature search found no published research detailing or comparing methods of hand expressing, or research on effective ways of learning skills of hand expression. The combinations of a term such as teach, assist, or learn, with milk or breast and terms related to expression, found four non-research articles and one educational video relating the views of the authors on how to hand express (Riordan and Countryman 1980; Frantz 1988; Auerbach 1990; Terry 2004; Glynn and Goosen 2005). The views of these five authors had some similarities and some differences and could not be taken as an authoritative list of skills that mothers needed for hand expression (Table 2.1). The length of the material affected how comprehensive the coverage of hand expression was. The dates of the materials also need to be noted as later materials may source some of their information from earlier materials.

In addition to the items that were found in the electronic database search, a very wide variety of leaflets and other material exists explaining how-to hand express. These are produced by individual health workers, institutions, associations, and for-profit organisations. The variety of educational materials available for health workers and for mothers achieves little consistency between the materials that could be deemed an agreed set of skills.

**Table 2.1: Instructions on hand expression in items found in search**

Item	Instruction
<p>Riordan, J &amp; Countryman, B. (1980) Basics of breastfeeding. Part II: the anatomy and psychophysiology of lactation. Journal of Obstetric and Gynaecological Neonatal Nursing 9(4) 210-213. Opinion – US Target audience: health workers</p>	<p>Nurse is to firmly massage mother's breasts to move milk to lactiferous sinuses. Nurse to express the mother, then ask mother to return demonstration. Thumb and finger at areola edge, push back towards chest wall, then compress thumb and finger and pull forward. Repeat and rotate around the areola. It is not easy to do, needs practice, and is helpful to watch another mother expressing. No information on container or storage. Refers to expressing to relieve engorgement in early days.</p>
<p>Frantz, K. (1988). Hand expression. Breastfeeding techniques that work! Geddes Productions Video – US Target audience: mothers</p>	<p>Skill can be learnt. Useful in variety of situations. Elicit milk ejection reflex with warmth and stroking. Find place on breast that works. Rotate fingers around breast, swap breasts, use wide mouth container when expressing. Also storage information.</p>
<p>Auerbach, K. G. (1990). Assisting the employed breastfeeding mother. Journal Nurse-Midwifery 35(1) 26-34 Opinion - US Target audience: health workers</p>	<p>Appropriate compression of lactiferous sinuses; use wide-mouth container; massage; avoiding sliding or too much pressure leading to bruising; storage information. Also pump use information. Expression takes time and practice to develop skill and to get quantity, frequent expressing is key. Social support helps.</p>
<p>Terry, J. (2004). Teaching mothers to express and store breast milk Journal of Family Health Care 14(5) 121-3. Opinion - UK Target audience: health workers</p>	<p>Avoid sliding, brushing, squeezing. Stimulate and condition milk ejection by warmth, photo/think of baby, privacy, comfort. Have realistic expectations. Only small amounts of milk at start. Massage fruit oils into breast. Express frequently "the more the better." Express above baby's needs as may be difficult to increase supply. Storage information. Wash hands before expressing. Also pump information – advise mothers expressing regularly to get a pump.</p>
<p>Glynn, L. &amp; Goosen, L. (2005) Manual expression of breast milk. Journal of Human Lactation 21(2) 184-5. Opinion - South Africa Target audience: health workers</p>	<p>Only a few mothers need to be shown (most know how). Locate milk sinuses, elicit milk ejection reflex, place thumb &amp; forefinger opposite at base of sinuses, rhythmical push into chest wall, repeat, rotate around breast, massage milk forward, do not pinch or squeeze. Mother comfortable, drink available; time with baby, skin contact, photo; massage breasts; may take time and practice.</p>

### 2.1.2 Knowledge gaps

In my searching, reading, and discussions, it became apparent that there was insufficient published data to indicate agreement on the skills or knowledge that a mother needs in order to hand express effectively. Therefore, it was necessary to carry out original research to establish what skills were considered necessary for mothers to have, as a prerequisite to developing an informed list to use to assess performance of health workers in assisting a mother to learn.

## **2.2 Seeking new knowledge**

### **2.2.1 Methods of gathering knowledge**

#### **2.2.1.1 Concept analysis**

Different study methods suit different situations. Concept analysis might be used to establish a definition of “effective hand expression” from the literature. Mulder (2006) describes a process to establish a conceptual definition of “effective breastfeeding”, and the antecedents, attributes, and consequences associated with the definition, as a precursor to developing tools or evaluating tools to measure the concept. She examined articles where the concept of effective breastfeeding was defined or described and the characteristics for effective breastfeeding were suggested, which resulted in identifying four essential attributes of the interactive process of effective breastfeeding as described in the literature. However, this method could not be used in my study of hand expression due to the very few articles on hand expression available for concept analysis.

#### **2.2.1.2 Content evaluation**

Evaluating or reviewing the content of hand expression materials in a structured manner can assist to focus on specific actions, produce quantitative information in the form of a chart, allow systematic comparisons between actions, and can be constructed so similar results would be obtained from different people observing, thus improving reliability. Quantitative method such as a checklist facilitates looking for specific items, allows numerical comparison between resources, and may assist reliability, however, it may miss items of importance that are not on the checklist. The whole process of evaluating materials is open to subjective interpretation and reliability is low. Every mother or health worker viewing the materials has a different history, experiences, and needs regarding the topic and information and the needs may change over time. Ideally, educational materials are an aid to teaching/learning and viewing this material as “complete” information may be taking the material out of context if it is normally used within a wider learning activity. Despite the challenges to reviewing materials, I considered it a key aspect in the gathering of information for this study, as these materials are a major source of information on hand expression for health workers and mothers.

#### **2.2.1.3 Consensus development**

Exploring concepts and gaining agreement can also be done by discussion with those involved. Formal methods of consensus development include the Delphi method, nominal group technique (NGT) and consensus development conference (Murphy et al. 1998). NGT, consensus development conference, and focus groups may provide insights, but require the people to be together; this was not possible as I sought a geographically spread input.

### ***The Delphi method***

The Delphi method has been defined as: “based on a structured process for collecting and distilling knowledge from a group of experts by means of a series of questionnaires interspersed with controlled opinion feedback” (Adler and Ziglio 1996 p.3). Conformity rather than consensus may be achieved if group members feel pressure, real or imaginary, to agree to a decision and the anonymity of the Delphi technique aims to reduce the pressure on group members to conform.

The term ‘Delphi’ method or technique is used for a number of different types of study and three main categories have been described (van Zolingen and Klaassen 2003):

- The Decision Delphi where the participants are both involved in the problem under discussion and are the decision-makers for the problem.
- The Policy Delphi, which aims to generate policy alternatives by generating as many opinions as possible through public debate, without a need to reach consensus or stability in response.
- The Classical Delphi, which has anonymity, iteration, controlled feedback, statistical group responses and arrives at stability of responses, using a group with expertise on the topic under discussion. The Classical Delphi was used in this study.

The Delphi technique is based on the idea that several people are less likely to arrive at a wrong conclusion than a single individual, thus assisting validity. Participants who are knowledgeable and interested in the topic may help to increase content validity and successive rounds may help to increase concurrent validity. However, the Delphi technique does not create new knowledge and it may reinforce inaccurate knowledge if that is the knowledge of those consulted. The lack of face-to-face discussion means the reasons for disagreements cannot be debated, which may result in lack of agreement. Other disadvantages of this technique such as the choosing of the expert participants, development of questions, determination of consensus, and validity of analysis can arise. However these issues also arise with other methods of consensus development.

Reasons for choosing the Delphi technique for this study were that:

- opinions from people with expertise could be collected by email, allowing geographical spread of participants as well as low cost and timely return;
- decisions and inputs of the participants were made confidentially, thus reducing the risk of stronger or more well-known members dominating the group;
- participants could reply in their own time, reducing participant burden;
- there was a structured interaction; and
- an explicit method of aggregating the respondents’ views could be used.

The Delphi technique is a process or method for collecting and analysing data. Though the first round in this study involves interpretative analysis of the open statements of the respondents the meanings of these statements are not explored but are reduced to composite ‘alike’ statements that can be viewed as quantitative or objective (Stewart 2001). In this study, the Delphi technique is used within an overall quantitative framework where the experts are asked to rate the statements with the aim of measuring agreement.

#### **2.2.1.4 Survey / Questionnaire**

Not all the knowledge to be gathered requires agreement and questionnaires can provide quantitative replies as well as open comments. Self-administered questionnaires have the advantages of being quick to administer, inexpensive, ensure everyone is asked the same question in the same way and can be analysed using computer software. The disadvantages are that participants can interpret the questions differently and that questions may not be answered. For my study, questionnaires provided a means of gathering information effectively in a range of areas.

#### **2.2.1.5 Observation**

Hand expressing is primarily a psychomotor skill rather than cognitive knowledge. Therefore, seeing what the mothers actually do when hand expressing may be more enlightening than to ask them what they do. This can be videotaped observation, which gives the advantages of:

- capturing the actual movements rather than relying on textual/verbal reports of these movements that might miss actions or use different terms to describe them;
- seeing what the mother might not notice or might find hard to describe - seeing the “familiar as strange” (Foster 1997);
- allowing re-playing of the actions for initial coding or re-coding and to see patterns;
- being able to look for an action or an earlier observation that only becomes relevant later.

Videotaping as a form of observation may also have limitations including:

- difficulty in finding mothers willing to be filmed;
- the mother may hand express differently, consciously, or unconsciously, because they are being observed (reactivity) (Foster 1997);
- the interpretation of the observation is constructed by the observer, who selects, consciously or unconsciously, what to record or what to comment on (researcher bias);
- observation is time consuming, which may restrict the sample size or the depth.

Videotaping mothers hand expressing was considered as worthwhile to include in this study so as to obtain information on the actions of the mothers, and in keeping with the mother-centred framework of the study.

### 2.2.2 Multiple viewpoints

What are considered the skills of hand expression may differ depending on whom you ask. Health workers assisting mothers may have a different viewpoint from the mothers themselves. Materials provided either to train health workers or for use by mothers may add other viewpoints that may be similar or different. To obtain a wider view data can be collected from multiple sources - health workers, mothers and materials using a strategy based on triangulation. Triangulation can add depth or completeness to the data; generate ideas by one method that are then tested by another method – abductive inspiration; and assist in confirmation of findings and reduce threats to validity (Risjord et al. 2002). Though more data from more sources or settings can contribute to validity and reliability of the findings, triangulation does not ensure that the findings are accurate or confirm the findings; each method used must of itself be valid (Begley 1996).

Triangulation has been explained as: “the combined use of two or more theories, methods, data sources, investigators or analysis methods in the study of the same phenomenon” (p.224)(Burns and Grove 2005). Methodological triangulation such as the use of a research design combining both quantitative and qualitative research strategies in the one study is frequently debated (McEvoy and Richards 2006) and the term “methodological triangulation” is applied confusingly to methods of data collection, to analysis methods and to research design methodologies (Rolfe 2006). The use of multiple data collection methods and instruments within a study using the one-design approach, and data triangulation – the collection of data with the same foci from multiple sources, appears to be less debated. For example, Wadhwa & Lingard (2006) collected data through documentation, observations and semi-structured interviews to examine tensions in inter-doctor telephone consultations and triangulated their findings comparing for similarities and differences. In some studies, these multiple sources are viewed as a process towards increasing validity or reliability and the researchers do not use the term triangulation. Wilson & McDonald’s (1994) examination of health promotion in general practice consultations compared data collected via patient questionnaire, medical record, and audio tape relating to health promotion activities carried out in the consultation. This study could be considered triangulation, though the term is not used.

### 2.2.3 Sources of data

For my study, triangulation is taken as meaning multiple collection methods and instruments providing data that can be combined to examine for similarities and differences. Data were gathered from three sources by various means: (Figure 2.1)

*Source A* - a Delphi process plus a self-administered questionnaire to a sample of people who train health workers to assist mothers to learn the skills of expression;

*Source B* - a content evaluation of a sample of educational materials for both mothers and health workers on the topic;

*Source C* - videotaping and analysis of a sample of mothers who were self-judged to be competent in hand expression, plus a self-administered questionnaire.

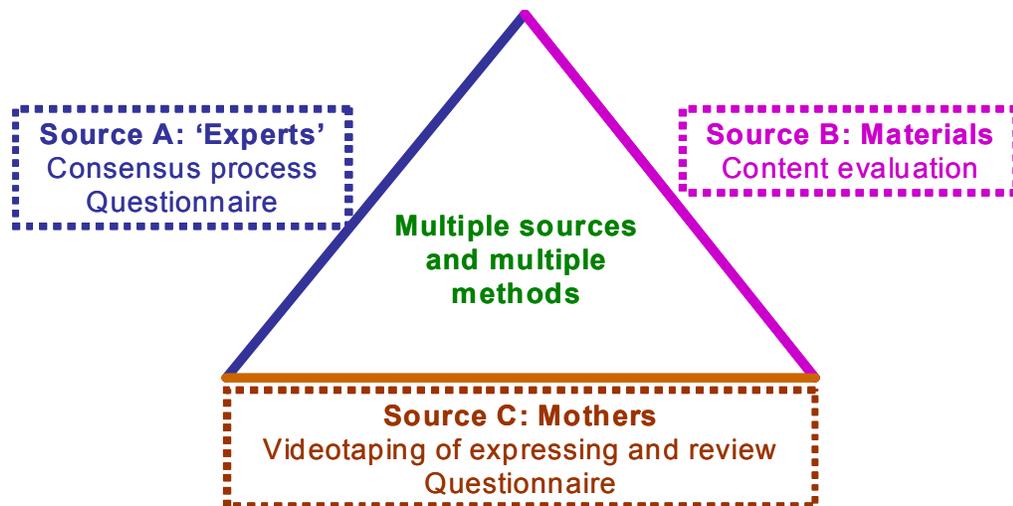


Figure 2.1: Data gathered from 3 sources by multiple methods

### 2.2.4 Questions to explore

The data collected from the three sources sought to answer the following main questions:

1. According to Source A respondents', what are the important and not important skills of hand expression?
2. What skills did the Source B materials and the Source C videotapes include?
3. Were there similarities and differences between the three sources regarding the skills needed?
4. Could a composite list of skills of hand expression be developed that could be used to inform the construction of a performance assessment tool for lactation consultants assisting mothers?

## 2.3 Source A: Expert views

### 2.3.1 Data collection

#### 2.3.1.1 The process

The data collection processes for Source A involved two questionnaires and the Delphi process (Table 2.2). Each questionnaire used was piloted with a similar sample of the relevant subject group before use. At each stage of this study, a brief covering letter explaining the stage and thanking participants for their continued support accompanied the questionnaire or Delphi instrument. These materials are in Appendix C.

**Table 2.2: Data Collection Process Source A**

	<b>Aim</b>	<b>Method</b>	<b>Output</b>
Delphi Round 1	Identify items important as skills of hand expression	Open-ended statement for completion	List of completed statements condensed to reduce duplication (items)
Questionnaire A	Demographics	Self-administered questionnaire	Information about participants
Delphi Round 2	Validate the list by rating the importance of each item	Questionnaire with rating scale	List of items with each item's level of importance, range of response, and open comments from respondents
Delphi Round 3	Further validate the list by rating the importance of each item	Questionnaire with rating scale plus median and IQR for each item and comments from respondents	List of items with each item's level of importance, range of response, and open comments from respondents
Questionnaire B	Opinions	Self-administered questionnaire	Open and closed responses on assisting learning, barriers, and materials.

IQR = Inter-quartile Range

#### 2.3.1.2 Questionnaire A

This questionnaire was formed of six closed questions used to gather demographic information including experience of teaching hand expression. It was sent in the time gap between the Delphi Round Two and Round Three while waiting for late responders and while the analysis was being done. Sending it at this time kept up the momentum for the participants, though in theory it could result in no demographic data for non-respondents.

#### 2.3.1.3 Questionnaire B

This questionnaire was sent after the Delphi Round Three. It asked what learning materials they considered key in learning about of hand expression. These responses are reported as part of Source B: Materials, later in this chapter. It also sought the participants' opinions on methods of assisting learning. The responses to this part of the questionnaire are reported in Chapter 3.

### **2.3.1.4 Delphi rounds**

The iterative process is fundamental to the Delphi process and assists in developing stability of response as the repeated consideration of the statements allows the participants opportunity to reflect on their responses and to take into account the views of the others in the panel. The number of rounds varies depending if the process has started with an open idea-generating question or with pre-determined statements, the amount of time available, the level of consensus sought and the level of participant fatigue (Crisp et al. 1997).

In this study, it was decided to have an open round followed by two rating rounds due to time constraints for both the participants and the researcher. It was not envisaged that a high number of rounds would achieve greater consensus due to the differing views known to be held; therefore, stability of response was considered the desired outcome.

### **2.3.2 The expert panel**

#### **2.3.2.1 Establishing the panel**

It is acknowledged that the “experts” in hand expression may be the mothers themselves. The term “expert” is used in this study to signify a limited group that would be expected to bring their experience of assisting many mothers. Delphi study participants’ were purposely recruited from a lactation educators’ network and known contacts with particular interest or expertise in hand expression.

Participants were sought that had:

- knowledge and practical engagement with the topics of hand expression and assisting learning;
- experience in prioritising needs for learning;
- published referenced material on the topic (in English), or were known in their area as a resource on assisting health workers to learn the skills of hand expressing;
- capacity and willingness to contribute to the exploration;
- time available;
- access by email;
- ability to communicate in English.

Delphi studies have varied in size and no ‘ideal’ size has been determined. If inclusion criteria are lofty, participants may feel privileged to participate and this recognition may be motivation enough (Wicklein 1993). Participants may also be motivated because of their interest in the topic and potential to benefit from the interaction. Because a number of the possible participants had published material (books, leaflets, video, articles) on the topic, some on a commercial basis, there was potential for bias of these respondents towards their own material. This needed to be balanced with the need to include participants who are interested in the topic and

motivated to complete the Delphi process (Hasson et al. 2000). The use of email for data collection could limit the participants to only those who had email (Marsden et al. 2003). However, for this study there was no indication that there were any potential experts in the topic that were not accessible via email.

Potential members of the expert panel were approached to participate in the Delphi via an introductory email that explained the purpose of the study, the process and the amount of time they were asked to give to participation. Each Delphi round was expected to require no more than 30 minutes, the related questionnaires not more than 10 minutes each, and the participation was expected to extend over no longer than eight weeks in total.

### 2.3.2.2 Ethical considerations

The panel members were all free-living adults in senior positions informed of the purpose and process of the research project; all contact was via email that facilitated not replying if they chose; and no harm was likely to the panel members if they responded or did not respond. All responses were confidential, with numbers used to identify respondents and contact details stored separately to identification numbers. Therefore, it was considered that due ethical care had been taken and no formal written consent procedure was used.

### 2.3.2.3 Panel response rate

Twenty-six people were initially approached to participate in the Delphi process. Four people immediately said they were unable to participate, three were now working in other areas and one due to lack of time available. One of the people now working in another area suggested a colleague to be contacted, which was done. This provided 23 people for the first round. If a response was not returned by the date indicated two reminders were sent unless the respondent replied that they did not wish to participate any longer.

Of the 23 initially participating in Round One, one person dropped out saying she did not have time. Two people sent their responses to Round One (replies to the open question) too late for these views to be included in the statements compiled for rating in Round Two. These people were included in the rating rounds (Round Two and Three) and participated. One person did not complete the Delphi Round Two as directed and follow-up did not achieve compliance. Thus, of the 23 people who agreed to participate, 21 (91%) completed the process (Table 2.3).

**Table 2.3: Source A participation in Delphi**

	Delphi Round One	Delphi Round Two	Delphi Round Three
Sent	23	22	21
Returned	20	22	21
Late	2	-	-
Not useable	-	1	-
Not returned	1	-	-

### 2.3.2.4 Demographics of Delphi respondents

The geographic spread of the 21 respondents to all rounds of the Delphi included participants from Ireland, UK, North America and Australia, plus those who had produced materials or research articles in English in other European countries and in South America (Table 2.4). Though it would be enlightening to study the beliefs and methods of hand expression in Africa and Asia and in non-English speaking countries, they could not be included in this study. This was due to perceived difficulties in accessing experts, the need for translating materials in other languages, the cultural and practice issues regarding expression in countries with very different societies, and the difference in educational materials.

**Table 2.4: Demographics of Delphi participants**

<b>Region</b>	Europe (4 countries): 16	South Pacific: 2	Americas: 3
<b>Worked in breastfeeding education of health workers</b>			
< 10 years:	3	10-25 years:	14
> 25 years:	4		
<b>Taught health workers about hand expression</b>	(number of teaching sessions)		
< 10 sessions/year:	6	10-25 sessions/year:	12
>25 sessions/year:	3		
<b>Materials on hand expression</b>			
Published research/peer-reviewed/professional article published:	4		
Produced staff information on hand expression:	13		
Produced mother information on hand expression:	7		
Produced other materials related to teaching hand expression:	3		
<b>Presented at a workshop/conference on hand expression</b>			
<b>Health worker event:</b>	Major: 6	Local: 13	
<b>Event for mothers:</b>	7		
<b>IBCLC:</b>	Current: 14	Past certified but not current: 1	Never certified: 6
<b>Assist mothers with hand expression</b>			
< 10/month:	9	10-25 / month:	8
> 25 / month:	4		

### 2.3.3 Delphi Round One: generating the statements

The first round of a Delphi may be constructed from a literature review or other prior knowledge of the researcher to produce headings or items for the participants to rate or rank. Alternatively, the first round may collect the participants' viewpoint by means of open-ended questions to generate ideas and identify issues to include in later rounds. In this study, there was scant research available to produce initial items, plus a variety of strongly held beliefs among the "experts" on how hand expression should be taught. Thus, it was necessary to have an open idea-generating Round One in order to seek opinions, avoid limiting responses and to reduce bias that might arise from selective review of the literature.

The Delphi instrument was piloted with four health workers known to me who were undertaking post-graduate study in the area of assisting breastfeeding plus one practitioner with no research background, who lived in three countries. They found no major difficulties with the information letter, directions and the open statement to which replies were sought. Minor changes included the need to clarify how this study would be beneficial to mothers. They found it took less than 30 minutes to complete the Round. The pilot group responses were used to clarify the process and analysis methods.

Round One participants were asked to complete the open statement (Appendix C2):

*“In order to hand express effectively, a mother needs to be able to do and/or to know the following: ...”*

There was no limit to the number of items that participants could include in their reply. Participants were asked to respond within 7 days and a reminder email was sent after that time. This rapid turnaround helps to keep the process active and limits the participants’ time commitment to the process.

### 2.3.3.1 Round One responses

Twenty participants returned approximately 200 statements; each participant’s responses were printed on a different colour paper and then cut into individual statements. This colour coding allowed an individual participant’s responses to be tracked if needed. To reduce the risk of bias that might be introduced in the combining of the open responses thought to be similar, all Round One verbatim responses were reviewed jointly by myself and a colleague experienced in interpretative analysis. These were then sorted to identify similar replies and condensed as appropriate (Table 2.5).

**Table 2.5: Example of similar responses**

Separate responses: <i>“heat may help”</i>	<i>“warm the breast”</i>	<i>“use warmth”</i>
Amalgamated: <i>“In order to hand express, a mother needs to warm her breast.”</i>		

Some respondents had written long or complex comments that were condensed, for example one respondent wrote:

*“the milk comes from deep within the breast, so her finger and thumb need to be well away from her nipple, towards the edge of the areola (the darker skin surrounding the nipple). If she has a large areola, she may need to bring her fingers well inside her areola. Some mothers can easily feel the ducts under the skin, and can use that to guide the placement of their finger and thumb, for others it is more a matter of experimenting.”*

This response was included with other responses to form the statements:

*"in order to hand express, a mother needs to know where to position her thumb and forefinger on her breast," and,*  
*"in order to hand express, a mother needs to know how to find the lactiferous sinuses/ducts/area where the underlying breast tissue is different."*

Responses that were more personal observations than completion of the sentence were excluded, for example:

*"I find that girls that come from farming backgrounds tend to find hand expressing easier."*

### **2.3.4 Delphi Round Two: rating the statements**

The statements were then grouped together in three sections: information, skills and psychological, making a total of 49 statements and sent for rating on a scale of 1-5 with 1 indicating "not important" and 5 indicating "very important" with regard to completing the statement: *"In order to hand express, a mother needs to..."*. A separate category of "no view" was also provided for each statement. Comment space was included with each statement if respondents wished to explain their view to the others in the group that could be used to influence others or to justify their own position (Appendix C3).

Round Two responses were analysed on their return and a median and interquartile range calculated for each statement.

#### **2.3.4.1 Analysis of the Delphi responses**

Data from Delphi Round Two and Round Three were separately entered into SPSS (Version 12 and 14) and Excel (Microsoft Office 2003), then checked for accuracy with a second person. Examination for irregularities in the initial exploratory data analysis of distribution (shape, central tendency and spread) provided another check to reduce the risk of random error with any missing data or irregularities re-checked and corrected if necessary. "No reply" and "No view" were set as separate missing values in SPSS. Data was carefully stored as a complete, clean data set and a duplicate of the data set was used for exploration of the data.

The median (central tendency of agreement/group opinion) and interquartile range (extent of agreement/spread) were used, as these statistics are less sensitive to extreme values or skewed distribution (Murphy et al. 1998).

### **2.3.5 Delphi Round Three: validation of views**

The same set of 49 statements was sent again for rating with the median and inter-quartile range (IQR) visually presented to the respondents who had completed Round Two. Any additional comments added by the respondents were included with the statement the comment referred to when these could affect the 'discussion'. For example, comments such as:

*“For most mothers, used correctly, it’s extremely helpful”* or *“According to research, lactiferous sinuses are non-existent”* were circulated, whereas verbalising the rating they had marked such as *“I think this is important”* were not circulated in the Round (Appendix C3).

Again, participants were asked to respond within seven days and a reminder email was sent after that time. There was some difficulty in obtaining the responses to this round due to respondent fatigue, though all the responses were eventually obtained.

### **2.3.6 Exploration of the Source A Delphi data**

#### **2.3.6.1 Response pattern**

There were 49 statements to be rated by 21 respondents in each round resulting in 2184 potential responses. There were 17 “blank” responses giving a response rate of 99% over the two rounds. One respondent left the last 13 statements blank and it was concluded that she had returned the Round Two form before her responses were completed; the responses that she did return were included.

#### **2.3.6.2 Opportunity to comment**

Respondents, if they wished, could add a comment to each statement in Round Two and in Round Three to explain their rating or to try to influence others. Most respondents added at least one comment.

#### **2.3.6.3 Stability between rounds - respondents**

Stability of response between rounds is also important, not just the final round results. Examination of change between rounds can indicate if the agreement was there throughout, if it developed during the Delphi process, and if it changed between rounds; this information can contribute to the quality and reliability of the final decision (Greatorex and Dexter 2000). For each respondent, the number of statements rated in each round, the number of statements where rating changed by >1, and the percentage of statements with significant change between rounds (>1) were calculated. All respondents changed their rating of at least two statements between Two and Three (including if they changed from no response or marking “no view” to marking a number); however, 73% of the changes were by one rating category or less.

### 2.3.6.4 The level of agreement and consensus

The aim was to establish agreement on the skills that a mother needs to hand express her milk. The term “agreement” can take two forms (Jones and Hunter 2000):

- *The level of agreement or group opinion* on the individual statement was indicated by using a 5-point scale with 1 indicating “not important” and 5 indicating “very important”. A group median of 3.25 was selected as the cut-off point for statements to be considered as “important” and 2.75 as “not important”, as there are no recognised guidelines for determining a cut-off point in a Delphi process (Keeney et al. 2006).
- *Agreement with each other* (consensus) on the individual statement was taken as a stable or narrowing interquartile range.

A stable median across the rounds or a median that is moving to the outer points of the scale (towards 1 or 5) indicates a high level of group agreement for that statement, whereas a stable or narrowing interquartile range (IQR) over the Delphi rounds indicates agreement with each other (consensus).

### 2.3.6.5 The important and not important skills of hand expression (Source A)

#### *Agreed as important*

Twenty statements had a stable median greater than 3.25 across both rating rounds. One additional statement had a median greater than 3.25 that changed between Round Two and Round Three to move towards the outer (high) point of the scale, and another statement changed median between rounds by 0.5 towards the scale’s mid-point though remaining above 3.25. All these 22 statements had an IQR that was stable or narrowing, and thus were considered to be agreed as important (Table 2.6). Full results for all the statements are in Appendix C4.

**Table 2.6: Skills agreed as *important* to KNOW / DO**

<b>Statement</b> <i>In order to hand express, a mother needs ...</i>	<b>Median</b> <b>Round 2</b>	<b>Median</b> <b>Round 3</b>	<b>IQR</b> <b>Round 2</b>	<b>IQR</b> <b>Round 3</b>
1.01 to believe that breast milk is important.	4	4	1	1
1.02 to believe that hand expression will work.	4	4	2	2
1.03 to be able to find emotional/psychological support as well as practical instructions.	4	4	2	1
2.02 to know when to start expressing after the baby is born.	4	4	1.25	0.88
2.05 to know that expressing milk usually only produces small amounts to begin with and that there is a learning period before larger quantities are achieved.	5	5	1	0

Continued on next page

**Table 2.6: Skills agreed as important to KNOW / DO (continued)**

<b>Statement</b> <i>In order to hand express, a mother needs ...</i>	<b>Median</b> <b>Round 2</b>	<b>Median</b> <b>Round 3</b>	<b>IQR</b> <b>Round 2</b>	<b>IQR</b> <b>Round 3</b>
2.06 to know what is a realistic amount to aim to express.	4	4	2	1.5
2.07 to know that expressed milk will sometimes come in drops, or spurt/spray.	4	4	2	1
2.08 to know that expressing should not hurt and to seek help if it is uncomfortable.	5	5	0	0
2.09 to know what a let-down is and ways to stimulate a let-down reflex.	4	4	1	1
3.04 to be able to judge how long to continue expressing for at a time.	4	4	1	0
3.06 to massage her breast.	4	4	1	1
3.12 to alternate breasts.	4	4	2	1
3.15 to know where to position her thumb and forefinger on her breast.	5	5	0	0
3.16 to position her thumb and fingers opposite each other.	5	5	1	0
3.21 to rotate her thumb and finger position positions around the breast.	5	5	1	1
3.24 to be able to judge when to change breasts.	4	4	0.75	0
3.25 to use rhythmic movements.	4	4	2	1
3.26 to compress and release the finger pressure on the breast.	5	5	1	1
3.28 to press back towards the chest wall and press her fingers together.	4	4	1.75	1
3.30 to find her own method of hand expression in the best way that it works for her.	5	5	1	0
3.32 a practical demonstration (i.e. assistance and verbal feedback) with the mother trying on herself.	4	5	1	1
2.03 to know how frequently to express.	4.5	4	2	1.75

***Agreed as not important***

Six statements had a stable median of less than 2.75. Eight additional statements had medians after Round Three of less than 2.75, which had changed between rounds to move towards the outer (low) point of the scale. All thirteen statements had a stable or narrowing IQR. One additional statement (3.23) had a small move from a median of 3 to 2.5. However its IQR greatly narrowed, so this statement was included in this category making 14 statements that were considered to be agreed as not being important (Table 2.7).

Table 2.7: Skills agreed as *not important* to KNOW / DO

Statement <i>In order to hand express, a mother needs ...</i>	Median Round 2	Median Round 3	IQR Round 2	IQR Round 3
2.10 to know what prolactin and oxytocin do.	2	2	2	1
3.09 to stroke, massage and shake her breast.	2	2	2	1
3.11 to shake her breast.	1	1	1	0
3.13 to have a (non-alcoholic) drink.	2	2	1.75	1
3.17 to position her thumb exactly at 12 o'clock and her finger at six o'clock on the breast.	1	1	0.75	0
3.19 to position her fingers at the edge of the areola.	2	2	1.25	1
1.04 to know other mothers who have hand expressed.	2.5	2	1.25	1
3.08 to knead her breast.	2	1	1.75	1
3.14 to have her back/neck/shoulders massaged.	1.5	1	1	0
3.18 to position her fingers where her baby has his upper and lower lip when feeding.	2	1	2	1
3.33 to see another mother doing this who can demonstrate the techniques.	2.5	2	2	1
3.10 to stimulate her nipple.	3	2	2	1.62
3.22 to support her breast while expressing.	3	2	1	0.25
3.23 to use both breasts.	3	2.5	2.75	1

***Agreed as neither important nor not important***

Six statements had a median of 3 and a stable or narrowing IQR across both rounds and an additional four statements had a median moving towards 3 and a narrowing IQR. These 10 statements were considered agreed as neither important nor not important (Table 2.8).

Table 2.8: Skills agreed as *neither important nor not important* to KNOW / DO

Statement <i>In order to hand express, a mother needs ...</i>	Median Round 2	Media Round 3	IQR Round 2	IQR Round 3
2.01 to know the advantages of expressing by hand.	3	3	1	1
2.12 to choose a suitable container for the milk.	3	3	1.25	1.25
3.02 to have a warm, private, comfortable environment.	3	3	1	0.75
3.03 to be near her baby, have a picture of her baby or an item of the baby's clothes.	3	3	1.5	1
3.07 to stroke her breast.	3	3	1	0.25
3.31 a picture of where to place her fingers.	3	3	1.75	1
2.11 to know the basics of breast anatomy.	3.5	3	2	1
3.01 to be able to wash her hands well before expressing.	4	3	2	1
3.20 to know how to find the lactiferous sinuses/ducts/areas where the underlying breast tissue is different.	4	3	2	1.63
3.27 to squeeze her fingers together, hold for a few seconds and then release pressure.	4	3	3	2

### ***Lack of agreement***

Of the remaining statements, two did not have stability of responses as their IQR was widening as well as an unstable median that was crossing categories. One additional statement had a decreasing IQR, however it was still a large range and the median was moving towards the mid-point though not strongly. Therefore, these three statements were considered not to have reached agreement (Table 2.9).

**Table 2.9: Skills with *lack of agreement***

<b>Statement</b> <i>In order to hand express, a mother needs ...</i>	<b>Median</b> <b>Round 2</b>	<b>Median</b> <b>Round 3</b>	<b>IQR</b> <b>Round 2</b>	<b>IQR</b> <b>Round 3</b>
3.05 to warm her breast.	3	2	1.25	2
3.29 to use a rolling technique.	4	3	1	2
2.04 to know how long to express for each time.	4	3.25	3	2.5

## **2.3.7 Discussion of Delphi findings**

### **2.3.7.1 The process**

The Delphi process via email provided an effective way to involve experts that were geographically dispersed. It obtained their views and enabled them to rate and to review their ratings in light of the responses from other participants. The high level of interest in the topic resulted in an excellent response rate, including many additional comments from the respondents. The data was collected within a four-month period. The biggest challenge was for the respondents to remember to save their completed form before they emailed it back as some came back blank and had to be requested again, which was annoying for the respondents. Technology has moved on since this data was collected and if repeated, I would consider using an on-line means of marking the forms that would also facilitate automatic generation of medians and IQR to feed back to respondents.

### **2.3.7.2 Agreement**

Before the Delphi process, I thought there would be strong agreement on many items. However, it quickly became clear there were a wide variety of views, with many respondents pointing out that the required skills depended on why the mother was expressing, as quantity was not always the key issue, and that some skills related to time since birth. Therefore, the final ratings were not surprising, and of the twenty-two statements agreed as important, only one statement had 100% agreement that it rated a 5 as very important (of those marking a rating):

*“In order to hand express a mother needs to know that expressing should not hurt and to seek help if it is uncomfortable.” (2.08)*

Two statements (which were similar to each other) reached 100% agreement as important with respondents giving a rating of 4 or 5:

*“In order to hand express a mother needs to know where to position her thumb and forefinger on her breast” (3.15), and*

*“In order to hand express a mother needs to position her thumb and fingers opposite each other.” (3.16)*

This agreement as important can be contrasted with the 100% consensus that it was not important (rated 1 or 2) that:

*“In order to hand express a mother needs to position her thumb exactly at twelve o'clock and her finger at six o'clock on the breast.” (3.17)*

This clear difference in agreement indicates the ability of the respondents to discriminate in their replies. Statement 3.17 was the only statement which 100% of the respondents rated as not important (rating 1 or 2), including the first Delphi round respondent who had offered that statement. It is interesting that many of the respondents' initial statements in the first round failed to reach group agreement and consensus as important in the final iterative round. It could be explored separately if a respondent who offered a statement as needing to be known by the mother in the initial open round continued to rate that suggestion as important throughout the rounds.

### **2.3.7.3 Did the Delphi process change the respondents' views?**

#### ***Stability of responses***

The median response after Round Two and after Round Three remained the same or changed by less than one rating point for thirty-nine of the forty-nine statements (79.6%). The remaining ten statements changed by 1 rating point. This general stability of response implies the respondents were confident in their viewpoint even when presented with the group results and the other respondents' comments, and it reflects the reliability of the agreement.

Of the ten statements for which the group median changed by one rating point, the median rating for six moved further towards the 'outside'. Five statements (3.05, 3.08, 3.10, 3.18, 3.22) moved from neutral or not important (marked as 3 or 2) further towards not important (marked 2 or 1), and one statement (3.32) moved further towards important. Four (statements 3.01, 3.20, 3.27, 3.29) moved from important (marked as 3.5 or 4) to neutral (marked as 3), and none moved from not important to neutral. This movement is shown in Appendix C5.

The four statements which had the highest number of individual respondents making a change of >1 rating position between Round Two and Three, were examined further (Statements 2.10, 2.12, 3.01 and 3.12).

### **Change to less important**

*“In order to hand express a mother needs to know what prolactin and oxytocin do”* (2.10), had a median of 2 (not important) in both Rounds. However, four of the 21 respondents rated it as a 4 or 5 in Round Two, and all of these four people changed their rating to a 1 or 2 in Round Three. It may be that the comments added by other respondents caused these four respondents to reflect on their Round Two rating and change them. These comments highlighted the difference between a simple explanation to the mother of how her breasts work and a science lecture, and pointed out that many mothers all over the world hand express without having heard about prolactin and oxytocin.

For statement 2.12, which related to the mother choosing a suitable container and had a final median of 3 (in the “neither important nor not important” category), five respondents changed their views between Rounds by 2 rating positions, with four respondents moving towards “not important.” They were perhaps influenced by other respondents’ comments that milk needed a container only if it was to be kept for the baby and that mothers might be expressing in the shower to relieve fullness. However, one person’s rating changed in the other direction from a 3 to a 5. She added the comment that: “We provide hand collection funnels and bottles,” so was perhaps justifying her own practice as important.

### **Inconsistent changes**

The need for the mother to wash her hands well before expressing (3.01) had a median of 4 in the first iterative round and 3 in the final round. Three respondents changed from a 5 to a 3; however, one respondent changed her rating from a 1 to a 3, and another person changed from a 3 to a 5. This movement may reflect further consideration of the statement, but the inconsistency indicates that there might be need for more discussion on the topic in relation to why the mother is expressing. For example, if the mother is expressing a few drops at the end of a feed to rub into her nipples, suggesting that she go and wash her hands before doing this may be unnecessary.

### ***Inconsistent responses***

Statements 3.12, 3.23 and 3.24

Statement 3.12, which had a high number of respondents making changes of rating, was:

*“In order to hand express a mother needs to alternate breasts”*. The median in both Rounds for this statement was 4 (important to know). It had five of the twenty-one respondents (23.8%) changing by 2 rating positions, though not all in the same direction. A similar statement was 3.23 *“In order to hand express, a mother needs to use both breasts.”* This statement had a median rating of 3 in Round Two and of 2.5 in Round Three, with a narrowing IQR putting it in the category of *not* important to know/do (Table 2.7). Six respondents were consistent with their own similar ratings for both questions, though the importance varied between the six respondents.

The remaining respondents had no clear association between their ratings to these two questions.

It is not clear why one of these apparently similar statements would be rated as important and one as not important. Statement 3.24 *“In order to hand express, a mother needs to be able to judge when to change breasts,”* was very clearly rated as important with little spread of ratings and little movement between the rounds. It may be that the proximity of statements 3.23 and 3.24 highlighted the difference between a ‘rule’ to use both breasts and a more individual ability to judge when to move to the other breast, and thus influenced the responses (Table 2.10).

**Table 2.10: Comparison of Statements 3.12, 3.23 and 3.24**

Statement	Round 2 Median (IQR)	Round 3 Median (IQR)
3.12 – alternate breasts	4 (2.00)	4 (1.00)
3.23 – use both breasts	3 (2.75)	2.5 (1.00)
3.24 – judge when to change breasts	4 (0.75)	4 (0.00)

#### Statements 2.04 and 3.04

Statement 2.04 was: *“In order to hand express a mother needs to know how long to express for each time.”* This statement did not reach agreement with an unstable median and a wide range, although a related statement (3.04) easily reached agreement as important (Table 2.11).

Statement 3.04 was: *“In order to hand express a mother needs to be able to judge how long to continue expressing for at a time.”*

**Table 2.11: Comparison of Statements 2.04 and 3.04**

Statement	Round 2 Median (IQR)	Round 3 Median (IQR)
2.04 – know how long	4 (3)	3.25 (2.25)
3.04 – judge how long	4 (1)	4 (0)

This difference may indicate that assisting the mother to learn to “judge” how long to express is considered more important than “knowing” a pre-determined length of time and also allows for individual situations, such as expressing to reduce an overfull breast or to relieve a blocked duct.

These inconsistent responses highlight the importance of choosing words carefully if “both breasts” and “alternate breasts” mean different things, so may “judge” and “know.”

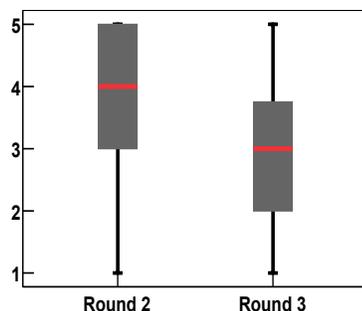
#### ***Contentious statements***

At the time of the study, the existence of lactiferous sinuses was being examined by a research group and widely discussed in the international lactation consultant community. Statement 3.20: *“A mothers needs to know how to find the lactiferous sinuses/ducts/area where the underlying breast tissue is different”* generated many varied comments on Round 2, with some questioning their existence whilst others saw lactiferous sinuses as key (Table 2.12).

**Table 2.12: Open responses related to lactiferous sinuses (statement 3.20)**

<p><b><i>“A mother needs to know how to find the lactiferous sinuses/ducts/area where the underlying breast tissue is different”</i></b></p> <p>“Difficult to find and confuses mothers”</p> <p>“There are not lactiferous sinuses, see research by Peter Hartman and Donna Ramsay”</p> <p>“Useful if she can feel this – but not all mothers can.”</p> <p>“Again, this is one of the few critical points in my view.”</p> <p>“I don’t think we understand the physiology yet. So experimentation is the key.”</p> <p>“Can be really useful if the mother can locate the swellings before expression”</p> <p>“Good idea, but not always easy to feel, especially if milk supply is not yet established”</p> <p>“According to Hartmann/Ramsay’s research, lactiferous sinuses are non-existent. Nevertheless, one inch of tissue dorsal to the base of the nipple is what works best for most mothers”</p> <p>“If they exist!”</p> <p>“What about Hartmann’s work on this? Do we know if saying this is still valid?”</p> <p>“She needs to know where pressure must be applied in order to obtain milk effectively. However, she does not need necessarily to be told this in advance, provided she feels able to experiment and find the right place. On the other hand, assisting a mother to find the right ‘spot’ will enable her to obtain milk quickly.”</p> <p>“This may be right for some but again individual care suggests this type of rule is unhelpful.”</p>
--

Figure 2.2 and Table 2.13 show that although the very wide range and the spread (IQR) are similar, the median (group opinion) has shifted with more respondents rating this statement in Round Three as neither important nor not important. This movement could indicate that the respondents were influenced by the comments others made in Round Two and that some respondents became less confident in their Round Two rating and changed it in Round Three. This level of diversity in a small group may indicate similar mixed views in the wider body of those who assist mothers, and thus limit agreement on how to assist hand expression.

**Figure 2.2: Change in rating on Statement 3.20****Table 2.13: Statement 3.20 – lactiferous sinuses**

Statement 3.20	Round 2	Round 3
Median	4	3
IQR	2	1.63
No. marking 1 to 2	5 (24%)	6 (30%)
No. marking >2 and <4	5 (24%)	9 (45%)
No. marking 4 to 5	11 (52%)	5 (25%)
No. not rating	0	1

\* % of those marking a rating

### **2.3.8 Summary of Source A findings**

This section provided information on the process and findings from the 21 Source A respondents using questionnaires and a Delphi process. Lists were formed of the skills for the mother to know/do in order to hand express. These were divided between those considered as important, not important, neither important nor not important, and those for which no agreement was found. Exploration of the results from these “experts” indicated only a few areas clearly in agreement, with inconsistency of responses in some areas and lactiferous sinuses as an area of contention. Further exploration of the Source A data is addressed later in section 2.6 when examining the combined data from the three sources.

## **2.4 Source B: Learning materials**

### **2.4.1 Background and rationale**

The aim of this part of the study was to review existing learning materials on hand expression using a structured quantitative method to establish if there was a common set of skills of hand expression.

I was already aware of some evaluations of the content of materials for staff training related to breastfeeding (Courant 1993; Blaauw 2000; Cooke et al. 2003). However, none of these evaluations provided information specific to hand expression. Evaluations have been done on the use of videos and leaflets for the education of mothers in skills of breastfeeding (Hill 1987; Swanwick 1992; Nikodem et al. 1993; Hauck and Dimmock 1994; Coombs et al. 1998), particularly a number of years ago when these materials were viewed as the solution to assisting mothers. However, I was not aware of any evaluations of materials related to hand expression.

I undertook a search using a broad range of terms related to breastfeeding and breast milk, variously combined, with terms for textbook, content and evaluation (Appendix A3). This search yielded 164 items, which on review of titles reduced to 15 and on review of abstracts reduced to three items related to health worker materials. I was already familiar with these and none related to materials for mothers.

The three studies found in the search (Cooke et al. 2003; Philipp et al. 2004; 2007) plus the two reports with limited publication that had not appeared in the search (Courant 1993; Blaauw 2000), were examined for their method of evaluating materials.

Cooke, Cantrill & Creedy (2003) building on the work of Gupta and Kumar (1999), developed an “adequacy of information” evaluation criteria to review Australian midwifery textbooks for information related to breastfeeding initiation. These criteria were based on the degree to which evidence-based research was incorporated into the text. As there was a lack of evidence-based research regarding how to hand express, it was not possible to use a similar evaluation process for my study.

A team in Boston reviewed paediatric textbooks (Philipp et al. 2004) and nursing textbooks (Philipp et al. 2007), independently scoring each book for the inclusion of 15 (paediatric) or 20 (nursing) basic breastfeeding criteria based on the American Academy of Pediatrics breastfeeding policy statement and the WHO/UNICEF Ten Steps to Successful Breastfeeding. All the textbooks included some mention of milk expression, but if this was hand expression or mechanical pumping is not reported. The books were scored as “criteria reviewed and correct,” “criteria reviewed but incorrect or inconsistent,” or “criteria omitted”, with the review group discussing the judgement. Since my study was looking to establish “correct” criteria, this method of evaluation was not suitable for my study.

Blaauw (2000) carried out her evaluation based on the evaluation criteria of Courant (1993) which had been developed from the published work of international authors on breastfeeding and covered eleven aspects including physiology, management, lactation problems, weaning, support and marketing of breast milk substitutes. “Maintaining lactation during periods of separation” was a sub-point in the criteria of “Management of common problems,” but no details were provided on hand expression techniques. As the development of the criteria was based on published works that were not necessarily based on research evidence, this method did not appear to be suitable for my review.

As these evaluation methods relied on an existing list, or perceptions of a small group to validate the accuracy of the information, I did not consider them suitable for examining information on hand expression in order to develop a list of criteria. Hence an evaluation process of my own was developed.

#### **2.4.2 Sample Source B**

The materials examined were those mentioned by the respondents in the questionnaire to Source A. Source C mothers were also asked if they would recommend any materials though no additional materials were mentioned. This resulted in six instructional videotapes and six written texts for review (Appendix C7). Three of the videotapes needed to be obtained and the rest of the materials were already to hand. In cases where expression was only one of the topics included in the item of material, only the section related to hand expression was reviewed (Table 2.14).

**Table 2.14: Source B Materials Reviewed**

<b>Country of origin:</b>	Europe x 10	South Pacific x 1	Americas x 1
<b>Videotape target audience:</b>	staff training: 2	mothers: 4	
<b>Text target audience:</b>	staff training: 3	mothers: 3	

### **2.4.3 Data collection Source B**

#### **2.4.3.1 Development of observation tool**

The 49 statements in the Delphi process were listed to form an observation tool to review the videos and texts. Additional items in the videos and materials that did not occur in the Delphi items that seemed relevant to the reviewers were noted for each item of the material (Appendix C6).

#### **2.4.3.2 Reviewing the materials**

The materials were reviewed by myself and a practitioner familiar with hand expression using the observation tool. Each video was viewed independently at least three times with the order of watching any video or reviewing any text randomly decided. The action was marked as seen or not seen in the video tape, or included/not included in the written materials for each of the 49 statements. Where there was disagreement, both people reviewed the video or written text together and agreement was obtained. The quality of the information was not assessed as there was no evidence against which to assess it beyond personal opinion, so it was only marked for the information included or not included. Data were entered in Excel and checked by a second person.

### **2.4.4 Findings Source B**

Summary descriptive calculations established the number of materials that did or did not include the item in the observation tool. Every Delphi statement appeared in at least one of the materials reviewed. Three of the Delphi statements were included in all the materials reviewed:

- 1.02 In order to hand express, a mother needs to know that hand expression will work.*
- 3.15 In order to hand express, a mother needs to know where to position her thumb and forefinger on her breast.*
- 3.16 In order to hand express, a mother needs to know to position her thumb and fingers opposite each other.*

Further results of the review of Source B (materials) are reported and discussed in the combined data Section 2.6.

### **2.4.5 Summary of Source B findings**

Twelve items on learning to hand express reported as useful by Source A and C respondents were obtained and reviewed for their statements or visuals regarding learning about hand expression using an observation tool based on the Source A Delphi statements. Findings are discussed later when the three sources are compared and contrasted.

## **2.5 Source C: Information from mothers**

### **2.5.1 Background and rationale**

The aim in this section was to videotape the actions of mothers when hand expressing, then observe and analyse the actions recorded using an observation tool, and to collect additional information on attitudes and opinions on hand expression by means of a questionnaire.

### **2.5.2 Sample Source C**

The sample was a convenience sample. A note giving brief information on the study and seeking mothers who were currently hand expressing was posted on the web site of Cuidiu – Irish Childbirth Trust, and circulated by email and post to facilitators of voluntary support groups, lactation consultants in hospital and in the community, and midwives known to be interested in supporting breastfeeding research projects. These communications were distributed throughout the island of Ireland, though concentrated in a geographic area of 50 miles from my base. Mothers who responded were also asked if they had friends who would be willing to participate (this is known as snowballing). Sourcing mothers through a ‘gatekeeper’ such as a support group or person known to them could facilitate access for what is an intimate activity. Access was also assisted because I am a lactation consultant known to many people and was a volunteer breastfeeding counsellor.

Mothers were currently hand expressing on a regular basis (and might also be using a pump) and were self-described as effective at expressing. Mothers with newborn infants currently in special care units were not specifically sought as I felt videotaping might add to their stress. No attempt was made to have a representative sample of mothers. Initially, there was no age of baby or parity sought, however all the early participants were multipara mothers with a current baby over 5 months old. Consequently an attempt was purposefully made to seek some first-time mothers with a baby less than six weeks of age to examine if these mothers hand expressed differently. However, no mothers with younger babies were willing to participate, generally giving a reply of: “later when I’m more confident at expressing and everything is more settled.”

At the start of the project to videotape mothers, no sample size was set as the hope was to continue until “saturation,” i.e. until nothing new was being learnt. However, sampling ceased after 9 months when there were few additional mothers found and each taping session was taking a full day, including travelling to the mother.

### **2.5.3 Ethical considerations**

At the time this study was conducted the School of Medicine, University of Leeds ethical review process did not apply to studies that did not involve patients or students of the university. The ethical considerations of my work were discussed with my academic supervisors and I took actions to protect the rights of those involved in my study.

#### **2.5.3.1 The right to self-determination**

To protect the right to self-determination, there was no coercion to participate, the mother's involvement was clearly stated, and signed consent was obtained. A covering letter, information sheet and consent form, were prepared, checked, and piloted for clarity and ease of comprehension; these documents are in Appendix C8. Each mother who contacted me and expressed interest in participating in the videotaping was sent the documents, which gave the mothers the opportunity to read about the project, check my authenticity if they wished, and decide to participate or not before any face-to-face contact. This mailing was followed by a phone call a few days later to answer any questions and, if the mother was willing, to arrange a time to videotape. All the mothers were free-living adults and considered to be capable of understanding the information and giving consent.

#### **2.5.3.2 The right to privacy and confidentiality**

To protect the right to privacy and confidentiality, I visited on my own and did the videotaping with a hand held recorder to record one episode of expression, focusing on the breast area. After filming, the mother could view what had been filmed if she wished to do so, to allow her to check she were not identifiable, though no mother chose to do this. Mothers were also offered a copy of their videotape if they wished, though none took up this offer. In reviewing the videos, there were a small number of shots that included a portion of the mother's face and these were edited to conceal the face. Each mother was given a different coloured band for her wrist during videotaping and all identification was by colour – e.g. the red mother, the blue mother etc. The individual camera tapes were transferred to one home video tape in the order in which the mothers were recorded, with the original tapes kept in a locked filing cabinet. No identifying information for the mothers aside from the colour band was included on this video tape that was then used for the analysis. The tape was viewed by only myself and one colleague as co-reviewer.

The colour code was used also on the questionnaires. The consent forms, contact details and code list were not copied or transferred from their paper format and were stored securely and separately from the questionnaires and tapes. The tape co-reviewer had no access to identifying information of the mothers.

### **2.5.3.3 The right to fair treatment**

As there was no particular benefit to the mother or her baby from participating or not participating, there was no concern that the right to fair treatment might be affected by the selection of participants. Fair treatment was further protected by arranging to videotape at a time and venue of the mother's choice, arriving on time and carrying of the taping in a polite and efficient manner.

### **2.5.3.4 The right to the protection from discomfort and harm**

It was considered unlikely that participating in the videotaping or completion of the questionnaire would result in any direct harm to the mother or to her baby, though there might be some minor temporary anxiety or embarrassment arising from being videotaped. Mothers were not required to travel or incur any costs, and were not separated from their baby. The mother's right to the protection from discomfort and harm was protected by suggesting the mother could have someone with her if she wished, though none chose to do so. Each mother was in existing contact with a breastfeeding support person who could provide any assistance with questions about breastfeeding or expressing, if needed.

## **2.5.4 Data collection Source C**

### **2.5.4.1 Development of tools**

Similar to the process for Source B, structured observation was used to produce quantitative data on pre-specified actions. The observation tool included the twenty-nine Source A Delphi statements that were observable actions (Appendix C8). In this study, the videotaping provided scope to also include actions that were not pre-specified before filming and add them to the list. This allowed a fuller examination of the actions mothers used and repeated viewing to clarify description of the actions (or lack of actions).

In addition, a self-administered questionnaire was used to obtain demographic information and to collect the mothers' attitudes to hand expression, reasons for expressing, and information on how they were assisted (or not assisted) to learn the skills of hand expression (Appendix C9). This questionnaire was piloted with two mothers of infants who were known to me and were not willing to be videotaped. The pilot comments resulted in minor changes to the layout of questions to make it clearer where to put responses.

### 2.5.4.2 Videotaping the mothers

All mothers choose to be videotaped in their own homes. Mothers were given no directions on how to express, except to do so by their usual method. If the mother asked, “is this right?” or similar questions, I replied that I was interested in how *she* expressed, not in any particular technique. There was some general light conversation during the filming if the mother wished it, and this conversation was not analysed.

The mother determined the length of the expression, ceasing when she felt she had enough milk expressed or that she stated that she wished to stop. No attempt was made to assess quantity or quality of milk expressed. Average time in an individual mother’s house was twenty minutes with hand expressing taking place for about 5 minutes.

### 2.5.5 Exploration Source C

The analysis process and same two reviewers were used for the mother videotapes creating a set-up similar to the process used for Source B.

### 2.5.6 Findings Source C

#### 2.5.6.1 Characteristics of participants

Six mothers contacted me for information on participating and five agreed to be videotaped. One additional mother was a colleague who was interested and agreed to be videotaped. None of the mothers were known to each other and they were geographically spread around Ireland. Two mothers were first time mothers; three were second time mothers, and for one it was her fifth baby. All mothers were established with breastfeeding and for all but one, the babies were over 5 months old (Table 2.15).

**Table 2.15: Characteristics of Source C**

Mother code	Age of baby	Parity	First time to hand express	Current frequency of expression	
				hand	pump
Red	11 months	2nd	no	1/week	occasionally
Green	7 months	2nd	yes	1/day	none
Turquoise	6 months	2nd	no	3-4/week	none
Grey	5 weeks	5th	no	occasionally	none
Orange	9 months	1st	yes	1+/day	none
Yellow	5 months	1st (twins)	yes	1+/day	occasionally

Mothers were asked if they found it more difficult to express during the videotaping than for their usual expressing. Five mothers reported no difference and one mother found it more difficult to express as her baby had recently fed. The baby was present in three situations and there were no other people present.

### 2.5.6.2 Attitudes to hand expression

The attitudes of the mothers towards hand expressing were gathered by self-administered questionnaire before the videotaping. Attitudes were generally positive as would be expected in women who volunteered to be videotaped (Table 2.16).

**Table 2.16: Source C - Attitudes to hand expression**

<b>Overall, I find hand expressing ...</b> (number of mothers marking each point) n=6					
	1	2	3	4	5
unpleasant			1	3	2
pleasant					
inconvenient				3	3
convenient					
unnatural				2	4
natural					
embarrassing				4	2
not embarrassing					
stressful				3	3
satisfying					
time consuming		1	1	1	3
quick					
worse than using a pump			1	2	3
better than using a pump					
painful				1	5
comfortable					
difficult to do				2	4
easy to do					
difficult to learn			1	2	3
easy to learn					
long time to develop skill		1		1	4
quick to develop skill					
hard to do away from home*					5
easy to do away from home					
unusual				2	4
ordinary					
repressing			1	2	3
empowering					
cow-like			2	3	1
womanly					
hinders continuing breastfeeding				2	4
helps continue breastfeeding					

\* item not scored by one person

### 2.5.6.3 Reasons for expressing milk

The most common reason for expressing was for separations from the baby for work, college and or social outings (Table 2.17).

**Table 2.17: Source C - Reasons for expressing milk**

<b>Main reasons for expressing milk</b> (Tick all that apply)	<b>Number of mothers (n=6)</b>
Baby not able to latch on to the breast	0
Baby ill or very preterm and unable to suck	1
Engorgement/mastitis	2
To rest a sore nipple	3
For social outings without the baby	4
Return to employment	3
To increase milk supply	2
To donate milk	1
When taking a medication incompatible with breastfeeding	0
Other: Mix with baby's food	2
Attend college	1

### 2.5.6.4 Key points to share with other mothers

All mothers provided at least one point that they would share with another mother learning to hand express. These included positive comments about the value of hand expression as well as suggestions on 'how-to' express, and the need for patience (Table 2.18).

**Table 2.18: Source C – Points to share with other mothers**

<p><b>7. What are some key points that you would share with another mother learning to hand express?</b></p> <p>“Easy to do, very convenient” (red)</p> <p>“Try it and don't disregard it” (red)</p> <p>“No need for sterilizing equipment” (red)</p> <p>[learning is ] “No big deal if someone shows you themselves” (green)</p> <p>“Use thumb and first two fingers in a cup hold with fingers positioned outside the areolar tissue, inward pressure towards chest and then squeeze breast in an outward motion” (turquoise)</p> <p>“Try to find what suits you and your situation” (grey)</p> <p>“It's nice to be in a relaxed atmosphere” (orange)</p> <p>“To persist as it is so handy” (orange)</p> <p>“It takes time to learn, doesn't get going as quickly as a pump” (yellow)</p> <p>“Don't be surprised at how slow milk flow is” (yellow)</p>
---

Mothers were colour-coded for anonymity.

### 2.5.7 Summary of Source C findings

The six mothers videotaped hand expressing were positive about it and offered varied suggestions for other mothers. The skills observed on the videotapes are discussed in the combined data section that follows. The questionnaire responses relating to how hand expression skills were learnt and the remaining questions on this questionnaire are reported in Chapter 3 where assisting learning of hand expression is discussed.

## 2.6 Combined sources

### 2.6.1 Exploration of similarities and differences

The data obtained from reviewing the Source B materials and the Source C videotapes of the mothers was compared to the Source A list of skills (Figure 2.3) and examined for the similarities and differences in the skills of hand expression aiming to answer the questions:

*What skills did the Source B materials and the Source C videotapes include?*

*What were the similarities and differences between the three sources of the skills needed?*

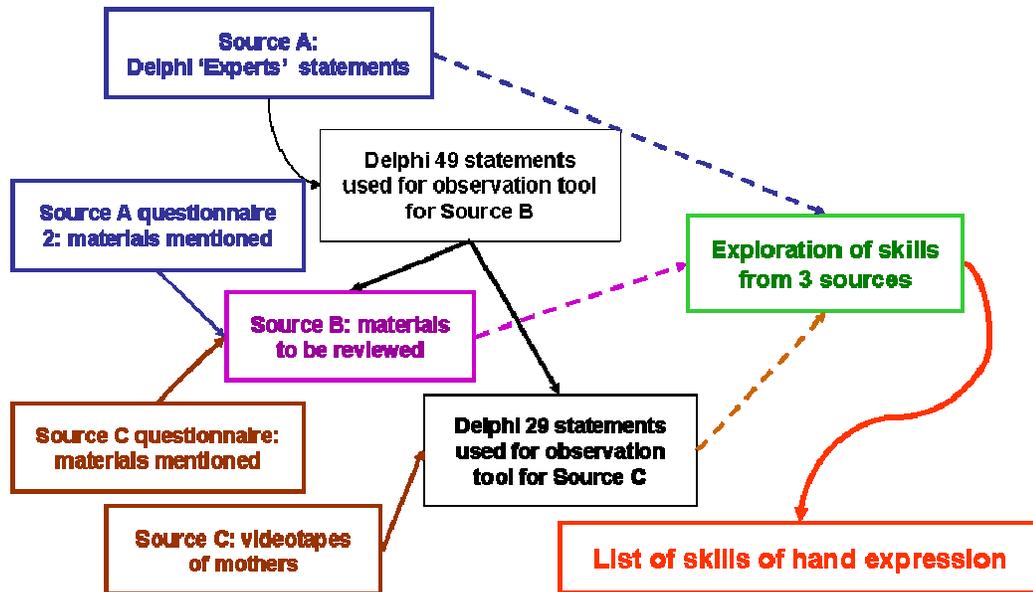


Figure 2.3: Exploration of the combined data

Educational materials (Source B) did not always reflect statements that were rated as important by Source A (experts) and included statements rated as unimportant. The techniques used by these experienced mothers (Source C) to hand express did not always reflect the materials in common use or the “experts” views. Source A rated 22 statements as important. Eighteen of these items were included in the majority of the Source B materials. Ten items of the 22 items were visible actions and five of these were observed as actions carried out by more than three of the six mothers. These comparisons are displayed in full in Appendix C11.

The tables of compared results were clustered into what was considered important in relation to:

**Techniques:**

- Stimulating let-down or milk ejection reflex;
- Where to put fingers/anatomy;
- Compress/squeeze;
- Demonstration, know others who express.

**What to know:**

- When to express;
- Amount/how long;
- Other knowledge or information.

### 2.6.1.1 Techniques of expression

#### *Stimulate let-down or milk ejection reflex*

The milk ejection reflex is the response to release of the hormone oxytocin, which causes contraction of the milk producing cells and brings the milk down the ducts. Oxytocin release can be conditioned in response to sounds or sight of the baby, preparation for expressing, or other stimuli. Source A respondents mentioned a variety of stimuli such as breast massage, warmth, nipple stimulation, and others. Many respondents in Source A, as well as the reviewers for the Source B and Source C videotapes, found it difficult to distinguish between the separate terms of massage, stroke, knead, or shake. This was due to the fact that stroke, massage and knead might be similar movements of the hand differing in pressure. Therefore these statements related to stimulating let-down were combined (Table 2.19).

There was agreement that it was not important for mothers to know what prolactin and oxytocin do, though knowing what a let-down is and ways to stimulate it was seen as important by both Sources A and B. There was less agreement on the importance of specific ways to stimulate a let-down. Breast massage was seen as important by the “experts” and mentioned frequently in the materials. Only two mothers were seen (on the video tape) to do any specific activity to stimulate their let-down, however the sample mothers were all experienced mothers who might not need to stimulate their milk ejection reflex; it might be different with new mothers learning the skill.

Shaking the breast was not seen as important by Source A generally, though one respondent was adamant of its importance. Shaking as a technique appeared in many of the materials, perhaps reflecting the long international spread of the material of the adamant respondent. Though not viewed as the vigorous leaning forward “shake” in the way described in the Source B materials to help gravity bring the milk down, nearly all the mothers were seen to “bounce” their breast while expressing. This action appeared to be done unconsciously when the mother was repositioning her hand, although the degree of movement was beyond that needed to just reposition the hand. Calves and lambs will butt the udder while feeding to get more milk, and in hand milking a cow, the milker will do similar; it may release tension in the udder/breast and assist oxytocin release. It would be interesting to explore if this bounce action was common practice among mothers who hand express, as it may be an instinctive action.

All the mothers videotaped made themselves comfortable, which was not difficult as they were in their own homes. Though most materials suggested a comfortable and private environment, some Source A respondents commented that mothers often express effectively in less than ideal settings.

Many of the Source A respondents commented on the individuality of stimulating milk-ejection reflex. It was commented that some mothers might need to stimulate it and some might not, stimulating the reflex may not be needed by a mother experienced at expressing, and that one technique might work better than another for an individual mother.

Table 2.19: Techniques - Combined results from Sources

$\checkmark$ = agreed as important A= $\geq 4$ , B= $\geq 7$ x = agreed as not important A= $\leq 2$ , B= $\leq 5$ ~ = agreed as neutral A=3, B= 6 $\infty$ = no agreement ** not appropriate to compare		Source A Delphi Round 3, n=21 Median (IQR)	Source B Materials n=12 Number containing	Source C Mothers seen to do n=6	
<b>Stimulate let-down or milk ejection reflex</b>					
2.09	know what let-down is and how to stimulate	$\checkmark$	4 (1)	7	-
3.06	massage breast	$\checkmark$	4 (0)	10	0
3.07	stroke breast	$\infty$	3 (0.25)	7	2
3.05	warm breast	$\infty$	2 (2)	6	0
3.08	knead breast	x	1 (1)	4	0
3.09	stroke, massage and shake breast	x	2 (2)	2	0
3.11	shake breast	x	1 (0)	5	0
3.14	back/ shoulder massage	x	1 (0)	2	0
3.10	stimulate nipple	$\infty$	2 (1.62)	9	0
3.03	near baby, have a picture	$\infty$	3 (1)	7	4
3.02	comfortable environment	$\infty$	3 (0.75)	7	6
3.13	a drink	x	2 (1)	4	0
2.10	to know what prolactin & oxytocin do	x	2 (1)	3	-
<b>Where to put fingers</b>					
3.15	know where to position thumb & finger	$\checkmark$	5 (0)	11	-
3.16	position opposite	$\checkmark$	5 (0)	11	6
3.21	rotate finger position around the breast	$\checkmark$	5 (1)	11	5
3.17	position at 12 and 6	x	1 (0)	1	0
3.19	position at edge of areola	$\infty$	2 (1)	9	3
3.18	position where baby has lips	x	1 (1)	1	-
3.20	know to find sinuses/ducts	$\infty$	3 (1.63)	9	2
3.31	picture of finger placement	$\infty$	3 (1)	11	-
3.22	support breast while expressing	x	2 (0.25)	4	0
<b>Compress/squeeze</b>					
3.25	use rhythmic movements	$\checkmark$	4 (1)	11	5
3.26	compress and release finger pressure	$\checkmark$	5 (1)	11	5
3.28	press back towards chest wall and press fingers together	$\checkmark$	4 (1)	10	0
3.29	use a rolling technique	~	3 (2)	6	3
3.27	squeeze fingers together, hold and release	$\infty$	3 (2)	1	1
<b>Demo, other mother, know others</b>					
3.32	practical demo with mother trying herself * Mother received this	$\checkmark$	5 (1)	5/6 videos	2*
3.33	see another mother demonstrating	**	2 (1)	5/6 videos	-
1.03	find support as well as instructions	$\infty$	4 (1)	3	-
1.04	to know other mothers who have hand expressed	x	2 (1)	1	-

Statements are condensed, see exact wording in Appendix C

Median (agreement): 1 = not important, 5 = very important.

Narrow interquartile range (IQR) indicates greater consensus

Not all items were able to be seen on the Source C videos

### ***Where to put fingers***

Using an opposing thumb and finger showed the most agreement. Specific places to put the fingers were not rated highly by Source A, though the materials were inclined towards “edge of the areola” and this place seemed to be used by half the mothers. Some of the mothers were seen to palpate to find a good spot to express as was recommended by many of the materials, though this was rated as neither important nor unimportant by Source A. None of the mothers were observed to support their breast while expressing, though these were experienced mothers and none had heavy or engorged breasts (Table 2.19).

### ***Compress/squeeze***

There was good agreement between the Sources to use rhythmic movements, compressing and releasing finger pressure. None of the mothers were observed to first press back towards the chest wall before compressing the fingers, though this instruction was seen as important by Source A and occurred in most of the materials. There was some difficulty with the definition of “rolling” as some of the written materials described it as rolling the finger as one would when making fingerprints. This was slight movement difficult to see on a videotape. However, rolling the breast over the lower finger when compressing the breast was seen on Source B and C videotapes. The numbers reflect either rolling technique (Table 2.19).

### ***Demonstration, other mother, know others***

A practical demonstration with the mother trying the skills herself was rated as very important and appeared in five of the six video materials, though only one-third of the mothers received this assistance (Table 2.18). Five of the videos in Source B showed a mother hand expressing; the other video only showed her positioning her fingers at the start of expressing. Source A did not rate seeing or knowing another mother who was expressing as important, though a friend was a useful source of assistance to half of the mothers. The topic of who assists learning is returned to in Chapter 3.

#### **2.6.1.2 What to know**

In addition to techniques of hand expression there were statements that could be classified as information to know. Data collection was simultaneous for Sources A and C, which meant the items rated as important by Source A were not known at the time of contact with Source C. There are some statements which do not have a view from Source C that might have been interesting to know. Findings of *What to Know* are presented in Table 2.20.

### ***When to express***

There were two statements related to knowing when to start and how frequently to express, both of which rated as important with Source A. When to start expressing was addressed in most of the materials, and generally assumed the mother was expressing for a newborn unable to feed at

the breast. Again, there were many comments from the Source A respondents stating that it depended on the individual situation – was it a preterm baby unable to suck, an older baby who was not with the mother, or the mother expressing for breast comfort?

### ***Amount/how long***

Though generally considered important by Sources A and B to know something about how long to express, as discussed earlier, Source A respondents appeared to differentiate between “to know”, as in a pre-determined time, and “to be able to judge”, and whether to use both breasts or not, which allowed for individual situations (Table 2.11). In addition, an outcome that the mother “is able to judge” may reflect a mother-centred focus, where as “to know” may reflect a focus of the “teacher” imparting knowledge to the mother.

There was agreement on mothers needing to know there was a learning period, and one of the six Source C mothers had rated it as a long time to develop the skill, though bearing in mind these were mothers who had developed the skill. “A realistic amount” (2.06) though reaching a median of 4 and a narrowing IQR, still had some disagreement among Source A respondents with five of the 19 respondents who rated this statement giving it a 1 or 2 as not important. It may be that a “realistic” amount can only be discussed individually (Table 2.20).

### ***Other knowledge***

#### **Should not hurt**

*“In order to hand express a mother needs to know that expressing should not hurt and to seek help if it is uncomfortable”* (2.08) was the only statement rated 5 as very important from Source A with 100% agreement (of those marking a rating). However only half of the materials included this information and this omission is of some concern. It may be that the developers of some of the materials considered that this was such a basic point that it did not need to be stated (Table 2.20). However, as there is evidence that many women do not seek help when breastfeeding is painful because they believe pain is normal when first breastfeeding, so too some women may think expressing is normally painful at first and may not seek help. The Source C mothers did not rate hand expression as painful, though these mothers were hand expressing for many weeks or more. Mothers may find it painful and give up hand expressing quickly if they do not have assistance available and know to seek it.

#### **Advantages of hand expression**

The advantages of expressing by hand were included in most of the materials though Source A rated this as neither important nor not important. The use of the term “advantages” implies that this is above normal, and if this is so, what is the “normal” that hand expressing is more advantageous than? There was agreement that it was important for mothers to know that breast milk is valuable and that hand expression will work (Table 2.20).

### **Containers and hand washing**

Choosing a suitable container (2.12) assumes that the milk is to be contained. A number of Source A respondents commented that milk may be expressed in the shower or at other times for breast comfort and is not kept. All the mothers did use a container during videotaping though not all intended to keep the milk expressed at that time.

Hand-washing was mentioned in many of the materials and rated as neither important nor not important by Source A. None of the Source C mothers went to wash their hands immediately before expressing. Again Source A respondents commented that it made a difference to importance if the milk was to be given to the baby or not (Table 2.20).

### **Anatomy**

Knowing the basics of breast anatomy were not seen as particularly important by Source A respondents though most of the materials provided some information on anatomy; often a simple diagram of the breast structures (Table 2.20).

### **“Find own way”**

All of the Source A respondents except one rated it as important that a mother find her own way of expressing and most of the materials mentioned this. All the mothers had found an individual way that suited.

### **It depends on the situation**

Many of the respondents commented in the Delphi rating rounds that what the mother needed to know or do was specific to the situation. For example, was it a preterm birth, a mother with an established milk supply leaving milk for an older infant, or a mother who was engorged? Seventeen of the 21 respondents made an “it depends” type comment in response to at least one statement and one respondent commented thus to 14 of the statements. The statement attracting the most “it depends” comments was statement 2.03: how frequently to express, with 12 “it depends” comments, followed by statement 3.23: to use both breasts, with seven comments. Though not all the statements would elicit an “it depends” type comment, twenty-six of the forty-nine statements had at least one of these comments.

Despite replies that “it depends,” some of the Source A respondents appeared focused on their own work setting such as a neonatal unit, postnatal ward, or in the community with mothers of older infants. Their responses often reflected that setting alone, for example, a comment related to hand washing that: “We need clean milk”, reflected the respondent’s focus on a milk bank. Some respondents seemed more able to recognise the variety of situations, highlighting the difference between expressing a small amount to relieve an overfull breast, expressing for quantity, expressing to establish a milk supply, or just expressing to learn the skill.

The setting for the six video materials (Source B) varied, with two videos sited in the postnatal ward with the mothers in sleepwear and focused on expressing for a preterm or ill infant. Three of the videos were in a home setting, though mentioning a variety of reasons why to express including an ill infant. One video showed a variety of settings and reasons for expressing. Two of the six text materials were specifically targeted to preterm or ill infant situations by their title, and one text referred to teaching expression soon after birth. Two other materials did not refer to a time or setting and mentioned a variety of reasons for expressing, and one text made no mention of why or when to learn this skill (Table 2.20).

These responses and materials indicate that those assisting mothers in learning to hand express may need to be more aware of their own mindset regarding when hand expression is useful and how techniques may vary depending on the reason for expressing. Those assisting, and the supporting materials that they use, may need to point out to mothers that situations differ and the mother can find her own way that works in her situation.

**Table 2.20: What to know - Combined results from Sources**

			<b>Source A Delphi Round 3 n=21 Median (IQR)</b>	<b>Source B Materials n=12 Number containing</b>	<b>Source C Mothers seen to do n=6</b>
√ = agreed as important A= ≥4, B= ≥7 x = agreed as not important A= ≤2, B= ≤5 ~ = agreed as neutral A=3, B= 6 ∞ = no agreement ** not appropriate to compare					
<b>When to express</b>					
2.02	when to start after baby born	√	4 (0.88)	8	-
2.03	how frequently to express	∞	4 (1.75)	5	-
<b>Amount/how long</b>					
2.06	what is a realistic amount	∞	4 (1.5)	5	-
2.05	learning period before large quantities are achieved	√	5 (0)	11	-
3.04	to judge how long to continue expressing at a time	√	4 (0)	7	-
2.04	to know how long to express for	∞	3.25 (2.5)	8	-
3.12	alternate breasts	√	4 (1)	10	2
3.24	judge when to change breasts	√	4 (0)	8	3
3.23	use both breasts	∞	2.5 (1)	10	2
<b>Other knowledge</b>					
2.08	expressing should not hurt and to seek help if it is uncomfortable	∞	5 (0)	6	-
1.01	that breast milk is important	√	4 (1)	10	-
1.02	hand expression will work	√	4 (2)	12	-
2.07	milk will sometimes come in drops, or spurt/spray	√	4 (1)	10	-
2.01	advantages of expressing by hand	∞	3 (1)	11	-
2.12	choose suitable container	∞	3 (1.25)	10	6
3.01	be able to wash her hands well	∞	3 (1)	7	0
2.11	know basics of breast anatomy	∞	3 (1)	10	-
3.30	find her own method that works for her	√	5 (0)	9	6

Statements are condensed, see exact wording in Appendix C. Not all items were able to be seen on the Source C videotapes of mothers expressing. Median (agreement): 1 = not important, 5 = very important. Narrow interquartile range (IQR) indicates greater consensus

## 2.6.2 Summary of views from combined sources

The three sources had some similarities, but also many differences in what was considered important by the expert panel, included in the materials, or observed in the mothers expressing. Statements were clustered into topics for clarity (with the Delphi statement numbers in brackets). As the mother sample was very small (n=6) and all were experienced at expressing with a well established milk supply, their observed actions were taken into consideration but not treated as a requirement for agreement.

The knowledge and techniques agreed as important were for the mother to:

- know that breast milk is important and that hand expression works (1.01, 1.02);
- know what let-down (milk ejection reflex) is and to know how to do something to stimulate it if needed, though aside from the general term massage, any one specific technique is not seen as more important than others (2.09, 3.02-3, 3.05-3.13, 3.14);
- position her thumb and finger opposing, and to rotate her finger position around the breast – assuming all parts of the breast are to have milk expressed (3.15, 3.16, 3.21);
- use rhythmic movements to compress and release the pressure of the fingers on the breast, it may help to press back towards the chest wall first and then compress the fingers (3.25, 3.26, 3.28);
- know that milk will sometimes come in drops or spurt/spray (2.07);
- know that there is a learning period before large quantities of milk are achieved (2.05);
- know when to start expressing (2.02);
- be able to judge how long to express for each time and when to change breasts (2.04, 3.24);
- find her own method of hand expression in the best way that works for her and her situation (3.30).

All of the Source A respondents rated as 5 that the mother needs to know that expressing should not hurt and to seek help if it is uncomfortable (2.08). This is included in the list despite its absence from some materials, as it is considered such a basic point of information.

Though not included in the majority of materials (perhaps because it is difficult to be definitive due to the variety of reasons for expressing) two further items that were rated as important by Source A were included to discuss individually with a mother depending on her situation:

- a realistic amount to aim to express (2.06);
- how frequently to express (2.03);

In addition, Source A rated as very important and the videotapes included, “assisting the mother by providing a practical demonstration, with the mother trying the techniques on herself” (3.32).

## 2.7 Chapter 2 Summary

This chapter recounted the lack of existing agreed skills or principles on hand expression and described a study to develop a list of principles. There were three sources of information: 21 “experts” who were international health workers with particular expertise in expression, who participated in a three-round Delphi exercise and completed questionnaires (Source A); a review of twelve information materials (Source B); and six mothers who were willing to be videotaped expressing and to complete a questionnaire (Source C).

This set of studies set out to answer the questions:

1. According to Source A respondents’, what were the important and not important skills of hand expression?
2. What skills did the Source B materials and the Source C mother videotapes include?
3. Were there similarities and differences between the three sources regarding the skills needed?
4. Could a composite list of skills of hand expression be developed that could be used to inform the construction of a performance assessment tool for student lactation consultants assisting mothers?

The findings of this set of studies indicated that there were some similarities but also many differences in what knowledge and skills were considered important by the expert panel, included in the materials, or observed in the mothers expressing. These findings were used to form a composite list that could be used when assisting a mother. This is discussed further in Chapter 3 and the findings also inform the development of the assessment tool in Chapter 4.

## Chapter 3: Assisting Learning

Chapter 2 explored the skills related to hand expression that the mother needs, and this chapter examines the skills that the health worker uses in assisting a mother's learning. It presents the theoretical basis for patient education, including examples of the application of learning theories and models particularly focusing on mother-centred learning. It also explores how the competence statements and standard of practice documents from lactation consultant organisations outline the expected skills of assisting learning. Further findings from the three Sources introduced in Chapter 2 are discussed, exploring the Source A respondents' views on the preferred time, person, setting and barriers to assist mothers with learning hand expression, and the views of mothers in Source C related to assistance. This chapter concludes with a framework that combines the skills of assisting learning with the specific situation of hand expression to form guidelines for assisting the learning of hand expression.

### **3.1 Existing knowledge on assisting learning**

#### **3.1.1 Why assist learning?**

##### **3.1.1.1 Develop personal skills**

The Ottawa Charter for Health Promotion (WHO 1986) highlighted five main principles for action in health promotion related to public policy, supportive environments, community action, health services, and personal skills. In the following twenty years there have been many conferences, debates, and publications on the first four areas but less discussion on the principle of developing personal skills (Kemmer 2003). In research literature and in textbooks, personal skills are often taken as developing assertiveness and improving self-esteem with the assumption that if a person is motivated to carry out a behaviour that they will automatically acquire the skills to be able to do so. I would question this assumption that skills to carry out the behaviour automatically appear if the person is motivated sufficiently. For example, a mother may know that breast milk is important to her ill baby and she may be motivated to provide her baby with her milk if the baby cannot feed at the breast. However, if she does not have the skill or technique to express milk, and cannot find anyone who can assist her to learn the skills, she may not be able to carry out her choice. In this situation, the mother needs the personal skill of expressing her milk in order to carry out her choice to provide breast milk to her infant, and the health worker needs the personal skill of assisting learning to help the mother develop this skill.

##### **3.1.1.2 Learning is part of many interventions**

Educational and support interventions related to breastfeeding have variable outcomes (Fairbank et al. 2000; Renfrew et al. 2004). Interventions are generally multi-faceted even if this is not fully acknowledged in the protocols or evaluations.

For example, an intervention involving the giving of information might describe the content of the information, the method of delivery, e.g. leaflet or video, and the mother's literacy and economic level, but rarely discusses the education process or the 'teaching' skills of the person offering the information. It is plausible that the skill of the health worker in facilitating learning could have a major impact on the outcome of an intervention.

### **3.1.1.3 How not to assist learning**

Dykes (2005) carried out a critical ethnographic study of encounters between midwives and breastfeeding women in postnatal wards. One of the encounters described in the published article highlighted a mother relating how the midwife insisted on telling her about expressing even though she (the mother) repeatedly said she did not want to be shown. This is an example of teacher-focused rather than learner-focused behaviour where the midwife thought the task of providing information needed to be done at that time and, as Dykes states, delivered the predefined information "chanted as a set of technical steps." This provides an example of how not to provide mother-focused learning.

Renfrew et al (2005) in their systematic review, comment on the absence of reference to education models in the studies of breastfeeding educational interventions that they reviewed, and highlight the importance of incorporating the adult education evidence base in future studies.

## **3.1.2 The goals of patient education**

### **3.1.2.1 Information-giving**

The concept of patient education or learning may have different meanings for different people. Redman (2001 p.4) distinguishes between patient education as being an individualised part of clinical care based on learning/teaching theory, and health education as population-based campaigns based on behavioural change theories and compliance. Tones (2002) separates health education as aimed at individuals' behaviour, as distinct from health promotion aimed at socio-political changes and support for health. Wilson-Barnett (1988) explores the differences between information-giving, patient teaching or education, and counselling pointing out that they are all important but serve different purposes. She explains how information-giving focuses on the process or provision and that research has shown that information-giving in a generalised fashion such as the provision of a leaflet is unlikely to be effective at improving patients' ability to cope. Wilson-Barnett continues that patient teaching may be more or less focused on the learner's needs and interactive or passive depending on the teacher, whereas counselling may involve more exploration of feelings and assisting the patient to discover a means of coping, usually with a specific difficulty.

### **3.1.2.2 Increasing knowledge**

Patient teaching frequently aims to increase the patient's knowledge, though knowledge alone may not influence behaviour, particularly if the information is not perceived as relevant to the patient (Mirka 1994). Mothers are often given a leaflet as the sole means of assisting them to learn to hand express their milk, with little or no discussion on the relevance to them of this information (information is often focused on expressing large quantities of milk when mother and baby are separated), or individual guidance in transferring this written knowledge into a practical skill. Evidence is lacking that printed materials alone can increase breastfeeding knowledge, assist behaviour change or develop skills (Hauck and Dimmock 1994; Coombs et al. 1998), though written materials may be useful in reinforcing oral communication (Hoyer and Horvat 2000).

### **3.1.2.3 Providing support**

Terms such as 'special teaching' or 'additional support' may give the impression that breastfeeding skills are difficult to learn (Henderson et al. 2001), and supportive words on their own may be seen as inadequate with practical demonstrations more valued, particularly by less educated women (Hoddinott and Pill 2000).

## **3.1.3 Outcome measures**

Stamler et al (2001) highlight that conducting patient education research on discrete topics such as breastfeeding, or heart disease minimises the important "crossover of theoretical frameworks, teaching strategies, and evaluative measures". Outcome measures in patient education research are generally those outcomes valued by the researcher rather than the patient, for example the number of weeks of breastfeeding rather than if the mother was satisfied with the length of breastfeeding. The outcomes may be related to the idea of the education resulting in achieving or maximising compliance or adherence by the patient to the advice of the health professional.

### **3.1.3.1 Compliance**

I consider that there may be discordance in the minds and statements of health workers on patient education and practices. For example, Bellamy (2004) in a review article encouraging medical students to learn theory-based skills of patient education, states that "Patient education is the process of enabling individuals to make informed decisions about their personal health-related behaviour". However, this patient education might only be seen as effective if the decision the patient makes fits with the doctor's advice, as Bellamy goes on to say patient education "aims to improve health by encouraging compliance with medical treatment regimens." He sees the objective of patient education as different from the education of his medical students, stating that "When educating students we are attempting to transfer knowledge and skills whereas in patient education we are attempting to facilitate behaviour change" (Bellamy 2004).

These statements imply that the outcome of the patient education process is not increased knowledge and skills of the patient, or informed decisions, but compliance with the required behaviour. In relation to learning skills of hand expression, some mothers may choose not to learn the skills when the health worker offers, and there may well be mothers who learn the skills but choose not to use them; both outcomes could be considered non-compliance if the focus is process-centred rather centred on the individual mother.

Compliance still involves feasibility, described by Rankin as “the extent to which the patient has the needed information to act and the ability to master and apply the skills so that compliance can be achieved” (Rankin 2001 p.394). Therefore, even if compliance is the goal, more than merely imparting information is needed to achieve that goal.

### **3.1.3.2 Acquiring new behaviours and skills**

Much of the existing patient education research relates to situations such as diet and exercise following diagnosis of heart conditions, or stopping smoking in which there is a change sought in unhealthy behaviour. This view runs into difficulties when applied to educating a mother about hand expression because hand expression generally does not involve unhealthy behaviour change but the acquisition of new knowledge and skill to apply in a previously un-encountered situation. In order to carry out the behaviour, first the mother must know what the behaviour is and see the value in her carrying out that behaviour, and then know how to perform it and feel confident that she has the ability to perform it.

In my writing, I use the term patient education to mean education aimed at the individual though recognising that the pregnant women/mother may not be a ‘patient’ and she is unlikely to have a disease condition. The expected outcome of this learning process is that the mother will have the knowledge, skill and self-efficacy to hand express if she wishes to do so. Various theories or perspectives of learning and behaviour can be used towards achieving this aim. The next section examines the theory underpinning the skills and practices of assisting the mother’s learning.

## **3.1.4 The theoretical basis for patient education**

### **3.1.4.1 Behavioural perspectives**

Behavioural perspectives focus on objectively observed behaviours rather than the thought process behind the behaviour. Skinner’s Stimulus Response Theory (1953), conceptualises behaviour changes as related to immediate consequences. For example, reinforcement or punishment immediately following the behaviour of expression such as getting milk/relieving pressure as positive reinforcement and continued behaviour, or not getting milk and/or having pain being punishment leading to not continuing the behaviour.

Teaching using this theoretical base could include structuring activities with step-by-step actions designed to facilitate positive reinforcement at each stage such as Gagne's (1985) instructional design models, or instructing the mother in a specific process to assist milk let-down. For example, teaching a list of actions such as massage, drink of water, particular seating, a picture of baby and so on that would act as cues or conditioning to elicit the response of milk let-down followed by positioning fingers in a designated way and providing praise when each step was done 'correctly'.

No hand expression or breastfeeding education studies were found in which the researchers specifically stated that they were using a behaviourist approach. Henderson et al (2001) published a report of their randomised trial of an educational intervention with 160 first-time mothers which included a standardised one-to-one session providing information on breast anatomy, "correct" attachment and three stages of suckling. During the session and on subsequent days in hospital the mother's technique was assessed using the LATCH tool and immediate feedback was given on the mother's ability to position and attach her infant as instructed. No significant differences occurred in breastfeeding rates between the groups at 6 weeks, 3 months or 6 months, and the experimental group were less satisfied with breastfeeding and less confident about breastfeeding at 3 and 6 months after birth. The researchers suggest further trials to evaluate if this type of education might have a negative effect, although they also suggested that researcher bias and the Hawthorne effect may have masked a difference. This standardised approach, the measuring of the mother's ability to follow the instructions and the feedback to the mother as regards her successful compliance may indicate a behaviourist approach, though I recognise that the researchers may have had learning intentions that were not apparent in reading their published article. The published article uses the term feedback, though this could be praise and thus positively reinforcing the 'correct' attachment or it could be negative comment resulting in mothers being less likely to use the 'incorrect' attachment; both possible outcomes in behavioural based learning methods. The feedback could affect the mother's overall feeling of competence with breastfeeding, with praise generally reinforcing continued breastfeeding.

Behaviourism may be appealing for the person assisting the mother as it relies on specific, standardised actions that may seem safe and reassuring to the inexperienced person assisting, and it facilitates assessment of the student (or mother) by using a checklist. It may be reassuring for the tired mother who thinks that if she learns a few steps properly, the 'one right way', then everything will work fine, though reality may not be that simple. Trying to get it 'exactly right' may be too difficult and may make breastfeeding seem too complex and rule-bound. In common with all learning perspectives, the theory may have useful elements if they are effectively used in practice.

### **3.1.4.2 Cognitive learning perspectives**

Cognitive learning perspectives take the view that learning develops understanding that then provides a guide for behaviour, though this does not guarantee the behaviour will occur. The randomised controlled trial by Hill (1987) provided a slide presentation lecture, a question and answer time following the lecture, and a pamphlet to a sample of antenatal women. The knowledge significantly increased in the intervention group. However there was not a significant difference in the number of women breastfeeding at six weeks, or in the women's perception of themselves as successful.

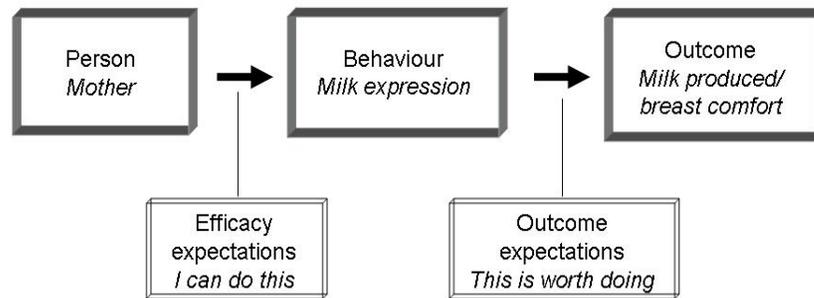
Constructivist learning has cognitive theory as a basis, influenced by the work of Piaget, Vygotsky, Bruner and others (Black 1999; Tynjälä 1999). It views learning not just as the acquisition of knowledge but as the active processing of new information in relation to existing information/ experience, forming patterns and bridges to organise the information and develop meaning for the learner. The teacher provides guidance in learning, including offering challenges for the learner to explore, and reinforcing success. When used in assisting mothers to learn about expressing, analogies, metaphors and mental pictures can help to link familiar and unfamiliar ideas, such as describing milk alveoli as a bunch of grapes. Presenting the mother with information on why hand expression might be useful to her helps situate the learning, and describing how expression works can be linked to her knowledge of how breastfeeding works. Experimentation can assist learning, for example, seeing the effect of placing the fingers in a different place on the breast when expressing; however there remains the need for some teacher guidance rather than leaving the mother to discover on her own how to express her milk. The mother's prior knowledge can negatively affect learning if this knowledge is a misconception, for example, that hand expression is difficult, painful or less likely to provide milk. Similarly, the mother's existing cultural beliefs can support or be a barrier to new learning. Reviewing the mother's existing knowledge and perceived barriers can help to highlight areas that might undermine the aims of the learning session about expression.

### **3.1.4.3 Social cognitive perspectives**

Social cognitive perspectives consider the interplay between a person's self-belief, their behaviour, and the situation. The person is viewed as being able to think through a situation, to change and adapt their behaviour. It recognises that having knowledge alone may not affect behaviour, and that the goal or outcome needs to be seen as important by the person. Whereas behaviourists views control as external, social cognitive theorists view control as potentially internal to the person and thus able to be self-regulated.

Bandura (1977; 2004) has been an influential writer on social cognitive theory from the mid-1970s onwards. One aspect of his work emphasises the role of a person's self-beliefs, and their perception of self-efficacy.

Bandura (1977; 2004) has been an influential writer on social cognitive theory from the mid-1970s onwards. One aspect of his work emphasises the role of a person's self-beliefs, and their perception of self-efficacy.



**Figure 3.1: Components of Self-Efficacy** (adapted from Bandura 1977)

This self-efficacy has two distinct components: efficacy expectations (can I do this), and outcome expectations (is it worth doing/will it lead to the desired outcome) (Figure 3.1). Even if a mother strongly believes expressed milk is valuable to her baby, she is unlikely to carry out the behaviour of expression if she believes she is not capable of expressing milk. Conversely, if a mother thinks the expressed milk does not matter she may not express even though she is able to do so.

Self-efficacy is the person's own judgement or belief that they can successfully perform the behaviour. People use four main sources of information to judge their self-efficacy:

- performance accomplishments or personal mastery;
- vicarious experience or role modelling;
- verbal persuasion;
- emotional state and physiological feedback.

Self-efficacy is behaviour specific and situation specific rather than a characteristic of personality. For example, a mother may be confident about expressing in hospital but not at home, or she may be confident about breastfeeding, but not about expressing. A mother may be confident about her ability to carry out her employment but have little confidence in her ability as a mother. The 'teacher' acts as change agent in a learner-focused situation and encourages the learner's self-reflection on the positive components of the situation.

Bandura describes components of a programme in reference to adolescent health promotion, though the same components are likely to be relevant in other settings and situations.

“An effective preventive program includes four major components. The first component is *informational*. It informs children of the health risks and benefits of different lifestyle habits. The second component develops the *social and self-management skills* for translating informed concerns into effective preventive practices. The third component builds a resilient *sense of efficacy* to support the exercise of control in the face of difficulties and setbacks that inevitably arise. The final component enlists and creates *social supports* for desired personal changes.” (Bandura 2004) (Italics added)

In learning how to hand express, these four components could be operationalised as:

- *informational*: Why hand expression is useful / relevant;
- *social and self-management skills for practice*: How to hand express;
- *sense of efficacy*: what could be done if ..., answering mother's questions, feedback building self-efficacy;
- *social supports*: follow-up and links to other mothers.

Dennis et al have published extensively on the development and use of a self-efficacy framework as the theoretical basis for examining the concept of breastfeeding confidence and providing a means of identifying mothers at risk of discontinuing breastfeeding early (Dennis and Faux 1999; Creedy et al. 2003; Torres et al. 2003; Blyth et al. 2004; Dennis 2006) . However, they do not appear to have included confidence in expression of milk in any of their studies.

Campbell (1996) reported on her Breastfeeding Promotion Nursing Intervention that was based on social cognitive theory and tested using a quasi-experimental design with first-time mothers who intended to breastfeed. Her intervention was developed to enhance the self-efficacy of the women and included:

- an additional one-hour antenatal class to practice mechanics of breastfeeding plus assistance with the mechanics through personal contact within 72 hours, then telephone contact at 1, 2, 3 and 6 weeks after birth, (*performance accomplishments*);
- observing the desired behaviour through antenatal demonstrations with a doll, video, and literature (*vicarious experience*);
- feedback on the mother's performance and facilitation to master the mechanics of breastfeeding in the antenatal class as well as postnatal contacts (*verbal persuasion*);
- information was provided antenatally regarding normal maternal physiological changes, infant behaviours and coping strategies to decrease anxiety, as well as the availability of assistance to reduce anxiety (*emotional state*).

In this study, Campbell used an instrument she had previously developed to measure a combination of breastfeeding self-efficacy, breastfeeding duration, and satisfaction with the breastfeeding experience. Mothers in the intervention group had significantly higher scores on the composite measure of breastfeeding success than subjects in the control group.

#### **3.1.4.4 Humanistic perspectives**

Humanistic perspectives aim to be more learner-led with facilitation of learning as a process enabling change. Behaviourist and cognitive perspectives in assisting learning are teacher-focused in that the teacher sets the learning agenda and outcomes. Humanistic theorists such as Carl Rogers, Malcom Knowles, and others presented and developed a concept of facilitation of learning where the learner learns how to learn, to adapt and to change as situations change,

rather than the learner simply having information ‘banked’ and waiting to be drawn on. In a humanistic perspective, education is viewed as personal growth and empowerment.

Adult learning principles, as explained by Knowles et al (2005) make the following assumptions about the design of learning:

- Adults need to know why they need to learn something and its relevance to them;
- Adults are self-directed and responsible for their own decisions;
- Adults bring prior experience and knowledge to new learning situations;
- Adults learn best when the topic is of immediate value to help them cope with real-life questions and situations;
- Adults approach learning as problem-solving using the knowledge or skill they are acquiring;
- Adults are more motivated to learn for internal reasons than external reasons.

Since learning builds on past knowledge and experiences, the learner’s view of themselves as capable of learning and using new skills has an effect on their learning. Pregnancy and birth alter a woman’s view of herself and positive breastfeeding learning experiences can help to nurture self-esteem and confidence (Brillinger 1990). In addition, the adult learning model focuses on the role of the ‘teacher’ as a facilitator of learning, rather than as responsible for the process of learning. However, patient education using adult learning principles that focus on the learner’s needs may be at odds with the practices that focus on the “teacher’s needs”, or the expected outcome as adherence to instructions or behavioural change in line with the health worker’s “recommendations” (Bartlett 1989; Dykes 2005).

#### **3.1.4.5 Adult learning principles combined with enhancing self-efficacy**

Noel-Weiss et al (2006a) in Canada, developed a two and a half hour small group breastfeeding workshop for antenatal first-time mothers based on the theory of self-efficacy and on adult learning principles:

- The workshop began with a needs assessment written questionnaire (*relevance*) which was reviewed by the facilitator at the break to ensure she was meeting the group’s needs.
- From the beginning of the workshop, active involvement of the participants was encouraged and a variety of learning formats was provided (*helping to meet individual needs*).
- Questions were answered as they were asked in order to focus on immediate needs and relevant topics (*immediate value*).
- Principles were explained rather than providing sets of rules (*self-directing*).
- Pictures and videos of breastfeeding mothers and babies and examples were provided (*vicarious learning experiences*).
- An opportunity to practice positioning was provided by using dolls, so participants could practice the task and receive feedback to build mastery (*performance accomplishments*).

- The authors state that the topics were presented in short segments and as offering suggestions rather than advice (*verbal persuasion*).
- The environment of the workshop and the suggestions for caring for the mother as well as the baby's needs helped to reduce anxiety and discomfort (*emotional arousal*).

Noel-Weiss et al (2006b) then tested the effects of this workshop strategy using a randomised control trial design with ninety-two pregnant women and they demonstrated higher self-efficacy scores and a higher proportion of exclusively breastfeeding amongst women who attended the workshop. This was a group setting that was able to provide for individual needs and participation and avoided the approach that the women should sit and learn the 'right' way.

Thus, principles of adult learning can combine well with education activities designed to enhance self-efficacy even though they originating from different learning perspectives. Both recognise the importance of the individual's beliefs, experiences, and own responsibility for action. The learner is the focus with the teacher acting as a facilitator in a task or problem-centred situation.

#### **3.1.4.6 Suiting the assistance to the situation**

Strict adherence to one learning theory in all situations is unlikely to be helpful to the mothers. For example, a mother with an emergency c-section at twenty-eight weeks gestation and with her infant in a neonatal intensive care unit may be frightened and lack confidence in her body's ability to function effectively. In the first days after the birth this mother may find a step-by-step guide supportive, in that small steps may seem manageable and she can see 'one right way' to hand express without having to think about options that might or might not work. She would, however, still need the lactation consultant (LC) to work at building self-efficacy. A few days later, the same mother might be interested in experimenting with other options and a more adult learning approach would be suitable. A breastfeeding mother being offered assistance to learn to hand express as a generally useful skill may have interest in first knowing why the skills are useful to her. The LC needs the skill of assessing the mother's current learning needs in order to choose and use approaches best suited to that mother at that time.

#### **3.1.4.7 Communication skills**

Effective skills of communication are an integral part of any framework or theory base for a patient education session. This includes general skills such as respect, greeting, active listening, responding, body language, eye contact and suitable language, as well as skills related to learning such as pacing, checking understanding, summarising and offering follow-up. Accurate information is also a key element, as is a suitable environment and time.

After receiving effective learner-focused information, including, at least briefly, mention of the reasons why hand expression is relevant, explanation of the skill, and discussion of perceived

barriers, the mother may decide not to learn or not to use the skill and that is her choice. She may decide to use a pump or other device, or not to express her milk at all. The use of hand expression is unlikely to occur without the mother knowing the skills, but knowing the skills does not ensure that hand expression occurs. Therefore, another skill of the health worker is to accept a mother's decision without judging and to support whatever decision the mother makes.

## **3.2 Seeking new knowledge: What did the sources think would assist the learning of hand expression?**

### **3.2.1 Background and rationale**

The literature searches specific to learning skills of hand expression discussed in Chapter 1 and 2 and the searches on assessment of assisting skills learning discussed in Chapter 4 indicated that little of the literature was client-focused. It tended to centre on compliance with instructions rather than adult learning or empowerment. For some skills such as insulin injections there may be research-based 'best-practice' and a behavioural learning approach may be suitable. The studies I found on breast self-examination addressed areas such as using video or leaflets to assist self-learning, and what motivated women to undertake breast self-examinations, but I found none that addressed the health worker's interaction in assisting learning of the skill. The literature searches did not provide any evidence on when, where, or what, might assist the learning of hand expression.

### **3.2.2 Method and sources of new knowledge**

The self-administered questionnaires previously discussed (Section 2.2.3) also provided information on assisting mothers' learning. These questionnaires are in Appendix C. Discussed in this section are the replies to:

- Source A, Questionnaire B, that was sent after Delphi Round Three to the participants via email to obtain their views on:
  - the setting, methods of learning, resources used, and time of learning considered best (by ranking) – 3 questions.
  - barriers to learning these skills and what might indicate effective hand expression – 4 open questions.
- Source C questionnaire to the six mothers that was sent before the videotaping session and was collected at the time of videotaping, to obtain their views on how they were assisted (or not assisted) to learn skills of hand expression, and the use made of materials.

Data from the questionnaires was entered in Excel. Summary and descriptive data plus open question responses were grouped and frequency calculations were carried out.

### 3.2.3 Questions to explore

The data collected from these three sources was explored in relation to the following questions:

1. What was considered the preferred time, person and setting to assist mothers with learning hand expression?
2. What assisted the mothers to learn skills of hand expression?
3. What were considered indications of a mother's competence at hand expression?
4. What were considered barriers to learning skills of hand expression?
5. What learning theories underpinned the Source B materials?

### 3.2.4 Findings

#### 3.2.4.1 Response rate

Source A: Twenty of the twenty-one respondents in the Delphi process returned the questionnaire B. Two reminders were sent to the non-respondent without result.

Source C: All six mothers who were videotaped also completed their questionnaire.

#### 3.2.4.2 Time and setting to assist

Source A respondents were asked when and where they thought it was best for mothers to learn the skills of hand expression. Day 1 or 2 after birth were the most highly ranked as times to learn, with the later postnatal days closely following. As regards the setting in which it is best for mothers to learn, one-to-one sessions were ranked the highest by Source A respondents.

(Table 3.1 & 3.2)

**Table 3.1: When best to learn**

<b><i>When it is best for mothers to learn skills of hand expression</i></b> (Source A: Q.1)	<b>Number of Source A respondents ranking item as 1 or 2</b>
Ante-natal	7
Early perinatal (day 1 or 2)	12
Later postnatal (after milk supply develops)	11
Any time is as good as any other time	3
Other (unspecified when)	1

**Table 3.2: The setting best to learn in**

<b><i>What setting is best for mothers to learn skills of hand expression</i></b> (Source A: Q.3)	<b>Number of Source A respondents ranking item as 1 or 2 or 3</b>
One-to-one session with a health worker	14
One-to-one session with experienced mother	13
One-to-one session with an IBCLC/specially trainer person	13
Small group session (2-4 mothers) with a health worker	4
Small group session (2-4 mothers) with experienced mother	3
Small group session (2-4 mothers) with an IBCLC/specially trained person	5
Large group session with a health worker	1
Large group session with experienced mother	0
Large group session with an IBCLC/specially trainer person	1
Learn by herself from written or visual resources	0

### 3.2.4.3 The preferred person to assist

Source A indicated that there was little difference if the teaching was done by a health worker, experienced mother or IBCLC/specially trained person (Table 3.2). Source C reported that friends were a common source of assistance with hand expressing and the most useful. Midwives/nurses in hospital also assisted some mothers and two mothers felt they were not assisted by anyone (Table 3.3).

**Table 3.3: Who assisted Source C mothers?**

<b><i>Who assisted you to learn how to hand express?</i></b> <i>Mark all those that assisted. Also mark the one person most useful and the one person least useful of those who assisted you. (Source C: Question 4)</i>	<b>Number of mothers assisted by each type of person (n=6)</b>		
	<b>Assisted</b>	<b>Most useful</b>	<b>Least useful</b>
Midwife/nurse in hospital	2	1	-
Public health nurse	0	-	-
Specialist hospital midwife/nurse for breastfeeding	1	1	-
Lactation consultant in private practice	0	-	-
Voluntary breastfeeding counsellor	0	-	-
Other breastfeeding mother(s)	0	-	-
Family member	1	-	1
Friends	3	2	-
Other (specify): "No-one assisted"	2	-	-

### 3.2.4.4 How best to assist

According to Source A, “Explaining where to put fingers/how to compress and observe how mother does this on her own breast” was the highest ranked method of assisting the mother (Table 3.4).

**Table 3.4: How to assist learning**

<b><i>How you think mothers are best assisted to learn the skills of hand expression? (Source A, Q2)</i></b>	<b>Number of Source A respondents ranking item as 1 or 2 or 3</b>
Leaflet with text only	0
Leaflet with pictures only	0
Leaflet with both text and pictures	5
Video of mother being assisted to learn skills of hand expression	7
Video of mother hand expressing by herself	7
Explaining verbally how to express with no written/visual material	0
Using a cloth/knitted breast model to demonstrate	4
Using a full size breast model that ‘expresses milk’ when correct techniques are used	3
Placing your hands on the mother’s breast to show her where to put her fingers and how to compress her breast	6
Explaining where to put her fingers/how to compress and observe how mother does this on her own breast	15
Other: 2 x verbal plus leaflet 1 x “combination of these methods” 1 x demonstrate on midwife’s own breast and get mother to copy	4

### 3.2.4.5 Indications of a mother’s competence at hand expression

On the questionnaire, Source A respondents were asked two open questions:

*“From your point of view, if you were assisting a mother to learn to hand express, what would indicate that she was competent at hand expression?”*

*“From the mother’s viewpoint, what do you think would constitute effective hand expression / competency in the skill of hand expression?”*

There was no restriction on the number of indicators that could be given. The open responses were grouped into similar indicators. Comfort when expressing or no pain was the most common indicator given from both viewpoints, followed by quantity of milk expressed. A more general indicator of competence was if the mother was able to get milk out (Table 3.5).

**Table 3.5: Indicators of effective hand expression**

<b>Source A Grouped responses</b> (number giving response)	<b>What would indicate to you a mother was competent at hand expression?</b>	<b>What do you think would constitute effective hand expression from the mother's viewpoint?</b>
Able to get milk out effectively	7	7
Comfortable/no pain	11	10
Feels confident / can do it herself	7	4
Quantity/ amount expressed	5	6
Uses a specific technique	2	-
Has knowledge about hand expression	3	-
Prefers hand to pump	1	-
Doesn't take a lot of time to express	1	3
Able to repeat the demonstration	3	-
Can meet her own needs for expressing	5	6
Breasts softer, relieves fullness	-	2
Milk flows	-	1
"Mother has no idea what constitutes effective hand expression"	-	1

### 3.2.4.6 Barriers to learning skills of hand expression

Source A were asked:

*"What do you perceive to be the main barriers to women learning skills of hand expression?"*

*"What do you perceive to be the main barriers for health workers in assisting mothers to learn the skills of hand expression?"*

The main barrier to assisting mothers and for mothers learning was seen as lack of knowledgeable, skilled and motivated health workers to assist the mother, as well as society's low valuation of hand expression and the marketing of pumps. The mother's lack of knowledge was seen as a barrier but, it is hoped that assistance with learning will address this barrier (Table 3.6).

**Table 3.6: Barriers to learning**

<b>Source A Grouped responses</b> (number giving response)	<b>Barriers to women learning</b>	<b>Barriers to assisting</b>
Health worker's lack of skill/knowledge/motivation	17	21
Health worker's time/ patience to assist mothers	1	5
Not knowing about/valuing hand expression	4	5
Marketing of pumps/ belief pumps are better	6	5
Uncomfortable/embarrassed about breasts	4	3
Personal attitude of health worker	-	3
"Reluctant to give control to mothers"/medicalisation	1	1
Lack of suitable visual aids	1	1
Anatomy of mother	1	-
Not knowing how it is done/how breast works	11	-
Lack of confidence	2	-
Health of baby	1	-

### 3.2.4.7 Materials to assist learning

Though many Source A respondents thought leaflets and videos provided by the health worker had a place in assisting learning (Table 3.4), the Source C respondents appeared to have different views. The most common materials used were self-sourced books. With the exception of one mother, who was a midwife herself and had materials via a training course, materials provided by a health worker were seldom used to assist learning to hand express. When mothers were asked at the time of the videotaping for names of the videos, books, and leaflets they found specifically helpful with hand expression, the respondents were vague and mentioned books related generally to breastfeeding. None of the mothers marked an item as being least helpful (Table 3.7).

**Table 3.7: Materials assisting Source C**

<i>What materials assisted you to learn how to hand express? Mark all those that assisted. Also mark the one item that you found most useful and the one item least useful. (Source C, Q 5)</i>	Number of mothers marking an item used. N=6		
	Assisted	Most useful	Least useful
Video(s) (mother was a health worker and saw it on a breastfeeding training course)	1	-	-
Leaflet(s) produced by hospital	-	-	-
Leaflet(s) produced by breastfeeding support groups	-	-	-
Leaflet(s) by others	1	1	-
Book(s) you got yourself	2	2	-
Book(s) you were given by hospital	-	-	-
Other (specify): Breastfeeding review course as a midwife	1	-	-
None assisted = 2	-	-	-

## 3.3 Do educational materials reflect learning theories?

### 3.3.1 Background and rationale

Learning theories were discussed earlier in this chapter. I showed that adult learning precepts and self-efficacy constructs could usefully form the underpinning for assisting mothers' learning.

### 3.3.2 Method and sample

The Source A and C participants were asked what resource materials they considered addressed the points/principles of learning hand expression that they considered key. Six text and six videotapes were mentioned and are listed in Appendix C7. These materials were reviewed for content using a checklist and the findings were described in Chapter 2. In this section, these materials are examined with regard to their underpinning learning theories.

A chart was prepared using the six points of Knowles' Adult Learning principles and the four points of Bandura's Self-efficacy construct. An additional item related to general principles of communication such as body position, vocal tone, environment, and active listening. The materials were evaluated, marking if the point was reflected in the materials. The findings are reported as the six text materials and then the six video materials. One of the written texts had an associated video tape, however each item was taken as stand-alone because the text on milk expression did not refer to using the text with the video tape and vice versa.

### ***Text materials***

The six text materials reviewed were designed to suit the needs of a wide audience rather than those of an individual mother and thus could not be evaluated for relevance to the individual situation, or interpersonal communication aspects (Table 3.8).

### **Adult learning**

*Need to know:* Five texts provided a variety of reasons why expressing might be used, with two focusing mainly on preterm or ill infants. The remaining text explained why to use this particular method in preference to others and did not offer reasons why a mother might want to express her milk by any method.

*Self-directed:* Four texts offered suggestions and encouraged the mother to choose what suited her best, with the other two texts providing a step-by-step list of tasks to do.

*Learner's existing knowledge/experience:* Four texts used analogies, rationales and overall principles to link with the mother's existing knowledge.

*Readiness to learn:* could not be assessed in a generic written text.

*Problem-focused:* Four texts focused on expressing in the wider context of a mother and baby while two texts focused on carrying out a process.

*Motivation – internal:* could not be assessed in a generic written text.

### **Self-efficacy**

*Performance accomplishments:* could not be assessed in a generic written text.

*Modelling:* Five of the texts provided a diagram or picture. The text that did not provide a diagram or picture was part of a larger package with breast anatomy explained elsewhere and did have an accompanying video tape, although readers of the hand expression section were not referred to these other sections. One text related negative experiences of mothers when other techniques were used.

*Positive emotional state:* Four texts mentioned mother's comfort, ways to relax or similar. One text provided a list of possible negative outcomes if the process was carried out wrongly.

*Social/verbal persuasion*: Four texts offered encouragement, realistic learning time, or options.

*General communication*: Three of the texts were aimed at mothers in that they were distributed widely and directly to the mothers. Of these, two used “you” and an active voice, and the other text did not use any pronoun. The three texts directed to those who were assisting mothers all used “she” or “the mother.” The reading level was moderate to high. Two of the texts aimed at mothers and two aimed at health workers were quite text-dense, with one aimed at each group using more bullet points and white space.

**Table 3.8: Learning theories in Source B text materials**

<b>Adult learning</b>		<b>Text 1</b>	<b>Text 2</b>	<b>Text 3</b>	<b>Text 4</b>	<b>Text 5</b>	<b>Text 6</b>
Why need to know	Relevance/individual needs	√	√	√	√	x	√
Responsible for own decisions	Self-directed, Teacher as facilitator, Offered suggestions learning style/speed	√	√	√	x	x	√
Learner's experiences/ knowledge	Builds on experiences Analogies, options, overall principles, rationale (confident of ability to learn)	√	√	√	x	x	√
Readiness to learn for current situation	Immediate framed as useful now Questions answered	na	na	na	na	na	na
Task or problem centred	Problem-solving rather than abstract, logical order and manageable chunks, applicable	√	√	√	x	x	√
Motivation - internal	Rather than external	na	na	na	na	na	na
<b>Self-efficacy</b>							
Performance accomplishments	Mother Hands-on, feedback	na	na	na	na	na	na
Vicarious modelling	Models, pictures, sees other mother hand expressing successfully	x	√	√	√	√	√
Positive emotional state, reducing anxiety	Attention to comfort, listens, provides follow-up	√	√	√	x	x	√
Social/verbal persuasion	Appropriate encouragement, no unrealistic promises, offer options rather than right/wrong, “what do you think/ feel?”	√	√	√	x	x	√
General communication skills	Eye contact, tone, body position, active listening, environment conducive to learning	na	na	na	na	na	na

√ = included    x = not included    na = evaluation not applicable to type of material

### ***Video tapes***

Four of the videos observed a health worker assisting one or more mothers, one video showed only one mother expressing herself, and one video showed a mixture of assistance and expressing without assistance (Table 3.9).

### **Adult learning**

*Need to know:* All the videos gave more than one reason for hand expression. In four of the videos, the health worker mentioned why it was relevant to the specific mother on the video.

*Self-directed:* Four videotapes suggested ways for the mother to find what worked best, two gave one way without any suggestion that there were other techniques of hand expressing.

*Learner's existing knowledge/experience:* Four videos used phrases to link to mothers' existing knowledge.

*Readiness to learn:* The five videos that contained an interaction with a health worker showed the health worker providing information that was of immediate use to the mother.

*Problem focused:* The videos were all divided into manageable sections. This provided a logical flow aimed at increasing the viewer's understanding of using the skills of hand expression.

*Motivation – internal:* could not be assessed in these videos.

### **Self-efficacy**

*Performance accomplishments:* The five videos that contained an interaction with a health worker showed the mother learning the skill, receiving feedback and improving her skill.

*Modelling:* All of the videos showed one or more mothers hand expressing comfortably and effectively.

*Positive emotional state:* In four videos the health worker made reassuring comments and paid attention to mother's comfort. The video without a health worker interaction provided relaxing music at the times when there was no information voice over.

*Social/verbal persuasion:* Realistic expectations were given in five videos, with the impression given that this was a normal activity.

*General communication:* All the health workers were attentive to the mother employing a relaxed tone of voice, and an approach that did not rush her. In the video of a mother by herself, the voice-over had a pleasant tone, there was no feeling of rushing, and a variation of shots was used.

**Table 3.9: Learning theories in Source B visual materials:**

<b>Adult learning</b>		<b>Video 1</b>	<b>Video 2</b>	<b>Video 3</b>	<b>Video 4</b>	<b>Video 5</b>	<b>Video 6</b>
Why need to know	Relevance/individual needs	√	√	√	√	√	√
Responsible for own decisions	Self-directed. Teacher as facilitator. Offered suggestions regarding learning style/speed	x	√	x	√	√	x
Learner's experiences/ knowledge	Builds on experiences Analogies, options, overall principles, rationale (confident of ability to learn)	√	√	x	√	√	x
Readiness to learn for current situation	Immediate framed as useful now Questions answered	√	√	x	√	√	√
Task or problem centred	Problem-solving rather than abstract, logical order and manageable chunks, applicable	√	√	√	√	√	√
Motivation: internal	Rather than external motivator	na	na	na	na	na	na
<b>Self-efficacy</b>							
Performance accomplishments	Mother hands-on, feedback	√	√	-	√	√	√
Vicarious modelling	Models, pictures, sees other mother hand expressing successfully	√	√	√	√	√	√
Positive emotional state, reducing anxiety	Attention to comfort, listens, provides follow-up	√	√	√	√	√	x
Social/verbal persuasion	Appropriate encouragement, no unrealistic promises, offer options rather than right/wrong, "what do you think/ feel?"	√	√	√	√	√	x
General communication skills	Eye contact, tone, body position, active listening, environment conducive to learning	√	√	√	√	√	√

√ = included    x= not included    na= evaluation not applicable to type of material

### **3.4 Discussion: What the Sources thought would assist learning**

Data in this section was collected by means of short, self-administered questionnaires with a small sample size and a small sample of materials. As such, the findings can only be considered as possible indicators of areas that could be explored further. It must be noted that the sources were not drawn from the same facilities. Further work could explore materials, views and practices of mothers and health workers in the same facility.

Learning to express milk may occur antenatally, on a postnatal ward, in a neonatal unit, in the community and elsewhere. It is hoped that all settings would provide an environment that was comfortable and respectful of the mother, with privacy and time, including during student learning and assessment. Future research would benefit from considering the specific environment in which the learning assistance is provided. An unsupportive environment could affect the mother's learning and the effectiveness of the assistance (Dykes 2005).

### **3.4.1 Assistance**

One-to-one assistance with learning to hand express and explanation plus observation of the mother doing it herself were rated highest by Source A (health workers). This can be compared with the mothers' (Source C) experience in which four of the six mothers did not have a lactation consultant, midwife or other health worker assisting them to learn the skill of hand expression. This suggests that preferred conditions may not always exist in reality.

The next most highly rated means of assistance chosen by Source A respondents was the health worker explaining how to express and the mother watching a video of expressing. Again this could be explored further in future studies in light of the Source C response that they received little explanation from health workers and no videos were provided.

Six of the Source A respondents chose an option of assisting that involved handling the mother's breast, and some of the Source B materials showed this, although studies have informed us that mothers do not like this touching (Hoddinott and Pill 2000; Dykes 2005; Furber and Thomson 2008). Recent work by Cantrill (2007) highlighted that there are levels of touching when assisting with breastfeeding. While minimal touching, such as gently guiding a mother's hand, may be acceptable and helpful, handling the mother's breast may not be considered acceptable or helpful by mothers.

It is interesting that three of the Source A respondents felt that the full size "expressible" breast model designed for training health workers was a good aid to use with mothers, even though the material that accompanies the breast model explains why it is not suitable for use in teaching mothers directly. These respondents may have thought that their own skills of assisting learning were poor and believed that an expensive demonstration aid would provide something that they could not provide. Alternatively, they may simply like 'gadgets'. This study did not provide the means of exploring these answers more fully.

### **3.4.2 Mother's competence**

In addition to comfort and lack of pain (considered by Source A to be the main indicator of the mother's competence at hand expression), the amount of milk expressed was also a common indicator. This finding could be explored further with regard to views on meeting the mother's

own needs for expressing, as a large quantity of milk may not be the goal in all situations, for example if expressing to encourage the baby to attach and feed. Other markers such as “can express effectively,” “feels confident,” “can meet her needs,” would not be easy to define and would need discussion between the individual mother and health worker in order to establish if the hand expression session was effective at assisting learning.

### **3.4.3 Barriers to assisting**

Barriers to assisting mothers in learning the skills of hand expression appeared to be strongly linked to lack of knowledge/skill/motivation amongst health workers. I hope that this project to develop a method of assessing the performance of the health workers in assisting will help provide competent health workers to assist mothers. The barrier of not valuing hand expression could be addressed by education, though marketing of pumps would also need to be addressed.

### **3.4.4 Materials**

The materials that a health worker chooses to use or recommend may reflect the health worker’s own beliefs about learning. It may also indicate that she/he uses the materials that are handy without any great thought to their relevance to the individual mother and situation. Health workers may need to be more aware of how learning aids can support or undermine learning strategies.

The materials examined in this study were generic and so could not be expected to address all individual situations, although general adult learning principles were evident in most. There was a tendency to present expression in relation to preterm or ill infants, and to use the quantity of milk as the goal, though some did include expressing for mother’s breast comfort. The health worker providing learning materials to an individual mother may need to point out how a general situation is of relevance to this mother’s particular situation. Some materials may be less appropriate, for example, a long text or video explaining expressing long term for a hospitalised infant may be viewed as not relevant to a mother who wishes to express a very small amount of milk to assist her healthy baby to latch on.

The materials varied with their use of the adult learning principles of offering suggestions and options to facilitate the mother to make her own choices. Some materials showed a variety of situations and techniques and emphasised that the mother would find a way that suited her. Other materials appeared more directive and could give the impression that there was only one right way to express. This directive approach could reduce the mother’s feelings of self-efficacy if either she could not become skilled in that particular technique, or that technique did not result in the quantities of milk she was led to believe would occur if she expressed “correctly.”

The use of analogies and explanations of the overall principles of hand expression can indicate to the mother that her existing knowledge and experience was valued. Building on existing knowledge also helps the mother to feel more confident that she is able to assimilate the new information.

The video tapes all showed ordinary women successfully learning and using hand expression skills in a supportive environment. This modelling could help to build the self-efficacy of the mother watching the video. However, most of the videos included some shots of the health worker actually handling the mother's breast and expressing. Only one video included the health worker asking permission or explaining why she was doing this. This breast-handling might generate negative emotions in a mother watching these videos, thus reducing her feelings of self-efficacy.

Ideally, a skilled person would use materials as learning aids providing individual, situation-specific and learner-led assistance, including opportunities for the mother to practice the skill, encouragement, answering questions, and other supports.

### **3.4.5 Did these sources agreed or disagree on assisting learning?**

The two "people" sources were not asked the same questions and the health workers in Source A were not providing care to the mothers in Source C, so direct comparison is not possible. Source A thought one-to-one assistance was best, but Source C was unlikely to have experienced this. Similarly, materials were seen as useful by Source A, but not received by Source C. This could indicate a difference in perceptions of what was useful between the sources or a difference in service delivery. Source C mothers might have found learning materials and one-to-one assistance useful if they had received them. Further research could be undertaken exploring the views of mothers and health workers in the same facility, as regards their views on assisting learning and the actual provision of assistance.

The views on assistance indicated that Source A respondents considered one-to-one assistance with learning to hand express and explanation plus observation of the mother doing it herself to be important. Video was considered a useful learning aid, though demonstration by the health worker directly expressing the mother's breast was seen by some to be useful. Source A considered that the mother's competence in expressing could be judged by lack of pain and by the amount of milk that she expressed. Source A considered the main barrier to assisting mothers to learn skills of hand expression was the lack of knowledge/skill/motivation amongst the health workers. The knowledge, skills and manner of assistance examined in this chapter are used to inform the assessment tool in Chapter 4.

### 3.5 Standards of practice and competency documents

As discussed in Chapter 1, the focus health workers in this thesis are lactation consultants. The International Board of Lactation Consultant Examiners (IBLCE) provides statements indicating the breadth of knowledge and skills required to become or to remain certified. The International Lactation Consultant Association (ILCA), the professional organisation for lactation consultants, has developed standards of practice for their profession. The documents from ILCA and IBLCE include statements endorsing communication/ education/ counselling that is effective, appropriate, supportive, individualised, reflects adult education principles, and assists informed decision making. These statements therefore fit with learning models based on self-efficacy using adult learning principles. Examples of relevant statement are shown here (Table 3.10), with more details in Appendix B.

**Table 3.10: Statements of practice and competence**

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#### **Clinical Competencies for IBCLC Practice (selected)**

##### COMMUNICATION AND COUNSELING SKILLS

In all interactions with mothers, families, health care professionals and peers, the student will demonstrate effective communication skills to maintain collaborative and supportive relationships.

*The student will:*

- Provide individualized breastfeeding care with an emphasis on the mother's ability to make informed decisions.
- Use adult education principles to provide instruction to the mother that will meet her needs.
- Select appropriate written information and other teaching aids.

Published by the International Board of Lactation Consultant Examiners, Inc. (IBLCE)  
Downloaded Feb 26, 2007 www.iblce.org

#### **Standards of Practice for International Board Certified Lactation Consultants (selected)**

##### Standard 3: Clinical Practice

3.3.4 Provide appropriate oral and written instructions and/or demonstration of interventions, procedures and techniques.

##### Standard 4: Breastfeeding Education and Counseling

4.3 Provide anticipatory guidance (teaching) to:

- Promote optimal breastfeeding practices
- Minimize the potential for breastfeeding problems or complications

4.4 Provide positive feedback and emotional support for continued breastfeeding, especially in difficult or complicated circumstances

Published by the International Lactation Consultant Association (ILCA)  
Downloaded Feb 26, 2007 www.ilca.org

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### 3.6 Combining skills of assisting

Chapter 2, while not providing a definitive list of specific skills of hand expression, did provide a list of knowledge and general techniques so that principles of expression could be explained to mothers and they could be assisted to learn a way of expressing that suited them individually.

This chapter reviewed the theories of assisting learning, highlighting the appropriateness of using adult learning principles and building self-efficacy in assisting mothers to learn skills of hand expression. It also outlined the practices expected of a lactation consultant.

From these findings, I constructed a framework that combined the principles of adult education and building self-efficacy, using social cognitive theory. This framework was intended to underpin the assessment of performance developed in the next chapters (Table 3.11). In keeping with professional practice, an item regarding documentation was also included, as well as the general communication skills that underpin all learning theories.

**Table 3.11: Framework for assisting learning**

<i>Activity</i>	<i>Social Cognitive Theory</i>	<i>Adult Learning Principles</i>
Use appropriate support and communication skills and identify any communication barriers		
Assess learning needs including what mother already knows / is able to do and readiness to learn	performance accomplishments	build on prior experience
Explain why breast milk is important, why hand expression is a useful skill to know and why it is relevant to this individual mother at this time	informational, social/verbal persuasion, positive emotional state	need to know, relevance, self-directed, problem-solving focus, immediate value
Describe how hand expression works (including demonstration, modelling, visual aids) in a way that the mother can understand	modelling, social and self-management skills	strategies to assist individual learning
Facilitate practise with supportive feedback, and provision of further assistance as necessary	positive emotional state, performance accomplishments	application of learning
Answer questions about using skill, check understanding and ascertain if mother feels capable of using the skills	positive emotional state, build self-efficacy	individualised
Provide appropriate educational materials to the mother on hand expression and related matters, as relevant	informational, social/verbal persuasion, modelling, social and self-management skills	strategies to assist individual learning, relevant, individualised
Offer follow-up, explaining what might be needed and key points to evaluate at follow-up	positive emotional state, social/verbal persuasion, social support	self-directed
Record appropriate documentation related to the mother learning and using the skill		

The list of knowledge, skills and techniques considered important and not important (Table 2.18 and 2.19) were combined with the principles of assisting learning to form a guidance sheet. This sheet would inform the examiners when assessing practice, in addition to serving as a learning aid to the students. The guidance sheet forms part of the assessment materials and can be found in Appendix D16.

### **3.7 Chapter 3 Summary**

Lactation consultants are expected to use effective communication skills in order to provide individualised, supportive and enabling care. There are varying perspectives for assisting patient learning including behaviourist, cognitive and humanistic approaches. Informed by the findings from the Sources of what might assist or hinder learning skills of hand expression, I blended social cognitive theory and adult learning principles, plus general communication skills, in a framework that underpins assessing the performance of a student LC in assisting a mother to learn skills of hand expression. This assessment is discussed further in the following chapters.

## Chapter 4: Examining assessment

### 4.1 Introduction

As outlined in Chapter 1, assessment serves a number of purposes including protecting service users, validating teaching, and guiding student learning. This chapter explores assessment in more detail and, as exploration involves asking questions, the educational assessment model of Rowntree (1987) provides suitable headings (Figure 4.1):

- Why is this assessment being done? (Purpose)
- What is to be assessed? (Content)
- How is the assessment to be done? (Method)
- How are the assessment findings to be interpreted? (Analysis)
- How is the assessment to be responded to? (Feedback and future learning and teaching)

The following chapter describes the development of the process and the tools for assessing performance and then examines the stakeholders' views of the tools and process.

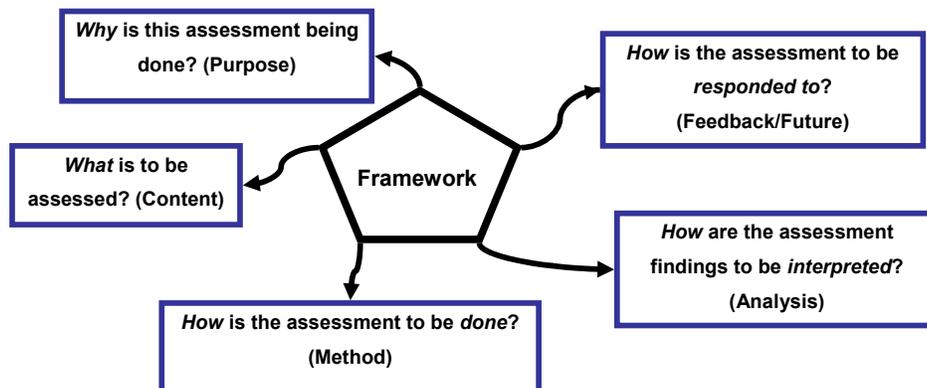


Figure 4.1: Rowntree Assessment Framework (1987)

### 4.2 Why is this assessment being done?

#### 4.2.1 Every assessment needs a purpose

Assessment is something that occurs in everyday life when evidence is gathered and weighed up and the findings of the assessment acted on. For example, the contents of the refrigerator could be assessed and analysed as to how suitable the findings are for the purpose of my dinner. The suitability of the contents is related to the purpose in mind – my dinner. An assessment of the same items for a different purpose, such as suitability for the dog's dinner, might have a different conclusion.

Summative or decision-making elements of assessment, such as to pass or fail the course, provide a gate-keeper function and help ensure that the assessment is taken seriously. Formative elements provide feedback to the student as well as assisting the student to become an effective assessor of their own work. This shapes their next learning stage and assists them in becoming life-long learners (Boud 2000). An assessment can contain both summative and formative elements.

#### 4.2.2 In relation to this thesis – purpose

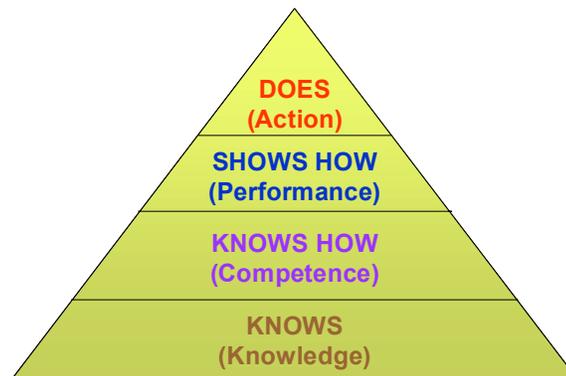
The purpose of the assessment in this thesis is to:

- ensure mothers are provided with care that is safe and of a high standard;
- guide student learning by building confidence in achievements and highlighting any areas needing attention;
- obtain quantitative evidence from three sources – mother, examiner, and student - of the performance of the student lactation consultant in assisting a mother to learn the skills of hand expression, that would assist in determining if the student was ready for independent practice.

### 4.3 What is to be assessed?

#### 4.3.1 Overall programme of assessment

As discussed in Chapter 1 of this thesis, Miller's (1990) depiction of four levels of assessment with different assessment methods suiting different purposes is used to illustrate how the levels support each other, rather than forming a hierarchy (Figure 4.2).



**Figure 4.2: Framework for clinical assessment** (Miller 1990)

Ideally, each assessment event fits within an overall programme of assessment that is designed as an integral part of the curriculum. It can be argued that assessing at a higher level also tests the knowledge and skill underpinning that higher level, for example when the student talks with the mother and provides an explanation of expression this activity could be assessing *Knows*, *Knows How* and *Shows How*. However, any one assessment cannot effectively cover wide domains and situations at the same time. Specifically testing the underpinning knowledge may ensure greater safety for the mother as well as building the confidence of the student.

The knowledge and skills used in assisting a mother to hand express may come from anatomy and physiology lectures, discussions on the importance of breastfeeding, training and practice in communication skills, as well as other areas; each with an assessment process. By the time the student is ready for assessment of performance in a real-life setting (at the *Does* level) prior assessments will have provided an opportunity for the student to demonstrate their ability to:

- describe the importance of human milk (*Knows*);
- discuss situations for which a mother may want to express her milk (*Knows How*);
- describe the principles of hand expression (*Knows*).

These assessments can have high levels of reliability and feasibility, for example via multiple-choice questions or short answer questions, although the validity is lower. Moving further up Miller's model, an assessment in a simulated situation could be used to:

- demonstrate (in general) the use of effective support and communication skills to assist patient learning (*Shows How*), and
- demonstrate assisting learning of hand expression skills (*Shows How*).

This demonstration of skill in a simulated situation could have an increased validity in that the skill was being assessed in use, though still not in the specific situation or with real mothers. The skills learnt and practiced in a simulated environment may not transfer effectively into use in a real setting. A structured process of clinical supervision including observation of practice and feedback to assist the transfer, is likely to increase the effectiveness of the student's skills in practice, as found in the randomised control trial undertaken by Heaven et al (2006).

#### **4.3.2 Workplace assessment**

The real-life assessment that is the focus of this project provides an opportunity to assess the student's integration and transfer of a range of generic knowledge and skills. The student demonstrates flexibility in a range of situations in order to meet the individual needs of the mothers. This putting together the pieces to make a whole picture is a more complex skill than merely performing a series of designated steps in the correct order and indicates moving towards the acquisition of the intuitive or integrated expertise of the professional (Schon 1987; Benner 2004; Dreyfus 2004; Gobet and Chassy 2007).

#### **4.3.3 Readiness for independent practice**

Chapters 2 and 3 determined the skills of milk expression and of assisting learning and indicated how they fit into the expected standards of practice for an International Certified Lactation Consultant (IBCLC). These serve as the elements to be assessed. Although this assessment process could be used at various points in the IBCLC training or in continuing professional development, the specific focus for this assessment is the student's readiness for practice as a

qualified practitioner. A practitioner who can function in an effective and efficient manner, to carry a case-load without direct supervision and, as a lactation specialist, provide a lead/role model/ teacher for non-specialist health workers. The settings in which the workplace assessment would be carried out include the postnatal and/or neonatal wards, outpatient services and in the community, with women in late pregnancy, and lactating mothers who wish to learn to express their milk.

#### **4.3.4 Assessment of measureable activities**

Many assessment processes already exist in different professions and within specialties. As one example, Ten Cate (2007) attempts to apply an educator's practical viewpoint by differentiating the concept of broad, general attributes of the doctor that are encompassed by theoretical competency frameworks from the observable, measureable activities from which competence can be inferred. Ten Cate suggests determining key professional activities or units of work that are expected to be assessed and achieved during training, and that when the student has demonstrated that they can assume responsibility to independently carry out the specific activity they are awarded a STAR – “statement of awarded responsibility” by their clinical supervisor. This award may occur at any point during clinical training. This idea of collecting STARS, one of which could be for assisting a mother to learn to hand express, is somewhat related to the practice of log books recording activities completed, though with the difference that activities are assessed in a specified process.

#### **4.3.5 In relation to this thesis – content**

The assessment developed in this thesis would form part of a broader assessment programme for student lactation consultants. Assisting a mother to learn skills of hand expression would be one observable, measureable activity that would provide evidence towards overall competence. This assessment would be situated near the completion of training to assess the integration of knowledge and skills in a variety of real situations in the work environment, and assist in determining readiness for independent practice.

### **4.4 How is the assessment to be done?**

#### **4.4.1 Existing literature**

##### **4.4.1.1 Assessment of lactation consultants**

As briefly outlined in Chapter 1, a literature search for existing tools/methods of assessment of lactation consultants was conducted using the terms “lactation consultant” and “education” combined with terms related to assessment, evaluation, competence, performance or skill. This yielded only two articles (Haughwout et al. 2000; Bunik et al. 2006) both of which related to lactation consultants involved in conducting breastfeeding education sessions for medical students.

The on-line database of the Lactation Resource Centre of the Australian Breastfeeding Association was searched using the term ‘lactation consultant’. This yielded 180 hits with none related to assessment of the LC, and a hand search of the conference proceedings of the International Lactation Consultant Association 2000-2007 yielded no relevant research articles. Search details are presented in Appendix A2.

It is surprising that despite the over 28,000 individuals who have become International Board Certified Lactation Consultants since 1985 and the twenty-year existence of a peer-reviewed specialist journal of the International Lactation Consultant Association, the Journal of Human Lactation, the topic of assessment of IBCLC performance has not generated publications.

#### **4.4.1.2 Assessment of other health workers related to breastfeeding**

It may be that certification as a lactation consultant is viewed as an add-on qualification and any research on assessment is carried out related to the original qualification such as nursing and published in journals of those professions. Therefore, the previous literature search was extended for tools or methods of assessment of any health workers related to milk expression and to breastfeeding. Search details are in Appendix A2. Articles were excluded which did not specifically relate to the assessment of the health worker, along with articles which reported surveys only of knowledge. This resulted in seven articles. One additional article was found in hand-searching. Thus, there were eight articles for in-depth review, none of which were specific to milk expression. These articles are discussed in the following section by their method of assessment and summarised in Table 4.1. Evaluation of the training was the focus of the studies and generally, the process or method of assessment was only reported briefly with no discussion of the effectiveness of the assessment process or tools.

##### ***Written assessment of application of knowledge***

Three studies (Moran et al. 2000; 2005; Law et al. 2007) used the Breastfeeding Support Skills Tool (BeSST), which was developed and validated by Moran et al (1999). The aim of this tool is to examine knowledge and application of knowledge related to positioning and attachment, breast refusal, sore nipples and sore breasts. This is done via a written questionnaire that takes about 30 minutes to complete and is then scored by a trained person using a marking grid. The developers acknowledged that “the ecological validity may be limited”(Moran et al. 2000) and that “in the absence of an alternative method to measure skills, is a useful indicator of the application of knowledge to particular breastfeeding scenarios”(Moran et al. 2005). Whilst this assessment tool could have a place in an overall assessment programme, it would not be suitable to be used on its own to measure a student’s performance with a mother in a real-life setting.

##### ***Objective Structured Clinical Examinations***

Two studies (Nyquist et al. 1994; Haughwout et al. 2000) used written questionnaires and Objective Structured Clinical Examinations (OSCEs) with standardised patients and a pre- and

post- intervention design to measure the effect of attending an education programme. Haughwout et al (2000) used a 3-station (15 minute) OSCE including history, physical exam, diagnosis and treatment plans, for the scenarios related to positioning and attachment, sore nipples, and evaluation and treatment of low-milk supply. A trained observer, who was an IBCLC, used an objective yes/no checklist developed for each scenario and later provided feedback to the students.

Nyquist et al (1994) in an evaluation of the Wellstart programme, used a 5-station OSCE including breast pain, engorgement, and infant failure to thrive. Faculty were trained as raters and used a 3-point rating scale consisting of: displayed the positive behaviour, somewhat displayed, did not display. The article did not mention feedback.

From the information in the published articles, it appears that these two studies used a model that considers breastfeeding as a clinical problem requiring diagnosis and treatment in accordance with set procedures that can be marked yes/no. These assessments used mothers from local support groups trained to act a scenario, and thus did not facilitate assessment of the student's performance in adapting to each individual situation as would be encountered in the real workplace.

### ***Performance assessment***

Three articles referred to competence models (Tweedie 2000; Chiu et al. 2003; Paterson et al. 2004) where the health worker was assessed for showing specified behaviours.

Provision of consistent high quality breastfeeding care was the aim of the tools developed by Tweedie (2000) and of Paterson et al (2004), which sought to have all relevant staff undergo a competency validation process. The tool presented by Tweedie consists of a yes/no checklist for the observer of 24 behaviours of the midwife in teaching a mother about infant attachment to the breast using the "Hands-Off Technique" (Fletcher and Harris 2000). The checklist is published as a letter to the editor and it is unclear if the midwife must achieve a "yes" mark for all items and what happens if remedial work is needed; further information was sought from the author but was not obtained.

Paterson et al (2004) developed a breastfeeding tool as part of a larger project of competence validation for community maternal child health nurses. The breastfeeding tool consisted of 56 written knowledge questions to assess technical skills including use of a breast pump, and 16 items related to interpersonal skills and critical thinking skills with suggested validation techniques such as observation, return demonstration, role play, client record audit, and case study analysis, scored as achieved/not achieved. Discussion questions are provided to assist the assessor to decide if the observation of practice was of an acceptable level to mark as 'achieved', though it appears that the decision could relate more to the nurse's ability to explain her actions and thought processes than to her observed actions. It is suggested by the materials

that the assessment could be done with role-play between the nurse and the assessor and that no real-life situation need be observed if it is inconvenient to do so.

The study by Chiu et al (2003) was undertaken to inform the development of an effective educational policy through the assessment of student nurses' clinical performance following a two-hour classroom session on breastfeeding and 4 to 15 days placement on an obstetric unit. An existing Competency-Based Clinical Performance Examination Model (Chung et al. 2001) in maternity nursing had been adapted and undergone a validation process to form a Breastfeeding Clinical Performance Examination. There were seven items of key behaviours in assisting breastfeeding listed, such as "latch-on techniques"; however, the published article did not describe how these were rated. The students were required to meet all the criteria in order to achieve a pass and post-assessment discussion with the external assessor was used to improve students' knowledge. In an example of how assessment can affect teaching, the gaps in the students' knowledge and skill are discussed, and recommendations made as to how they could be addressed by changes to the teaching programme.

#### **4.4.1.3 Summary of existing tools related to breastfeeding**

As summarised in Table 4.1, two of the tools reviewed (Tweedie 2000; Chiu et al. 2003) sought to assess at Miller's level of 'does' or performance in real-life, with one further tool (Paterson et al. 2004) offering this level as an option. Tweedie's tool is very detailed and assumes there is an agreed set of behaviours the health worker should use with all mothers. It does not appear to allow for flexibility in order to meet an individual mother's needs. The method of Paterson et al appeared useful as a professional development process where adequate time is allocated for reflection and discussion of observed practice. However, it appeared less useful when a short tool with clear marking criteria was needed. Chiu et al's method appeared to be relevant, but difficulties in acquisition and translation from Chinese of the underpinning research made it unfeasible to adapt for this project. None of the articles studied the use of the tools or the assessment process, nor reported on reliability testing.

Only one of the eight assessments reviewed included an element of self-assessment with participants asked to rate on a 5-point Likert scale "How comfortable are you in helping a woman who has problems breastfeeding?" (Haughwout et al. 2000). However, this question is not asking for the student's assessment of their performance. This article did not report any correlation between the student's view of their level of comfort in assisting and their actual scores on the OSCE or knowledge test.

None of the five studies that included mothers or standardised patients reported seeking the mother's view of the assistance received. Thus, I concluded that there is little research published on assessment of performance in assisting breastfeeding mothers, and I found none that included the mother's view of the performance.

Table 4.1 Tools used in assessments related to breastfeeding

Study	HOW was it assessed	WHAT / WHO was assessed	Assessed workplace performance
Chiu, F-H, Gau, M-L, Kuo, S-C, et al. (2003) Common Problems of Clinical Performance Examination in Breastfeeding Instruction for Nursing Baccalaureate Students. <i>Journal of Nursing Research: JNR</i> , 11, 109-18. (translation from Chinese)	Real performance assessed once, taking 60 minutes. Assessment form explained and given to students beforehand to familiarise them with the requirements. One trained assessor examined students spread over seven hospitals. Feedback given to student at time of exam and performance discussed with student for their input before marks submitted. All behaviour criteria must be met in order to pass.	Under-grad nursing students' skill of breastfeeding instruction to mothers carried out during obstetric clinical placements. Indirectly teaching on course was evaluated n=60 Taiwan	yes
Haughwout, J.C., Eglash, A.R., Plane, M.B., et al. (2000) Improving Residents' Breastfeeding Assessment Skills: A Problem-Based Workshop. <i>Family Practice</i> , 17, 541-6.	3-station OSCE (15 min) with history and physical exam basics of positioning and attachment, sore nipples (fungal infection), evaluation and treatment of low-milk supply. Trained 'patients' recruited from breastfeeding support group. Trained observer (who was an IBCLC) using an objective yes/no checklist. Written feedback. No information on requirement to pass.	Effect of attending the workshop on knowledge and practice of family medicine resident doctors n=24 USA	no
Law, S M, Dunn, O M, Wallace, L M & Inch, S A (2007) Breastfeeding Best Start Study: Training Midwives in a 'Hands Off' Positioning and Attachment Intervention. <i>Maternal &amp; Child Nutrition</i> , 3 (3), 194-205.	Written assessment testing knowledge of problem-solving skills and focusing on effective positioning and attachment using Breastfeeding Support Skills Tool (BeSST). Answers marked by midwifery lecturer independent of course delivery with random sample second-marked. No information on feedback or requirement to pass.	Effect on knowledge of breastfeeding practice of attending a workshop. Midwives/ nurses n=108 (w'shop group) Student midwives n=29 (control) England	no
Moran, VH, Bramwell,R, Dykes,F, et al. (2000) An Evaluation of Skills Acquisition on the WHO/Unicef Breastfeeding Management Course Using the Pre-Validated Breastfeeding Support Skills Tool (BeSST). <i>Midwifery</i> , 16, 197-203.	Written assessment using BeSST Tool. 30-40 minutes completion time. Written answers marked as above. No information on feedback or requirement to pass.	Effect of attending the course Midwives (n=15) who had attended compared to those who had not (n=13) England	no

Table 4.1 Tools used in assessments related to breastfeeding (continued)

Study	HOW was it assessed	WHAT / WHO was assessed	Assessed workplace performance
Moran, V.H., Dykes, F., Edwards, J., et al. (2005) An Evaluation of the Breastfeeding Support Skills of Midwives and Voluntary Breastfeeding Supporters Using the Breastfeeding Support Skills Tool (BeSST). <i>Maternal &amp; Child Nutrition</i> , 1, (4) 241-9.	Written assessment using BeSST tool. 30 items based on 4 video clips. Written answers marked by two research assistants from previously validated scoring sheet. No information on feedback or requirement to pass.	Measured knowledge of breastfeeding practice skills. Compared voluntary breastfeeding supporters and midwives (15 of each) England	no
Paterson, K.E., Leff, E.W., Luce, M.M., et al. (2004) From the Field: A Maternal-Child Health Nursing Competence Validation Model. <i>MCN, American Journal of Maternal Child Nursing</i> , 29, 230-5. Additional materials on web site.	Written test and either direct observation of nurse-mother interaction or simulated via role-play (scenario provided). Observation/role-play was followed by discussion of interaction (questions provided). "Validator" (trained in the clinical skills but not clear if trained in assessing) marks checklist if a specific skill was demonstrated. 75% to pass with some required items	Competence to provide consistent quality care MCH public health and home health nurses 2-3 years in post USA	observation of performance optional
Nyquist, J G, Naylor, A J, Woodward-Lopez, G & Dixon, S (1994) Use of Performance-Based Assessment to Evaluate the Impact of a Skill-Oriented Continuing Education Program. <i>Academic Medicine</i> , 69, S51-53.	5-station OSCE using trained standardised patients. Stations: nutritional assessment, prenatal counselling, and breastfeeding problems (breast pain, engorgement, infant failure to thrive) Faculty trained as raters. 3-point rating scale: displayed the positive behaviour, somewhat displayed, did not display. No information on feedback or requirement to pass.	Effect of training programme on acquisition of skills Experienced practitioners: doctors, nurses and dietitians n=27 USA	no
Tweedie, A (2000) Competency Checklist for Midwives: Teaching Mothers to Attach Their Babies for Breastfeeding. <i>Breastfeeding Review</i> , 8, 28. (letter)	Assessment of performance using yes/no checklist of 24 behaviours of midwife in teaching mother Signed by assessor – unclear if assessor received training. No info on feedback or requirement to pass.	Use of "Hands-Off Technique" in teaching mother to attach her baby for breastfeeding Midwives Australia	yes

#### 4.4.1.4 Performance assessment in other areas and professions

##### *Assessment of assisting learning*

Since the previous search indicated little published work on workplace assessment related to breastfeeding, I then explored the literature on workplace assessment of health workers assisting learning of any health-related skill. This search, described in Appendix A4, generated four studies (Speros 1986; Stetson et al. 1992; Schlundt et al. 1994; Boswell et al. 1996).

Speros (1986) developed a tool to evaluate patient teaching to be used as part of nurses' performance appraisals. The brief published report does not state if a specific encounter would be observed and rated or if the manager would form a global opinion of practice over time. A rating of 'good' indicated information was provided and patient's response was documented; 'commendable' involved establishing feedback and understanding with the patient, using teaching aids, and evaluating the patient's learning; 'distinguished' involved more in-depth discussions and use of resources. This tool would probably give a quick rating, though the reliability of the rating might be low without training in the difference between 'provided information' (good) and 'teaching included in-depth learning' (distinguished). The standards were developed by the managers and amended following dialogue with the nurses to take account of the realities of the work environment. While this standard setting dialogue might assist in the tool being usable by the nurses in the setting, there was no information in the report stating if the standards of performance were valid as regards their relevance to the service-users.

Three of the studies related to one programme, Adherence Promotion Training, and the studies reflected evaluations of aspects of this training (Stetson et al. 1992; Schlundt et al. 1994; Boswell et al. 1996). The health workers' performances were recorded on audio or video tapes and assessed with a tool composed of four categories of counselling skills: relationship building, interviewing, problem identification, and behavioural intervention, with sub-headings and component skills. Each skill was rated on a 4-point scale. Rater training involved reading the training manual, viewing and scoring an example tape, then re-viewing the tape and transcript, discussing both the rating and their scoring. This process was carried out for each of the four categories of skills. The raters then took an exam, in which they were required to correctly answer all the written questions, and achieve 90% or higher accuracy in scoring the tapes. The results show that the inter-rater agreement of the ratings was very high, which was not surprising given the level of rater training. The students organised the taping themselves and then sent the tape to the raters, which did not facilitate any feedback to the students. Stetson et al (1992) highlight a limitation of the patient instruction in that it relied on informing the patient rather than assisting them to learn and to use the instructions. The level of rater training needed and the limitation to imparting instructions to the patient would not make this tool feasible for my use.

### ***Assessment of health worker performance***

The literature on workplace / clinical practice assessment of performance was then explored in other disciplines for health worker-patient interactions. This search produced a very large number of items with a variety of foci of the studies and differences in terminology between disciplines and countries, such as evaluation or assessment, competence or proficiency or performance. As can be seen in Appendix A5, various combinations of terms were tried in order to reduce the number of articles to a manageable size for review. However, it was clear that studies were being missed by the reductions. I was also aware that publication bias might mean that I would be unlikely to find studies that did not work out as anticipated. These could have provided useful information to me on possible methods and pitfalls to consider.

#### **4.4.1.5 Conclusion of the literature searches**

The existing assessment of performance literature specific to breastfeeding was very limited. The literature I found that related to assisting learning of other health skills came predominately from one research and training group. The other article found came from the same city and may reflect high interest in the topic locally. The low number of articles found may result from a change of emphasis from directive patient education to the broader area of health promotion following the Ottawa Charter (WHO 1986). It may also be a consequence of the history of a lower level of research publications in the professions most likely to be involved in assisting patient learning of skills. Extending the search further to include any performance assessment that involved patient-health worker interaction was found to be too unspecific.

Therefore, a pragmatic approach was taken to read highly cited reviews and discussions in various disciplines (Friedman Ben-David 1999; Redfern et al. 2002; Schuwirth et al. 2002; Watson et al. 2002b; Williams et al. 2003; Norcini 2007) and then obtain relevant references and citations linked to those, focusing on aspects of instrument development and assessment processes. These readings provided the underpinning for this chapter of my thesis.

#### **4.4.2 Assessment as evidence**

Building on the view of assessment as providing evidence to inform and support judgements, Norcini's (2007) examination of the judgements made from observation was used as a framework and expanded to address:

- the grounds for judgement, including the number of observations;
- the people making these judgements;
- the nature of the judgement, including the quality or suitability of the performance;
- the process used to obtain the evidence on which the judgements are based.

### 4.4.3 Grounds for the judgement

#### 4.4.3.1 Observation of practice

##### *Live or recorded observation*

An assessment by observation can be live with the assessor present, or via visual/audio recording for later review by the assessor. Both methods have potentially positive and negative aspects related to time, cost, acceptability and recording of the event (Table 4.2).

**Table 4.2: Live versus recorded observations**

	<b>Positive</b>	<b>Negative</b>
<b>Live:</b>	Quicker to set up Flexible/opportunistic Lower cost Qualified staff present to ensure patient safety	No record to discuss Assessor presence may affect performance
<b>Recorded:</b>	Record of event Multi-discussion easier Only student and mother present (if student runs the equipment)	Intrusive Acceptability (to student & mother) as regards confidentiality Equipment cost Set-up time Less flexible unless special room May be no qualified staff present during encounter

The practicalities of recording need to be thought through as well as the ethical considerations (Riley and Manias 2004). As expression involves some exposure of the breast mothers may be unwilling for visual recordings to be made, and students might be unwilling for their performance to be recorded and filed. The informed consent process for both the mother and the student, including information about who will view the recording and what will happen to it afterwards, may be laborious for everyday use. Recording may add extra stress to the situation. Recorded practice sessions may help to accustom the student to the recording as well as techniques needed such as the need for the student to maintain awareness of camera angle unless another person is present to be responsible for the filming. The assessor may take more time to assess the action when viewing a recording than when observing live, as the recording can be re-viewed multiple times. This can be weighed against the time the assessor would use in a live assessment getting to the site, introducing themselves to the mother, waiting for the mother and student to be ready to start, pleasantries at the end and so on. Recording may have benefits when assessors and students are distant, enabling a wider selection of encounters to be assessed, and thus potentially increasing validity and reliability (Hays et al. 2002). A record of the event may be considered important for a high-stakes assessment.

### ***Number of observations***

Performance can vary from situation to situation and may be perceived differently by assessors. Reliability or reproducibility of an assessment result is strengthened by having a higher number of encounters and a large number of assessors observing a large variety of situations; many samples. Challenges to achieving high reliability include the nature of assessing an interaction with another person, the individual personalities, the variability of situations and complexities, and consideration of where the student is in their training programme. In addition, the mother learning to express her milk may be under stress or relaxed, in the early days after birth or sometime after birth, her baby may be healthy or may be very ill in a neonatal unit, and these variations need to be considered in the assessment. The effects of case complexity may be lessened if there is a range of observations assessed such as:

- new mother in postnatal ward - routine breast care and to encourage infant latch-on,
- new mother in neonatal unit - infant is unable to feed at the breast (under extra stress),
- mother post-discharge - seeking to learn this skill for regular or occasional separations.

### ***Defensible***

Sufficient observations are needed that the decision is defensible while avoiding over-assessing, which has financial costs to the educational establishment as well as personal costs to the students and mothers involved. Williams et al (2003) state in a review: “all reports agree that somewhere between seven and eleven ratings are necessary to achieve a generalisable global estimate of competence when raters are basing ratings on a non-systematic sample of observations”. However, they go on to explain that the number of ratings needed depends on the specific domain or skill and who is doing the rating; in other words the agreement of seven and eleven ratings may not apply to all assessment situations. A reliability or generalisability coefficient can be calculated, though there is lack of agreement as to what level is ‘good enough’. Ranges from 0.4 to 0.9 have been suggested along with the need to distinguish between the reliability of a mean across a group and an individual score (Vu and Barrows 1994; Smit and Van Der Molen 1996; Streiner and Norman 2003). Vu et al (1994) suggests that communication is not a generalisable skill. In my project, this level of calculation may be inappropriate for student performance based on the specific situation of the mother and in response to her needs rather than performing a defined and agreed list of behaviours that could be marked off.

Schuwirth et al (2002) proposes a binomial approach where the results of the previous performances determine when to stop assessing. Similar to this approach, in relation to mini-CEX events for medical students, Norcini (2007) suggests that if a student has two encounters that are clearly rated as satisfactory this may be sufficient, whereas a student with two encounters rated as borderline (or unsatisfactory) would need additional encounters.

The mini-CEX was used in the final year of a UK undergraduate medical course, with three assessments in each of five different attachments. Students with five or more borderline or below scores in any one attachment, or three or more borderline or below scores in any one element, were required to repeat the assessment (Hill and Kendall 2007). Putting thought into the purpose of the assessment and what is required to pass, and then deciding the number of observations required, can focus testing resources on those who need it most, whilst still providing a defensible process and facilitating student learning from the encounters.

#### **4.4.3.2 In relation to this thesis - observation**

Thus, the number of observations required is a balance between reliability and feasibility and needs to consider the number of cases/encounters, the number and type of assessors/raters, the settings or care dimensions being examined as well as the reason for the assessment. In my project, the number of observations needed cannot be decided before field-testing is carried out that will provide information of the extent of variable of performances between cases and the acceptance and feasibility of carrying out the assessments. Initially, a pragmatic goal may be two encounters in each of the three situations as outlined previously. For the development stage of this project, live observation may have lower resource costs and thus facilitate use of the assessment process. However, if some encounters can also be recorded these will provide material for training of assessors, standard setting, and review of the piloting.

#### **4.4.3.3 Who does the assessing?**

Perceptions of the student's performance can depend on who is assessing it and may involve self-assessment, peer assessment, patient assessment or a designated examiner, or a blend of these views.

##### ***The designated examiner***

The most common group of assessors are teachers, clinical mentors and others who are assumed to have greater knowledge and skill than the student; referred to here as the 'examiner'. Within a positivist framework this examiner is considered to be more objective or value free than other stakeholders in the assessment such as the student and service-user (Cowburn et al. 2000; Howley 2004; Norcini 2005), though this view may not be as firmly grounded as it is thought.

There has been debate in nursing about who should carry out the clinical assessments of students (Somers-Smith and Race 1997; Mahara 1998; Fraser 2000; Kelly 2002), and their concerns in relation to assessment by clinical practitioners working with the student are likely to apply to other disciplines also. The concerns include:

- the practitioners' expectation for the student to practice in the manner that they (the examiner) do, which might be different from the manner that the student has been taught;
- the lack of understanding of the student's educational programme and unrealistic expectations for the stage of the student's training;

- assessment materials which are developed by academic educators that use terminology unfamiliar to the clinical practitioners;
- the practitioner's reluctance to deal with poor performances of students for whom they are responsible;
- lack of time if the workplace examiner and the student work different shifts and if the patient load is not reduced to allow time for observation of the student's practice.

A workplace assessment process that relies on the examiner having time available within their own workload to assess students may result in rushed or skipped assessments. If the assessment is valued, then protected time is needed to carry it out (Clifford 1994; Somers-Smith and Race 1997; Kelly 2002; Williams et al. 2003).

### ***Peer assessment***

Peer assessment is becoming more common at student as well as at continuing professional development levels, as it is relatively low cost and with less organisational needs than external examiners, though assessment training is still needed. A student may be hesitant to assess a peer, particularly adversely, and resent the time it takes (Davis 2002). However, it has benefits for both parties as students learn to appraise material in order to come to a decision, as well as developing their skills of giving feedback (Schonrock-Adema et al. 2007). Peers may see each other more than the faculty assessors see students and may see a greater variety of situations. This may include occasions when the student is not on their best behaviour for a formal assessment, thus giving a more accurate view of global practice (Davis 2002).

In the available literature, the definition of a peer ranges widely from a student at the same level to a person working with the student who may be at a different level of experience or a different disciple. In some instances, an 'examiner' is only slightly ahead in training and may not have the skills or experience for the responsibility of the full assessment they are expected to carry out (Kelly 2002). In these instances, they might be better viewed as a peer assessor. This category of assessor is not discussed further here, though peer assessment may be useful in the student's preparation for assessment by other assessors.

### ***Self-assessment***

Self-assessment uses principles of adult learning in that the students are viewed as having ownership of their learning, are self-directed and are working in a problem-solving manner on a topic that is relevant to them. It benefits the student in that it requires reflection about what constitutes good work and can identify gaps in practice and ways in which these gaps can be filled, thus assisting the person to take steps towards remediation. In addition, the record of the self-assessment can provide the basis for discussion between student and teacher about the work.

However, the skills of self-assessment may need to be taught to students as an aspect of professionalism and as life-long learners (Davis 2002; Boud and Falchikov 2006; Dearnley and Meddings 2007). Without learning these skills students may be inclined to under-estimate or over estimate their own work (Rudy et al. 2001; Barrett et al. 2002; Dunning et al. 2004; Lane and Gottlieb 2004; Crisp et al. 2006) as well as creating additional stress for themselves in the examination process (Evans et al. 2005).

Barnsley et al (2004) caution about the reliance on self-assessment in their study, which found little relationship when comparing junior medical officers' self-report of their confidence in performing routine skills in an OSCE setting, with the ratings of the examiners. However, this caution needs to be viewed in its context. In that study, the junior medical officers were not provided with the examination criteria that the assessor would use, which were a binary checklist of expected actions, and thus may have had nothing against which to measure themselves. In addition, it was unclear if the course teachers were aware of the criteria that their students were to be assessed on.

#### ***Patient / service-user as assessor***

In keeping with the mother-centred focus of this thesis, the involvement of mothers is seen as an integral part of the assessment. The service-user brings another viewpoint that may be particularly valuable in the situation of being assisted in learning a new skill. Students attending a training course are frequently asked for their view of the course teaching, and in a similar activity mothers could provide useful feedback on the learning assistance provided to them, both to the individual providing the assistance and to the training establishment. Service-users can give their views in a variety of ways.

#### **Satisfaction with service**

The involvement of service-users may take a consumerism approach (Duxbury and Ramsdale 2007) and use satisfaction-rating instruments to look for a global view of perceptions of care over a period of time or during a specific encounter. These ratings may lack sensitivity, as service-users may find it difficult to discriminate one specific aspect of care from the wider experience of care (O'Connell et al. 1999; Edwards 2003). However, Middleton and Lumby (1999) found that orthopaedic patients (in focus groups) were able to discriminate between what was a helpful or unhelpful activity and to suggest activities that might have made a difference if they were performed. This global view in the mode of quality assurance differs from asking service-users to actually assess the performance of the student in a specific skill or task, which is proposed in this project.

### **Simulated patients**

In an attempt to reduce some of the variables and provide a more reliable estimate of the student's performance, it is common in assessments such as OSCEs to include the assessment views of simulated patients. These people are trained to their patient role and in assessing, usually do so on more than one occasion, and are often paid for their work. However, these 'patients' may not have the same views as a service-user for whom the encounter is their actual care (Collins and Harden 1998; Spencer et al. 2000; Wilkinson and Fontaine 2002; O'Keefe and Whitham 2005; Kilminster et al. 2007).

The focus in this thesis is on service-users (mothers) who have no specific training in assessing, who are unpaid, and who generally only give their views on one encounter in which they are the person receiving care. It would be difficult to find sufficient women that were at various stages of lactation to act as standardised or simulated patients and who would remain available for sufficient time to justify the training costs, whereas real mothers are available and generally would be learning the skills of hand expression as part of the normal maternity care.

### **Literature review of service-users as assessors**

To explore the literature on methods of involving service-users in assessment of student care performance a search was conducted using the terms (service-user or patient or consumer) adjacent to (participat\* or involve\* or view) combined with the terms (student or education). Search details are in Appendix A6. This search yielded 267 items which, following abstract review and removal of non-relevant articles, resulted in seven articles for in-depth review.

Of these seven articles, six provided descriptive accounts of the general frameworks and the experiences of those involved in projects with service users as assessors. However, none included sufficient details of the actual assessment processes to permit analysis (Bailey 2005; Davis and McIntosh 2005; Advocacy in Action et al. 2006a; Advocacy in Action et al. 2006b; Brown and Young 2008). One article reported a study undertaken to generate a grounded theory of patients' construction of competence of nurses (Calman 2006) and was excluded.

My impression from searching and reviewing this topic was that in nursing/midwifery education asking patients for their feedback on student performance was frequently done in an informal manner and used to inform the practice examiner's judgement. Medical education tended to report on the psychometric aspects, particularly reliability, when using standardised/trained 'patients' in OSCE-type assessments. Social work and mental health workers tended to work with a service-user over the period of their placement, and the assessment was built on the management of care over this extended period, with emphasis on the active involvement of the service-user in all aspects of their own care and on formally eliciting views. Whilst providing background information and areas for reflection, none of the articles found in this search provided sufficient description on how the assessments were conducted to permit analysis to provide details that could be used as the basis for my study.

### **Concerns about service-users as assessors**

The benefits of user involvement in assessment include: providing an opportunity to see the performance from the recipients' viewpoint, providing quality care relevant to the expressed needs of the users, as well as benefits to the students in their learning particularly in relation to communication skills and empathy (Twinn 1995; Edwards 2003; Repper and Breeze 2007). However, there are a number of concerns raised by educators and students about the use of service-users as assessors:

- service-users may assume that the technical competence of the student is not in question and may therefore focus only on the interpersonal skills (Calman 2006).
- service-users may feel that they do not know what qualities are expected in the student by 'the authorities' and thus cannot judge if those qualities are present (Twinn 1995; Duxbury and Ramsdale 2007). This concern also may be shared by some clinical practitioners who are asked to assess (Chambers 1998; Speers 2008).
- there may be concerns that service-users are kind to students and thus likely to rate them higher (McKinley et al. 2004).
- service-users may be hesitant about expressing an opinion if they think this will negatively affect the student (Twinn 1995; Calman 2006; Speers 2008), though this hesitancy is also reported by practice assessors other than service-users (Watson et al. 2002; Calman 2006).
- service-users may use the evaluation of the student as a means to express dissatisfaction with the overall service available (Edwards 2003; Bailey 2005).
- a student may be unduly praised from fear of reprisal, or in the belief that this praise will ensure better care (Edwards 2003).
- the feedback may be from an unrepresentative selection of service-users (Edwards 2003).
- additional assessors may result in extra stress for the students, resulting in poor performance (Duxbury and Ramsdale 2007).

Many of these concerns may be alleviated if clear explanations are given to all concerned regarding the purpose of the service-users involvement, including pointing out to service-users if they are being asked to also assess technical competence and performance. When this preparation and explanation was used in one project where service-users were involved in the assessment of summative student presentations, the initial "vociferous objections" to the assessment by the students receded. Indeed, the post-project evaluations by the students "were unanimous in asking for increased service-user involvement throughout the whole course"(Duxbury and Ramsdale 2007). Introducing any new method of assessment requires discussion with those involved if it is to work well.

Two qualitative studies looked at patient involvement in assessment. Calman (2006) working in Scotland with general patients in an acute hospital, refers to social conventions and states that patients may be concerned about the effect on their on-going care if they give their views. However, Speers (2008) in a mental health service in the south-west of England found that the nurse participants were more likely than the service users to see negative aspects such as service users' fear of repercussions if negative feedback was given. In the Speers study, four of the five service-users were happy to give direct feedback to an individual student, though the option of commenting anonymously was also mentioned. The views gathered in Speers' project were sufficiently positive that pilot testing of patient assessment is planned (Speers, personal communication). In all assessments, patients are told that their involvement is optional and they could end their participation at any time, though the manner in which the service-user is asked to assess the students may affect their participation. Black et al presented this as: "giving students feedback about how patients perceive them in order to help the students learn to interact with patients better" (Black and Church 1998).

As stated previously, assessment needs to be viewed as an integral part of the whole curriculum, and not as random events occurring during or at the end of training. It is particularly important when user involvement in assessment is being considered, that it is within a broader curriculum framework of a user-focused service rather than added as a token gesture to user involvement, and that there is discussion and agreement from all stakeholders. It is likely that there are differences in views between service-user groups and cultures, and the views of the specific service-user group and setting would need to be explored when using service-user as assessors.

### ***Multiple assessors***

The client's perspective is valuable (Duffy et al. 2004; Egener and Cole-Kelly 2004) as it may give an important view of humanistic aspects of practice (Wilkinson and Fontaine 2002). Indeed when the assessment is related to assisting a client to learn a skill, the client's view might be considered the most important. However, clients may not be aware of the educational objectives of the assessment, or of workplace situations affecting practice, and so the viewpoint of faculty and of practitioners may be needed. Students also need to develop the skill of self-assessment. Thus a solution may be to use multiple sources to provide input to an assessment and increase its validity. Multisource feedback (MSF) using some combination of ratings by faculty examiners, co-workers, service-users, and self-assessment has been used in various settings with positive results (Davis 2002; Greco et al. 2002; Norman et al. 2002; Violato et al. 2003; Wood et al. 2004). However, without user acceptance, MSF could be under-used or mis-used, thus threatening its validity and reliability. A study seeking the views of both students and raters, found that "trainees prefer to know who provides the feedback, while raters prefer anonymity" (Burford et al. 2006). Thus, whether multiple sources or a single source is used, there will be an array of possible risks of bias, and challenges to get involvement and acceptance.

### ***Whose view is 'best'?***

Correlation in the assessors' views is often taken as an indication of the reliability of the assessment process or instrument. This raises the question of whose view is taken as the 'gold standard' to which the other views are correlated when using multi-source assessment.

Davis (2002) takes the faculty (attending doctor) as the gold standard and found that nurses showed the lowest intraclass correlation coefficient when assessing medical residents for clinical competency, interpersonal skills, and overall, when compared to self, peer and faculty ratings.

O'Keffe et al (2001) asked mothers of paediatric patients to rate the medical student's interview skills by viewing a video-taped interview at two time periods and found that the stability of ratings over the two periods was very good. In another aspect of this work, parents of paediatric patients were found to be able to identify medical students that were performing poorly at similar rates to academic examiners (O'Keffe and Whitham 2005). In their study of the communication skills of GP trainees, Greco et al (2002) found a weak but significant correlation between some of the examiner ratings and those of real patients using a rating form. They also found that the global ratings of non-expert raters, including patients, correlated well to physician raters of the communication skills of medical students in OSCE settings (Wilkinson and Fontaine 2002; Scheffer et al. 2007). This indicates that the patient's viewpoint could be used as a valid indicator. However McKinley (2004) viewed patients' opinions as only complementing the faculty ratings, which were seen as more accurate.

Wood et al (2004) used a 10-item form with Likert-type scaling in a pilot study to gather evaluations related to communication skills of radiology residents. Ratings were gathered from the supervising faculty, the residents themselves and the women attending a breast imaging clinic. They found that the women's ratings correlated moderately with the faculty ratings, and they suggest that the resident's self-assessment may be the least accurate.

The match between scores from self-assessment and from teacher assessment have been found to be similar and to be diverging with students having over-inflated views (Barrett et al. 2002; Dunning et al. 2004; Lane and Gottlieb 2004), or underestimating their work (Rudy et al. 2001; Crisp et al. 2006). A systematic review undertaken by Colthart et al (2008) in a variety of health professions, examined the research on the effectiveness of self-assessment methods and the evidence of the impact of self-assessment methods on learning and on practice. They found that the accuracy of self-assessment is influenced by a variety of factors including ability, experience, understanding of the purpose and criteria of the assessment, how students process feedback, and psychological factors. They found that self-assessment may be more accurate for practical skills than for knowledge. In addition, they report that the definition used and the research design of the studies made study outcomes difficult to compare, and that consideration

needs to be given to more than quantitative comparisons of group level analysis of scores. They conclude that self-assessment is an important part of a multi-source assessment strategy.

### **Power balance in valuing viewpoints**

Aside from carrying out statistical correlations of assessment ratings, the use and value of multiple views may be determined by attitudes of those in power. The value of the different viewpoints needs to be clear in the assessment planning. If the service-user view is undervalued it may not be gathered or used, and it has been suggested that social work placement reports should not be accepted unless the service-users' feedback is included (Edwards 2003). The views of workplace practice facilitators may be viewed as carrying less weight than academic staff and may not be sought, or they may be interpreted as less valid because of a view that academia is more expert than those in practice, which may or may not be true (Crisp et al. 2006). The 'expert' view also assumes that the expert is knowledgeable, which may be questionable in a topic such as assisting hand expression that does not have a clearly defined knowledge or agreed practice. When comparing ratings from various sources it is important to be clear what the purpose of the assessment is, as the skills valued by educators may not reflect the skills valued by service-users (Cooper and Mira 1998).

Norcini et al (1997) found that the mini-CEX, which uses different examiners with different patients to assess medical residents' performance, produced comparable scores with little difference between examiners. This was particularly noticeable when multiple encounters were observed, thus indicating that the specific assessment instruments or process may have a greater bearing on the variability of scores than who is doing the scoring. It may be too much to expect high levels of correlation from various viewpoints in an assessment of performance, and a generalisation about the similarities and divergence of assessment by various groups is unlikely to be useful. Each assessment process and instrument would need to be tested for its reliability, validity and usefulness in the intended setting and for the specific purpose.

### ***Preparation of assessors***

Stakeholders need to value the assessment and have confidence in its findings. Therefore preparation is needed when introducing a new assessment method, including addressing concerns about examiners' reliability, and accuracy in ratings (Hill and Kendall 2007). Assessor training is expensive and it is debatable if extensive training of assessors improves their consistency or increases the accuracy of their rating and observation in medical clinical evaluation (Newble et al. 1980; Williams et al. 2003). Newble suggests using "inherently consistent examiners," testing their proficiency in consistent assessing via videotaped scenarios, and advises against using those who are inconsistent (Newble et al. 1980). While this suggestion may be important for a very high stakes assessment and possible where a panel of examiners may be available for years, it is unlikely to be feasible for on-going work-based assessment of performance, particularly when mothers are assessors.

The educational establishment is responsible for ensuring that those designated to act as assessors are able to function as such effectively. At a minimum, assessors of whatever type need to be clear what is expected of them as assessors, what is expected of students at the stage of training and in the situation, and what items in the performance to focus on (Lenburg 1999; Fraser 2000; Williams et al. 2003; Davis and McIntosh 2005; Crisp et al. 2006; Hill and Kendall 2007).

### ***Benefits and challenges when choosing assessors***

There are benefits and challenges with choosing any type of assessor. Assessment by the clinical teacher means the assessor is more likely to be familiar with the activities being observed. On the other hand, there is a risk of students being given good grades so that the teacher appears successful at teaching, or so the teacher does not need to do additional remedial work with the student. An assessor from outside the clinical site or training course may increase the stress for the student, be unfamiliar with the surroundings or patient population, only be able to observe a limited range of performance, and their involvement has cost implications.

However, they may be trained and more experienced in assessing, and have protected time to assess. Self-assessment may under-estimate or over-estimate performance depending on the understanding of the criteria, the self-awareness and the confidence of the student. Work colleagues may continue to work closely with the student after the assessment, which could bias them to give a good mark to keep friendly, or might result in strict marking to ensure that when the student is qualified they will be safe to work on their own and not as a risk to the team. A service-user may give a good mark through fear of retaliation, give a bad mark to indicate dissatisfaction with the service more than with the individual student, or may be unwilling to give a mark at all for fear of not knowing the standard expected.

#### **4.4.3.4 In relation to this thesis - assessors**

This thesis does not attempt to conclude if a particular type of assessor is best, as the assessor used is likely to vary between training systems, differing purposes of assessment, and availability of assessor. Perhaps the closest to an ideal assessor is one who is consistent by nature, with recent clinical expertise who has received training on the assessment instruments, practice at judging acceptable levels of criteria based performance, and has ample protected time in which to carry out observations of practice. Since those ideal assessor and conditions are in short supply, involving more assessor views may help to provide assessments that are more defensible.

It can be concluded that:

- One type of assessor cannot be deemed as ‘best’ in all situations and including the views of service-users may be particularly relevant when they are an integral part of the activity being assessed, for example when they are learning a skill.
- Multiple viewpoints can aid in the assessment of performance if the process is designed to seek these viewpoints, and they are valued by those involved.
- The assessment development needs to ensure that the purpose and process of the assessment is clearly defined, explained and feasible for all involved.
- For this project, the viewpoints of the mother, the student and the examiner are all valuable and will be sought.

#### **4.4.4 Nature of the judgement**

The grounds for the judgement and who is making the judgement were discussed in the previous sections. The nature of that judgement will now be discussed using three categories:

- occurrence of the particular behaviour;
- quality of the performance;
- fitness for the purpose.

##### **4.4.4.1 Occurrence of behaviour**

A checklist consists of a list of observable behaviours that the student is expected to perform (or avoid performing) which is marked as the listed behaviour occurs or does not occur. Use of a checklist may give some level of procedure objectivity (Eisner 1993, pp. 50-51). It may also indicate what elements are considered important in the assessment, aid analysis and assist in calculating reliability statistics in a psychometric model. However, checklists do have limitations. Cox states: “Checklists are incapable of identifying what actually happened... Clinical exams have even been subverted by the naive, pseudo-rational error that competence is defined by obedience to doing exactly what someone else expects you to do in every case”(Cox 2000).

The observation of occurrence may suit technical or procedural skills and may be more suitable at the early stages of training. A complex skill such as assisting patient learning would be difficult to break down into distinct actions, and with a high level of performance, the actions may be seamless. In a patient-focused model, the order of actions may be flexible depending on responses from and to the patient, and a checklist with many items may be difficult to use if the behaviours are not in a similar order to the checklist. The question also arises as to how the checklist items are decided. Egener (2004) points out that a student could rate poorly when assessed with a faculty checklist, but rate well with a patient’s overall judgement, as the checklist may reduce the assessment to only measure observable behaviours in a search for reliability, while the patient may be rating if their individual needs are met.

#### **4.4.4.2 Quality of the performance**

An instrument using a rating scale can distinguish between levels of performance such as “unsatisfactory”, “adequate” or “excellent”. Scales rely more on the assessor’s judgement of the quality of the performance and the anchor statements or descriptors can assist in forming a judgement. Preparing rating scales specific to the case may improve the accuracy of the assessors (Williams et al. 2003). The broader or more generic the items of the instrument are, the more that assessor preparation is needed to produce consistent understanding and rating of the criteria. Ratings scales are returned to later in the process to obtain evidence (Section 4.4.5.1).

#### **4.4.4.3 Fitness for purpose**

An assessor may be asked to judge if a performance overall was pass/fail as regards “fit for purpose.” This global rating may provide supporting evidence of the accuracy of a quality of practice rating scale or checklist if there is a high correlation between the scores from each source. However, there may be carry over from the checklist result to the global rating score and thus confound correlations (Govaerts et al. 2002). Regehr et al (1998) took this carry-over into account and examined the use of global ratings with and without concurrent checklist use in surgical residents performance on an OSCE-type examination. They found that global rating scales used on their own (without checklists) by experts were more reliable than checklists alone, or checklists plus concurrent global rating. However, a global rating on its own may have a higher risk of bias, as single incidences of very poor or very good performance may colour the overall view of the assessor, and a single global judgement may lack the detail to provide feedback to the student or course organisers. Providing the assessors with guidelines or descriptors of performance for reference and/or a structured form to direct attention to specific items to observe when deciding on a global rating could serve to assist assessors in indicating areas to provide feedback on as well as helping to standardise ratings (Williams et al. 2003).

#### **4.4.4.4 In relation to this thesis – nature of the judgement**

Thus, it is not that one type of judgement is better overall but that each type – occurrence, quality, or fitness - has a role and the overall assessment plan for the training and the particular purpose and setting will influence what are the most suitable types, or types, to use in each specific assessment. I do not considered checklists suitable for assessing this performance of assisting learning because of the complexity of the performance. It may be more suitable to use a rating scale to provide information for feedback on the performance and a global rating scale that as well as providing information to the student, can reinforce the concept of a judgement needing to be made of fitness to practice.

## **4.4.5 Process to obtain the evidence**

### **4.4.5.1 Instruments to aid judgements**

An instrument can provide an aid to gathering evidence to judge the performance and may reduce subjective judgements (Spies et al. 2004). Aspects to consider in developing an instrument include its feasibility and usability, indicators of performance and standards.

#### ***Feasibility and usability***

Workplace performance assessments need to be quick to complete and focused if they are to be feasible. The focus needs to be on the purpose of the assessment; in this project on assisting hand expression the instrument needs to specify the skill of choosing appropriate information rather than if the student can relate a long list of information and options to the mother. It may be an unnecessary use of limited space and time to include items to be assessed for which all students would be expected to rate highly, though including some items for which high ratings are likely may provide an opportunity for positive feedback to students. When service-users are participating as assessors, the instruments must be understandable and accessible to them. There may be considerations as regards the instrument's length, such as time taken to complete the forms, fitting on one side of a page to appear easy to use, or if there is a cost consideration in copying long documents and then storing the completed assessments.

One instrument may be used to record judgements of performances observed over a longer time period with multiple encounters using a global rating, though this is more likely to be completed in retrospect and more prone to bias as discussed previously. The completed assessments may be collected by the educational establishment; the student may keep the sole record of their assessed encounters; a multi-copy carbonised form may be used (Davies et al. 2005; Hill and Kendall 2007); or electronic means may be used ranging from scanning in paper forms, to entering directly into a hand held device, and developing software specifically for recording and tracking the assessment results (Mc Allister 2005). However, direct electronic scoring may pose more of a challenge when service-users are involved, and when there are numerous short encounters spread over a course, rather than assessments at fixed times.

For a summative grade, each assessor (examiner, mother, and student) could complete an instrument for each encounter and the set of instruments be returned together for review by the clinical facilitator, or academic coordinator, or other person responsible for grading the student. This would provide more anonymity for the mother; however, it would not facilitate feedback to the student immediately after the encounter. In a more formative model, the mother's view could be used initially as part of the examiner's immediate feedback to the student in a general discussion of the encounter. Feedback is discussed later in this chapter (Section 4.6.1).

### ***Indicators of performance***

An observation instrument may use indicators of performance, statements, items, behaviours or attributes, and in the health professions, these indicators are usually linked to the documents of the profession's standards of practice or requirements for registration. The specific behaviour or indicators can come from a variety of sources such as focus groups, key informant interviews, research findings, critical incidents, expert opinions, or task analysis (Streiner and Norman 2003).

An instrument may list the items to be assessed in varying specificity. For example, the Mini-CEX in medical education lists the broad areas of history taking, physical examination, professionalism, clinical judgment, counseling, organization and efficiency, and overall care, with a rating scale for each area (Norcini et al. 2003). More specific terms, including action verbs, are used in a 44-item general nursing instrument, with a rating scale for each item such as:

*“Makes sound, independent, clinical judgement” and “Involves the individual as a participant in the process of care”* (Fisher and Parolin 2000)

Similarly, these are used in a 17 item checklist for maternal-child nursing that includes:

*“Considers the effects of medications mother is using on breastfeeding and newborn health” and “Involves the mother in developing and implementing a plan for priority concerns”* (Paterson et al. 2004).

Very specific items are more likely to be found in checklists such as in a detailed twenty-four item checklist for midwives teaching breastfeeding skills ranging from:

*“Midwife organises herself with models alongside mother learning to breastfeed,”* through *“Midwife allows mother to identify when milk transfer is taking place,”* to *“Midwife reports/documents all observations/findings and replaces records correctly”* (Tweedie 2000).

The specificity of the items will also relate to the purpose of the assessment – what is being assessed, why, and at what point in the student's course or professional development.

An instrument that uses a rating scale for broad constructs or areas such as “shows professionalism,” “makes sound judgement” or “considers the effect”, may pose challenges to obtaining assessor reliability. Extensive training may be needed to obtain agreement on what constitutes a satisfactory level of “soundness”, “effectiveness”, “appropriateness”, or similar terms, and to avoid bias, for example, in a situation if the assessor does not agree with the management plan the student develops, even though the student can state clear and sound reasons for that plan.

### ***Rating scales***

If the assessment is to differentiate the quality of the performance then the rating scale used must facilitate this differentiation. Many rating scales use descriptors, definitions or explanations of the marks on the scale that provide an example of the expected performance. These can assist the assessor in judging the performance, provide a more defensible rationale for that mark, and contribute to reliability of marking as well as providing clarity for the student and teacher as to what is expected (Stetson et al. 1992; Fisher and Parolin 2000; Robb et al. 2002; Williams et al. 2003; Jasper and Fulton 2005). The descriptors may be written on the scale for each rating scale number or as end-anchors only, which may increase the tendency for the extreme points to be used. Alternatively, there may be general descriptive terms or statements on a separate sheet, with the assessors to decide how well the description was met. The descriptors need to clearly indicate if the maximum rating refers to “satisfactory” / “meets the criteria” or if it refers to “excellent” / “exceeds the criteria”, as half-way to excellent is very different from half-way to satisfactory. Similarly, it should be clear if the minimum rating refers to the behaviour done but done poorly, or not done at all.

### **Perceptions of rating value**

Raters may have a personal perception of the value of the number on the scale (Friedman Ben-David 2000; Streiner and Norman 2003). For example, if a scale of 1 to 10 is used, this may be perceived as 7 indicating 70% and equated with percentages in other types of assessments such as multiple choice or written essays. On the five-point rating scale used by Allison and Turpin (2004), 4 indicated a pass, whereas 2 indicated a pass on a four-point scale (Stetson et al. 1992). There is some evidence that negative values are viewed as more undesirable behaviour than positive values, e.g. on a scale of -2 to +2, -2 may have a different perception than 1 on a scale of 1 to 5. When rating student performance where most are expected to reach a satisfactory level, using an unbalanced scale with more rating points on the positive side may allow greater discrimination of the level of achievement (Streiner and Norman 2003,p.42). Similarly, when terms are used to denote the categories, such as novice to expert in scales such as Benner’s nursing adaptation of the Dreyfess & Dreyfess Model of Skill Acquisition (Benner 2001), there is a subjective bias in the assessor’s preconception of what a term indicates.

### **Visual Analogue Scale**

“Competence should be viewed as an appropriate cut-off point on a learning continuum, not as a state of mastery,” according to Eraut (1994 162). A Visual Analogue Scale (VAS) may provide a means of rating the perceived level of performance along a continuum and has been used effectively in a variety of situations (Wewers and Lowe 1990; Cox 2000; Roach et al. 2002; Streiner and Norman 2003; Meretoja et al. 2004).

The benefits of using a VAS include that it:

- does not restrict the rater to choose a specific category;
- can facilitate the fine discrimination of judgements, which may be particularly useful when students are nearing the end of their training and expected to be showing performances that are near the end-point criteria;
- can assist in recognising student development over the training period;
- avoids using a mid-point found in bi-polar scales that could be considered as a neutral point, and may assist in reducing end-aversion bias;
- can use descriptors based on the criteria provided as clear end-anchors rather than developing descriptors at numerous points on a scale, which may be vague and difficult to distinguish between.

The VAS is most commonly known as a method for the self-rating of subjective phenomena such as pain. However, it has also been used for indicating performance levels of physical therapy students (Roach et al. 2002; Straube and Campbell 2003; Stickley 2005), dietetic students (Pender and Looy 2004), and occupational therapy students (Miller et al. 2001) as observed in their clinical placements, and for nurses to self-assess their skills (Meretoja et al. 2004). In relation to performance, the scale could be viewed as similar to a measure of satisfaction as to what extent the criteria has been met. Reliability testing of VAS has been limited as most commonly it is used for constructs that are dynamic and may not remain stable for re-testing.

### **Analysis of rating**

Whereas in a checklist the judgements are categorical such as yes/no, pass/fail, and provide nominal measurements, a rating scale can use terms such as poor, satisfactory, excellent, or number or letter ratings. It cannot be assumed that the interval between poor and satisfactory (or 1 and 2) is the same as that between satisfactory and excellent (or 2 and 3) and therefore they are ordinal data and non-parametric statistics must be used in analysis. However, this definition is debated and rating scales are often analysed as if they were interval data, though if the distribution of the scores is skewed this may introduce bias (Streiner and Norman 2003, p.42; Burns and Grove 2005; Jamieson 2005; Pell 2005). A VAS can provide data that can be analysed as interval-level data with parametric statistics providing correlations with length of training, between skills and between groups of students (Roach et al. 2002; Meretoja et al. 2004; Pender and de Looy 2004). However, Straube and Campbell (2003) grouped the measurements marked by the clinical instructors and analysed the VAS as a 6-level ordinal scale.

Maxwell (in Wewers and Lowe 1990) reviewing the debate, concluded that “it generally makes little difference whether parametric or non-parametric data are used to analyze VAS data.” However, as with all analysis, the decision as to the most suitable test depends on the inferences being tested.

### **User understanding of rating system**

Though some difficulties have been reported with patients' understanding of the concept of the VAS, particularly with ill and elderly patients (Wewers and Lowe 1990), it has been successfully used with children over the age of 7 in school settings (Smith 2002; Shields et al. 2003), and to measure perceptions of breastfeeding support (Ekstrom et al. 2003). This may indicate that healthy individuals respond differently to the VAS than elderly and ill patients. Its use with staff and students has been well received in some studies (Roach et al. 2002; Meretoja et al. 2004), though some difficulties were encountered in an adaptation used with clinicians supervising occupational therapy student placements (Miller et al. 2001). Some of the difficulties with Miller's use may have related to the presentation of the scale in this adaptation of global assessment at the broad competence level. Shaded sections of the VAS were used to indicate different performance levels, and an array of confusing straight lines made it difficult to decide which lines were the scales to mark. In addition, there was little indication of the behaviours to observe as evidence for the rating. However, the main comments reported from the field-testing of Miller's instrument, were that a numerical scale would be viewed as more objective by some and that they were more familiar with using it for rating students, as well more clarity as to what was being assessed. Therefore, although graphic rating scales of various types are becoming more common and are found in various formats including internet surveys, as with any rating scale used in an assessment, it needs to be clear what is being measured and an explanation of the scales' use would need to be provided.

Service-users with literacy or language difficulties will present challenges with any form of instrument, though a pictorial rating tool may be useful in some situations (Advocacy in Action et al 2006a). A VAS scale may require the reading of fewer descriptors than other systems and less words to translate into another language if needed.

#### **4.4.5.2 In relation to this thesis – instruments**

In a process that includes the views of students, service-users and examiners, the use of the rating system by all of those involved needs to be considered. When feedback to the student is a main outcome of the assessment, a rating system is needed which indicates the quality of the performance and allows a suitable fineness of distinction between ratings. A visual analogue scale can facilitate fine discrimination and reduces the potential bias of pre-existing perception of the value of a number or term. It has also been shown to be useable by those with less education.

#### **4.4.5.3 Performance standards**

In using a pre-determined performance standard, it is appropriate to consider who set it, what the process for setting it was, and what it indicates (Kane 1994; Norcini and Shea 1997).

Standards are judgements, but judgements that should be based on information and due process.

The standard should relate to the purpose of the assessment in the context of the education of the students, practice requirements and public safety. Tests for reliability and validity indicators of the assessment can provide evidence to support indications and inferences from the assessment. However, due to the inherent variability of performance with real patients and lack of a provable right or wrong performance standard, evidence to support the credibility and defensibility of the process to set the pass standard may be more appropriate than relying on statistical tests (Norcini and Shea 1997).

### ***What does the standard indicate?***

#### **Level achieved**

The stakeholders, including mothers, educational providers, and employers as well as the students, have expectations that a passing grade means a certain level of proficiency and an assessment with a low standard to pass might be considered of little value. In some assessments the standard of performance considered acceptable is pre-determined and written on the instrument, for example, as a descriptor such as “acceptable” or “at the level required”. Performance standards with pre-determined criteria provide a means to assess the student’s performance in a specific setting, and without reference to the norms of the current or previous student group. If the criterion is defined as ‘sufficient for practice’ then the student must achieve this standard on 100% of the items as a standard of less than ‘fit for practice’ is not acceptable (Lenburg 1999a; Fitzgerald et al. 2007). However, having ‘sufficient for practice’ as the maximum level may limit feedback for those students who are performing well and provides no incentive to strive for excellence (Andre 2000).

#### **Compensation**

When multiple items or multiple events are included in one assessment, the question arises regarding compensation. Allowing compensation may increase the pass level if the pass level is the average across all the items or events combined, though this may allow students with poor skills in an area to go forward. Therefore a minimum score may need to be achieved for some items or events, or for all items or events as a conjunctive standard (Friedman Ben-David 2000). The purpose of the assessment such as whether formative or summative, the reason for inclusion of items that do not require a pass, the cost and feasibility of re-assessments, the risk to the patient of allowing students to pass with poor skills in some areas, the correlation between assessment items or events, and the acceptance of the standard by the stakeholders, all need to be taken into account when deciding on compensation.

### ***Who sets the standard?***

Standard-setters are ideally a mix of educators, practitioners, content experts, credentialing bodies, and service users, avoiding those who are known to have set beliefs about particular ways of practice, or a stake in particular training modes. In research reports it is assumed that

they are trained in techniques of standard-setting (Norcini and Shea 1997), though the practicalities of first training a varied group, and then having them spend time setting standards may be challenging. This is particularly true in a specialist area such as training lactation consultants, where the students and the training centres are widely dispersed. The standard required to pass that is set by one group, may differ from that set by another group even though the training and expected outcome is similar, which may be due to different views of what indicates competence or the method used to set the standards (Boursicot et al. 2006). The multiple-choice exam for lactation consultants is set by an international certification board. Consideration needs to be given to the feasibility of setting international standards for clinical performance. National or even institutional standards may be more achievable, at least in the short term.

### ***How is the standard set?***

The process for determining a criterion-referenced standard, which should be specified, recorded and thoroughly address the whole assessment, may be based on information regarding performances of other groups of students, or from other assessments. When this information is not available, the expert opinions of the standard-setters may need to be relied on and the standard re-examined later when more information is available.

### **Defensible process**

Though due diligence in setting standards is important, the feasibility also needs to be considered so that it becomes due diligence in the particular situation and for the particular purpose. For example, it would be unlikely to be considered necessary for a group of standard setters to spend days debating the performance standard to be set for a pilot assessment of performance in assisting a mother to learn to hand express her milk, as long as the process used was defensible. With regard to the reproducibility of the standard, Norcini et al asked “How would the standard change if it was set at a different time by different judges?” (Norcini and Shea 1997), and it is worth considering the points raised earlier about whose judgement was “best.” If the assessment involves multiple sources such as service-users, student and examiner, as part of the standard setting process there may need to be a political decision about how, if at all, to value the different viewpoints.

### ***Assessment of performance involves judgement***

Many of the standard setting methods and much of the testing and published research applies to multiple choice tests where there is one “correct” answer, unlike the more complex performance assessment where there is a range of acceptable approaches and low generalisability due to case specificity. Hambleton et al (2000) and Boulet et al (2003) reviewed the use of standard-settings methods that were historically developed with multiple choice tests discussing their lack of suitability for complex performance assessment, and then jointly in McKinley et al (2005), they

describe a “work-centred approach” in which the standard setters used their expertise and examples of student performance to determine a case-level standard of proficiency. Cox (2000) also highlights the need to assess performance at the case level rather than isolated tasks, and makes the point that “Clinical performance is too complex and interactive for measurement. Judgment is always necessary for its assessment.” The process for arriving at the judgement needs to be defensible.

#### **4.4.5.4 In relation to this thesis – standards**

Some issues arise at this time in relation to standard setting for assessing performance in assisting a mother to learn skills:

- A standard setting panel is assumed to be made up of trained experts. However, as the studies reported in Chapters 2 and 3 highlighted, the ‘experts’ may have quite differing views, and with few formalised clinical practice opportunities for lactation consultant students there is unlikely to be expertise in assessing these students easily available. There are small numbers in the profession, with a worldwide spread of personnel, so training standard-setters poses a challenge.
- Most standard-setting methods assume there is a “correct” answer, and though the profession’s expected competency statements underpin the assessment, there is no agreement as to what extent a qualifying student is expected to demonstrate mastery or what is considered “good enough” practice, or what behaviours would be viewed as demonstrating these broad competences.
- The well-documented methods of standard-setting require an exam to run for a period in order to obtain the data, which is in turn used to set the standard. The instrument and process in this thesis is only at a development stage, so there are no performance data to review. Assisting mothers to learn to hand express effectively may be an infrequent practice in some settings and if asked to visualize how a student would perform at a passable or any other level, a standard-setting panel might find this difficult to visualize.
- The standard set needs to be realistic relative to other assessments, for example, if a student lactation consultant passed on their assessments of clinical performance it might be expected that they would also pass on their multiple choice certification exam. However, the assessments are measuring different aspects and their correlation, if relevant, can only be tested after the practice assessment and exam are completed.

Therefore, in this project, a documented process is needed to establish an interim standard to be used to provide guidance during the testing with the opportunity to examine it again after the pilot and field testing when there is more information on which to base judgements, and a trained group of experts can be involved in the standard setting. The process of establishing this standard is described in Chapter 5.

#### 4.4.5.5 Assessment protocol

It is not possible for a workplace assessment with actual mothers to be identical for each student as each mother and their needs are different. Thus, an assessment protocol helps to ensure fairness and consistency, whilst allowing flexibility to ensure the situations are comparable and equivalent. The assessment protocol details who is to be assessed, the purpose of the assessment, settings, assessors, instruments, and standards, as well as processing of the assessment findings, and method of feedback to students and teachers.

#### 4.4.5.6 Ethical considerations

This assessment involves mothers, their infants, students, examiners and education programmes as well as wider society, and the potential for harm to any of these groups needs to be considered. As these assessments are likely to be carried out in teaching establishments, the mother would be generally aware that student training was an activity of the establishment and as there is little risk involved to the mother, verbal consent to participate is considered sufficient.

The main ethical concerns that would need to be addressed in this assessment include discussing with all involved what happens to the filled-in assessment instrument as well as:

*The rights of the mother:*

- To her care (and that of her baby if present) remaining paramount during the assessment. The student will be under supervision of an experienced practitioner during the assessment to reduce the risk of injury to the mother or baby.
- To have explained to her in a way that she understands, the purpose of the assessment, and her role. That she can refuse to partake or can withdraw at a later stage, and that not participating or withdrawing will not affect her care.
- For her responses to be confidential and for her privacy to be respected as far as practical (notwithstanding that there will be an additional person observing the interaction in the form of the examiner).

*The rights of the student:*

- To have the necessary learning opportunities prior to the assessment
- To have the assessment purpose, process and expectations explained well before the assessment takes place, and the involvement of mothers in rating discussed. A student would have the right to refuse to participate in testing of the assessment process.
- To a fair and accurate assessment. A poor mark could affect the student's self-esteem, their likelihood of passing the module and their future in the profession. As this is a project to develop an assessment process, it should not be used as the sole and definitive mark for the student until the instruments, process and standard are adequately evaluated.
- To constructive feedback on their performance and arrangement for remedial assistance if needed.

*The responsibility of the examiner:*

- To ensure the rights of the mother (and baby if present) are safeguarded.
- To protect the public from unsafe practices as students who are passed by an over-generous assessor may be a risk to patients and clients.
- To provide and discuss constructive feedback with the student.
- The examiner also has the right to be protected from an ungrounded appeal against their judgement.

*The responsibility of the educational programme (and researcher during field testing):*

- To provide the necessary learning opportunities to the student prior to assessment
- To ensure that the assessors understand their role and the instruments and are able to carry out their role
- To ensure that the assessment is carried out without undue rushing that might put all involved under additional stress, as well as resulting in poorly completed instruments

To address these rights and responsibilities, the instruments need to be carefully constructed with clear instructions, adequately tested, and effectively used within an environment that has provided effective learning for the student before assessment.

## **4.5 How are the assessment findings to be interpreted?**

Assessment analysis often focuses on tests for reliability and validity and the numerical results of those tests. Pronouncements are made such as: “Reliability is an absolute precondition to validity and it should be considered first. Only if a tool is found to be reliable should the researcher progress to consider validity”(Gibbon 1995). However, thinking this through, it becomes clear that having an assessment that gave a reliable result is of little value if what it is measuring is wrong or unrelated. For example, an assessment tool could reliably measure that the student handed the mother a leaflet on hand expression, though the accuracy of this measure in assessing the student’s skill in assisting the mother’s learning might be questionable. Thus, reliability and validity cannot be interpreted separately, but are linked.

### **4.5.1 Views of validity**

The term validity is frequently used to describe the authenticity of a measure or test, is it credible and measuring what it purports to measure (van der Vleuten and Schuwirth 2005). However, it may be more accurate to describe the validity or strength of the evidence for the interpretations that are made from the results of the test. The considerable amount of literature published on the concept of validity provides many different viewpoints and practices of researchers and reviewers from education, psychology, psychometrics and other disciplines.

Lissitz & Samuelsen (2007) review the history of validity testing in education research, outlining its roots in the early 1900s when it was seen with an external focus that associated validity with the predictive value of a test and its correlation with other concurrent evidence to produce what became known as criterion validity. In the mid 1900s, the concept of content validity arose taking into account if the test items covered the domain being examined and this resulted in a focus that was internal to the test. Construct validity was viewed as another type of validity in response to situations where no external criterion existed to which the test could relate to, and thus it needed to be validated to a construct, trait or hypothesis. These separate types of validity then evolved into types of evidence to support claims of validity, rather than as independent aspects. Messick was a particular champion of the unified concept of construct validity “based on an integration of any evidence that bears on the interpretation or meaning of the test scores” (Messick 1989). This concept viewed validity as the intertwining of facets of evidence such as criterion, relevance, content, utility and included the social consequences of the inferences made from the test results.

#### **4.5.1.1 Validity as enquiry and evidence**

Much of the writing on assessment refers to situations where the variability can be controlled or accounted for, for example, multiple-choice testing or using standardised patients and structured simulated activities such as Objective Structured Clinical Examinations (OSCE). High reliability is a goal in these assessments. However, real-life work is not standardised and service-users and situations, and the health student’s reaction to them, are variable. Thus, a pure psychometric or measurement model may be of limited value when applied to the assessment of performance, particularly if it is the responsiveness to the individual situation and mother that is being assessed. Schuwirth and van der Vleuten et al (2002; 2004; 2006) suggest using a model that focuses on the evidence to support judgements that can build to a fair and defensible conclusion about the student’s performance.

This concept of evidence and building justifiable conclusions can fit with the use of a portfolio that contains evidence of a variety of achievements during training, for example, assessments of performance in assisting a mother to learn skills of hand expression. The process and instruments for the assessment provide the means to collect the evidence of the student’s performance. Therefore, in a model of enquiry, this thesis uses the terms “validation” or “testing for validity” to signify the process of obtaining and examining the evidence to support claims. In this model, “valid” comes from valour or strength (of the evidence), and the focus of the assessment section of this thesis asks, “What is the evidence to justify the interpretation of the performance?”

## 4.5.2 Validation process

A model of enquiry or “interpretive argument” (Kane 1992) provides a structured process of laying out the interpretations and assumptions or arguments and then examining the evidence to support those assumptions and refute potential competing interpretations (Figure 4.3). This process would result in a plausible conclusion that contributes to a clear, credible, and defensible assessment procedure. The following section focuses on the validation process specific to the assessment in this thesis.

**Figure 4.3: Model of enquiry** (adapted from Kane, 1992)

### Model of enquiry for testing validity

1. Describe the specific purpose and population for the assessment
2. State the assumptions and interpretations being made
3. Gather information
4. Examine the evidence to support these interpretations

### 4.5.2.1 The purpose of the assessment

Validity testing of an instrument is specific to the population and situation; an instrument is not in itself universally valid. As discussed at the start of this chapter, it is vital for an effective assessment to be clear on the specific purpose for the assessment, who is to be assessed, what is being assessed and how it is to be assessed. The specific details related to this assessment of assisting the mother’s learning are described in the Chapter 5.

### 4.5.2.2 The assumptions and interpretations

The assumptions and interpretations that could be made regarding this assessment are:

1. The items and descriptors in the tool are representative of and relevant to expected behaviours of the students
2. The tool and process is useable by those involved
3. A poorly performing student is likely to be picked up
4. The cut-off score / performance standard is realistic and acceptable
5. The rating provides a reliable indicator of performance
6. There is a high correlation between the findings of the global rating and item rating, or between other tests
7. A high score on this assessment predicts that the performance would become normal work practice

8. Mothers who are assisted are more confident and effective at hand expression, and more likely to use the skills
9. The format assists in provision of feedback to the student
10. Results can improve curriculum and teaching of students

Though giving somewhat differing emphasis and terminology, a number of authors have presented their arguments for specific examination of the design of an assessment, or internal validation, prior to external examination or significance of the use of the assessment and its results; recommending re-valuing the assessment content within the overall examination of validity (Foster and Cone 1995; van der Vleuten and Schuwirth 2005; Schuwirth and van der Vleuten 2006; DeVon et al. 2007; Embretson 2007; Lissitz and Samuelsen 2007; Mislevy 2007). Following on from this position, it seems appropriate in this study to examine the instrument and the process to be used to gather information on the performance first, before any examination would be made of the findings of the assessment.

#### **4.5.2.3 Examining the evidence**

The examination of the instrument and process is described in Chapter 5 and addresses the assumptions one through four of the list above. Assumptions five through ten cannot be examined in detail until there is actual data from the use of the assessment process. Aspects of these later assumptions that need to be considered are discussed here.

#### ***Reliability***

##### Assumption 5: The rating provides a reliable indicator of performance

Reliability refers to the reproducibility or consistency of the measures obtained from an assessment. Test-retest techniques can examine stability of a measurement using a particular assessment tool, although this assumes that the item being measured does not change between testing events. As a mother's learning needs, existing knowledge and skills are dynamic, a second encounter by the student with the same mother would be a changed situation and test-retesting is unlikely to be a useful indicator of the reliability of this assessment. Another aspect of reliability relates to the assessors' judgements. Is an assessor consistent of themselves (intra-rater reliability) and are their ratings similar to each other (inter-rater reliability)? Because this assessment requires the assessor to make a judgement of the quality of the encounter, there will likely be variability due to aspects such as the personal state of the assessor that would occur even if the assessor were rating the same recorded performance on separate occasions. Assessor training may improve the intra-rater reliability. In a multi-assessor method, each may see different aspects. The student's assessment may not statistically link with the examiners or the mothers, the mother's with the examiner and so on. This is not a result of measurement errors but of natural variations. Clear guidelines for the purpose and process of the assessment may assist inter-rater reliability.

Evidence for reliability of the findings comes from the observations, and as discussed earlier in this chapter a greater number of observations across a wider range of situations would give more evidence of whether the student was ready for practice. Thus, whilst the calculation of a reliability coefficient can be done as an interesting exercise, of itself it is unlikely to provide strong evidence to support or disprove an interpretation beyond that of evidence provided by simple probability. For example, if the student has had two encounters in each of three settings (six mothers/encounters) and was rated as having achieved a passing standard for five of these encounters, the probability of the next encounter being of a pass standard is 0.83, which, for a low stakes assessment, might be considered as acceptable reliability of the judgement of “ready for practice”.

### ***Correlation***

Assumptions 6: There is a high correlation between the findings of the global rating and item rating, or between other tests

Correlation tests measure how the student’s performance in one test relates to performance in another test. For example, the assumption could be tested that the student who achieves a pass score on performance of assisting a mother to learn to hand express would also pass the IBLCE multiple choice certification exam, or that a pass related to assisting hand expression correlates to a pass on assisting with positioning and attachment for breastfeeding. Again, this might be an interesting exercise to explore generally how knowledge and clinical practice relate or the transferability of skills between situations, though for the individual student a pass in a knowledge test may not provide firm evidence that they would also pass the performance tests, though poor knowledge might be correlated with poor performance.

This assessment has the individual items and a global yes/no ready for practice. A test could be conducted to see how these two results correlated, though it is likely that having just completed marking the items there would be a carry-over or contamination to the global rating. Thus, the test might not provide evidence to support a link between the two tests, or that one test could be substituted for the other.

### ***Prediction***

Assumption 7: A high score on this assessment predicts that the performance would become normal work practice.

Assumption 8: Mothers who are assisted are more confident and effective at hand expression, and more likely to use the skills.

An assumption is that a passing score in the observed performance indicates that the student is likely to use the skills of assisting learning effectively in everyday practice, that the assessment has predictive utility or validity. However, evidence for this cannot be easily produced; further observations, perhaps covert, would need to be done at a future point and examined related to the assessment scores.

There may be an assumption that this assistance results in the mother being more confidence in using the skill or more likely to be able to hand express effectively. The mother's view of her ability to express can be obtained at the end of the assessment, and information on whether she did express effectively could be gathered in a follow-up a few weeks later. However the mother not using the skill is not evidence that she did not learn the skill, it may be that she had no need to use the skill or decided not to hand express. The mother's use of the skill is not a suitable measure to link with a rating for the student.

### ***Impact on learning***

Assumption 9: The format assists in provision of feedback to the student

Assumption 10: Results can improve curriculum and teaching of students

Feedback to the student is discussed further in the next section which deals with response to the assessment. These assumptions could be tested by measuring the incidence of feedback provided; which is a test of the process of the assessment and format of the instrument and is discussed in the next chapter.

One aspect of assessment is to evaluate teaching and if findings of the assessment are reported back to those responsible for curriculum and teaching these findings may reinforce good teaching aspects and help to remedy others. Though this may be a useful consequence of the assessment, it might be difficult to provide evidence that the assessment findings resulted in changes to teaching. The action of implementing the assessment may have also raised interest in examining the teaching resulting in changes alongside but distinct from any findings from the assessment.

## **4.6 How is the assessment to be responded to?**

Assessment whether summative or formative has an impact on learning and teaching. As outlined in Chapter 1, assessment has a role in monitoring quality of programmes, courses, and teaching as well as assessment findings aiding the evaluation of the assessment activities themselves. It would be naive to assume that high student scores on an assessment were solely the result of good teaching. However, many low scores on an assessment should raise a question about the teaching and the match of the assessment to the curriculum rather than assuming the students were the sole problem.

### 4.6.1 Feedback

The response to assessment that attracts the most attention is usually the response or feedback to the individual student. All assessment activities are opportunities for learning. Making a few comments on a student's performance is not the same as providing structured feedback. A clearer understanding of what feedback involves could assist in providing more effective feedback. Therefore, van der Ridder et al systematically examined the literature to develop an operational definition of feedback: "Specific information about the comparison between a trainee's observed performance and a standard, given with the intent to improve the trainee's performance" (van de Ridder et al. 2008). There are three aspects of this definition to note. Firstly, the action of comparing to a standard requires that the standard be articulated, ideally in assessment documents that adequately indicate and record the performance, or by the examiner (or other feedback provider) describing what level of performance that they believe the student should be aiming to achieve. This returns to the questions earlier in this chapter on the importance of defining what is the purpose and what is to be assessed. Secondly, the need for specific information rather than just general comments, and information that addresses behaviours that the student does well or could improve. Thirdly, the intent to improve performance and not just to criticise.

A potential benefit of workplace assessment is that the feedback can be given very soon after the performance. However, the complete process of giving feedback, allowing the student to react and also to give their self-appraisal, and the development of a plan of action, does not always happen (Holmboe et al. 2004). Examiner training helps feedback to happen, as do assessment forms and processes that include feedback as an integral part of the assessment, not as an optional add-on if there is time available. While a variety of examiners may give a broader picture and at times make it easier to find someone to do the assessment, having designated examiners who are trained and allocated time for assisting student learning might improve the quality of assessments including feedback.

A concern of some examiners may be that if they give feedback they are not in a position to provide the on-going support to remedy deficiencies, and thus they avoid raising the concerns. While this could be considered unprofessional and unethical of the individual examiner to avoid commenting on an area of concern, it is also an institutional responsibility to ensure there is adequate time and remediation processes available as needed.

Feedback may be provided as an aggregate at the end of a rotation, allows a pattern to be seen and may smooth out some of the dips and highs from specific encounters. However this aggregation may not provide the most useful information to the student (Wood et al 2004), and the student may lose opportunities to improve their practice if feedback is left until the end of the rotation. The feedback may be of most value to the student when the encounter is fresh in

their mind, though a challenge is to communicate to the student the assessment by the mother in a way that protects the mother from negative reaction by the student. The examiner might use the mother's assessment form blended into their own form and raise areas rated poorly as a question, e.g. "How do you think you handled answering the mother's questions?"; then filing the forms for later inclusion as indicators of achievement if a summative rating is to be made.

Health workers' intentions to provide breastfeeding support may not influence their actual provision of support if their knowledge and/or skill are deficient, and they may be unwilling to attempt practices for which they do not feel confident (Bernaix 2000). Feedback can assist in building confidence as the student recognises their strengths and sees that they can plan to address areas needing attention. This confidence can then benefit the mothers they care for.

## **4.7 Chapter 4 Summary**

This chapter explored assessment through the five questions of Rowntree's framework (1987). Assessments have time and financial costs as well as costs in stress to the students, service-users involved, and the examiners and educators. A balance needs to be achieved between costs and benefits. Clarity in the purpose of the assessment is of particular importance and this was discussed as the first question dealing with the why of this assessment. What is to be assessed was the next question discussed, highlighting that this workplace assessment forms part of an overall assessment at the level of assessing readiness for independent practice. The how of assessment looked at the very limited amount of existing research on assessment of lactation consultants and other health workers related to breastfeeding. It then explored assisting patient learning of skills more generally, before providing an overview of performance assessment of health workers in general. The decision was taken to examine the aspects of assessment rather than to continue searching for an instrument that could be adapted.

This examination was built on the concept of the evidence provided by the assessment. Firstly, I looked at the grounds for judgement. The number of observations of practice needed as grounds for making a judgement to take into account differences in situations that could be encountered, and a system that focuses on more assessments for borderline students is suggested as a balance between reliability and feasibility. I next examined who is making the judgements and concluded that multi-source assessment involving self-assessment by the student and assessment by the mother, as well as the more traditional assessment by a clinical facilitator or academic examiner, provides views of different aspects which help to give a more complete picture of the student. I found no research that indicated that any one type of assessors was overall better than another type.

I then looked at the nature of the judgement and the process of obtaining the evidence. The items included in the assessment instrument and the type of rating scale used need to be able to differentiate between a performance that meets the required standard and one that does not. More detail than just “pass” or “fail” is needed in order to provide useful feedback to the student. The rating scale should be able to differentiate the quality of the performance, and a visual analogue scale can facilitate fine discrimination. An assessment protocol can provide fairness and consistency, as it is not possible to provide identical situations when working with individual mothers. Though assessment may not be considered a high risk activity there are still ethical considerations to ensure care for the mother, fairness to the student, and protection to the public.

Reliability and validity of findings were discussed in terms of a process of enquiry and examination of the evidence for interpretations or assumptions, rather than a psychometric model. The response to the assessment, including feedback to the student and to the educational establishment, is an integral part of the assessment not an optional extra, and thus can have an impact on learning.

My work presented in this thesis takes the process of assessment from defining the key component skills to be assessed through to developing the instruments of the assessment. Once the instruments and process have reached an acceptable level of development, the assessment can be field-tested and start to provide data that can be further examined. This later examination could address if the instrument and process correlates with other measures, if it can discriminate between levels of expertise, if it predicts later results, and whether there is consistency and agreement between assessors. In other words, what evidence is there that the inferences made from the results of an assessment using this measure are valid and reliable inferences? However, before the instruments can be field tested, they need to be examined for their internal validity or design. This examination asks if the items are representative and relevant, are the instruments useable, are they likely to pick up a poorly performing student, and is the performance standard realistic and acceptable? The next chapter describes the empirical research to establish the stakeholders’ views of the assessment process and to answer these questions.

## **Chapter 5: Validation of the Assessment Instrument - Stakeholders' Views**

### **5.1 Background and purpose**

The previous chapter explored aspects to consider when developing an assessment, including clarifying why the assessment is being done, what is to be assessed, how it is to be assessed, and how the assessment findings will be responded to. It put forward a model of enquiry of the evidence to support interpretations made from the findings.

As discussed in Chapter 3, when assisting a mother to learn skills of hand expression, practices based on social cognitive theory and adult learning techniques can provide relevant information, model skills, guide practice, and offer feedback. It is these practices of assisting learning that are to be assessed in the specific situation of the learning hand expression skills that were established in Chapter 2.

This chapter now describes the draft assessment instrument and process, and goes on to examine how evidence was sought from the three stakeholder groups in order to examine the internal validity of the instrument. The results of the validation process are discussed. Changes needed to prepare for piloting the draft tools and processes are discussed.

### **5.2 The draft assessment instruments**

#### **5.2.1 Requirements of the assessment**

When choosing instruments the purpose of the assessment needs to be considered including how high a degree of accuracy, fineness of distinction between ratings, and reliability is required, and balanced with the feasibility of use. I decided at this point in the development that the assessment would aim to:

- ensure fairness, respect and safe practice for all involved;
- value the views of the mother, the student and the examiner;
- involve observation of practice in real situations and carried out in the student's workplace/clinical placement, which may be maternity services, neonatal/paediatric services or community health services;
- be credible and defensible, though recognising that aiming for a high degree of statistical reliability was not realistic with observations of dynamic encounters rated from varying viewpoints;
- provide formative information for use in feedback and to assist on-going learning for both the student and the educational establishment;

- provide evidence regarding readiness to practice in this area that would be combined with other assessments in this area and in other areas as parts of an overall assessment plan;
- use a scale that could distinguish small changes, since students at the end of their training are likely to be performing near the criteria. The scale should be easy to use for the assessor groups;
- be useable in varying educational and health systems;
- allow expansion at a later time to use the same process to rate students earlier in their training with a suitable standard set for these students, and could be adapted for assessing other situations related to assisting mothers to learn skills.

## 5.2.2 The instruments

Having reviewed and considered the various elements in developing an instrument and process, the following elements were included for the first stage testing:

### 5.2.2.1 Instruments for the student and examiner:

- Nine indicators of performance developed from the profession's documents of competence and standards of practice (Appendix B), the findings of the three-source study regarding skills of hand expression (Chapter 2), and theories of assisting learning (Chapter 3), which were presented as a framework in Table 3.11.
- A 100 mm Visual Analogue Scale (VAS) for rating with end-anchor descriptors specific to each indicator showing one end as the performance not done and the other end listing criteria that would indicate expected performance of a student at the end of their training; phrased appropriately for an examiner or self-assessment. (Figure 5.1).
- A global rating of yes/no as fit for independent practice on assisting hand expression.
- A guidance sheet that outlines the key principles of assisting learning of hand expression (Appendix D16).

**Figure 5.1: Example of item on student self-assessment form**

4. I described how hand expression works (including demonstration, modelling, visual aids) in a way that the mother can understand.	
Gave no information or inaccurate information	Explained general principles clearly and accurately with appropriate aids

### 5.2.2.2 Instruments for the mother:

- Seven items linked to the nine items in the student/examiner instrument with a similar VAS, worded with “I” statements, e.g. “I was not asked if I had any questions” at one end and “I was asked if I had questions” at the other end. The statement of the performance being assessed for each item was not included to reduce the amount of reading required.
- One item as a global view, “I felt I was not helped ...” – “I felt I was helped ...”.
- One item related to the mother’s view of the level of her self-efficacy.

### 5.2.2.3 Instruments for all three groups:

- Information as to the process of the assessment as relevant to each group and instructions on marking of the scales.

These instruments and supporting materials are in Appendix D12.

## 5.2.3 The assessment process

Informed by work I had previously undertaken (Becker 2002), and the process of Wood et al (2004) that was used with radiology residents, I proposed that at a time that the examiner is available, the student would request a mother to assist her by participating in her assessment, explaining the mother’s role, the examiner’s role and obtaining her verbal consent. The student would already be assisting in the care of the mother or her infant, not meeting the mother for the first time. Having the student ask the mother reinforces the idea that the mother is helping the student to improve, rather than the examiner asking the mother to make a judgement. An information sheet would be provided (Appendix D). The examiner would check the mother understood and was agreeable.

The student would assist the mother to learn the skills of hand expression with the examiner observing. The student would then withdraw to complete her self-assessment form. The mother would complete her form assisted by the examiner if needed, and give her form to the examiner. As soon as is feasible after the encounter, the student and the examiner would discuss the encounter with the examiner keeping the mother’s form though using points from it in the discussion.

Depending on the individual educational programme, the forms from the mother and examiner may be then filed with the forms from other encounters to provide information for a later overall grade for the student. The student retains their self-assessment to assist their learning and to form part of a portfolio of evidence. The process may vary depending on the structure of the clinical practice experiences. However, the confidentiality of the mother’s view should be maintained as discussed in Chapter 4.

### 5.3 Validation process

As described in the previous chapter, a model of enquiry was used to address the process of validating the instrument (Figure 5.2).

**Figure 5.2: Model of enquiry** (adapted from Kane, 1992)

**Model of enquiry for testing validity**

1. Describe the specific purpose of and population for the assessment
2. State the assumptions and interpretations being made
3. Gather information
4. Examine the evidence to support these interpretations

#### 5.3.1 The purpose of the assessment

*Purpose of the assessment:* to obtain quantitative data on the performance of the health worker in assisting a mother to learn the skills of hand expression of breast milk. This information can be used to provide formative feedback, can form evidence in a portfolio, can serve as an award in itself, or as part of a summative assessment.

*Target assessment group:* students in the final weeks of training to become certified lactation consultants. The assessment can be used for other groups with adjustment of the expected standard as required. Prior assessments will have shown that the student has the underpinning knowledge regarding hand expression and assisting learning and has shown competence in a simulated setting.

*Criteria:* based on the ILCA /IBLCE standards, and the findings of a three-source study of the skills of hand expression and of assisting learning. This assessment would form one part of a wider assessment programme.

*Performance level:* measured at the level of a newly qualified practitioner ready to function in an effective and efficient manner carrying a case load without supervision and, as a lactation specialist, provide a lead/role model/teacher for non-specialist health workers.

*Setting:* work-based assessment with women in late pregnancy, or lactating mothers either as patients or with a child who was a patient, or in the community, who wish to learn to hand express their milk.

*Process:* three sources of data, collected from the examiner/clinical facilitator observing the practice, the student, and the mother being assisted, using structured instruments to rate pre-specified behaviours, and a global question of readiness for practice.

### 5.3.2 The assumptions and interpretations

Table 5.1 outlines the assumptions that could be made regarding this assessment together with the means used to gather information and to test the evidence.

**Table 5.1: Assumptions**

<b>Assumption</b>	<b>Gathering information</b>	<b>Testing evidence</b>
The items and descriptors in the tool are representative of and relevant to expected behaviours (of LC students on topic)	Items developed through expert opinion, observation and materials review Review form via 3 stakeholder groups	Results of item development process Content Validity Index (CVI) Responses to questions
The tool is useable by the 3 groups	Review form via 3 stakeholder groups	Responses re: readability, clarity of instruction, bias, feasibility, willingness
A poorly performing student is likely to be picked up	Review form via 2 stakeholder groups (student and examiner)	Responses to questions
The cut-off score / performance standard is realistic and acceptable	Review form via 3 stakeholder groups	Marking on Visual Analogue Scale (VAS) Responses to questions

#### 5.3.2.1 Is the content relevant and representative?

An assessment instrument needs to represent the important areas or skills and include only items that are relevant to what is being assessed. Existing literature, content experts, and the population(s) to use the instrument are usually consulted in determining the content, as described in Chapters 1, 2 and 3 of this thesis. Reviewers of the instrument may include content experts, those with experience of the practice, and other stakeholders. In the assessment for this project, this would include the students and the mothers as well as those involved with the training of the students.

The number of experts involved in the review of the instrument and how they are chosen differs across existing studies, ranging from 2 to 26 depending on the range of expertise and representation sought (Lynn 1986; Grant and Davis 1997; Paterson et al. 2004; Fitzgerald et al. 2007). A Content Validity Index (CVI) can be calculated for the items using a 4-point scale to rate the relevance of the items in the instrument separately and together to provide a quantitative measure for the process (Lynn 1986; Haynes et al. 1995; Grant and Davis 1997; Streiner and Norman 2003; Polit and Beck 2006). Lynn (1986) recommends using the standard error to establish the proportion of experts who need to agree in order to establish the content validity beyond the .05 level of significance.

### **5.3.2.2 Is the assessment useable?**

For an assessment to be used regularly it needs to be acceptable to those who would use it. This starts with face validity, which refers to the first impression, or ‘on the face of it’ the instrument appears to be measuring what it purports to measure and that it appears useful. The instrument development stages include reviewing the readability and clarity of the instrument and checking for any other potential bias that could be reduced, such as use of terminology that might be unfamiliar to some groups. Feasibility and satisfaction with use can be estimated by asking for the views of those in the development reviews. These can be measured later by examining the number of students with whom the assessment is carried out, the level of participation of all three sources of ratings and their satisfaction. Pilot testing can determine the cost of the assessment in materials and actual time involved.

### **5.3.2.3 Is a poorly performing student likely to be picked up?**

For patient safety, it is important that the risk of a poorly performing student passing the assessment is kept to a minimum. On the other hand, ethically the assessment should be designed so that a good student is unlikely to fail because of the assessment process.

### **5.3.2.4 Is the cut-off score / performance standard realistic and acceptable?**

This current process seeks the stakeholders’ views on where the cut-off score might be and views on compensation across the items. This provides a score that can be re-examined when there is data from field-testing.

## **5.3.3 Gathering information**

### **5.3.3.1 Sources of evidence**

Members of the three stakeholder groups were invited to participate in the development and testing of the assessment – mothers, students and examiners/educators, in a two-phase process using self-administered questionnaires. All responses from the panel members were confidential and numbers were used to refer to participants. The risk of harm from participation was considered minimal.

#### ***Examiner panel***

The examiner panel for the first phase were the members of the curriculum sub-group of the Professional Development Committee of the International Lactation Consultant Association. This includes educators and practitioners with global representation, and who were involved in a larger project to review the curriculum for training lactation consultants. Members of the earlier Delphi process (Chapter 2 & 3) who worked in settings with assessments of students were also included.

The second phase review panel was formed of potential users of the tool. This consisted of educators involved in training lactation consultant students, who were recruited via the Professional Educators Network of the International Lactation Consultant Association and the Association of Lactation Consultants in Ireland trainers' group. These groups were already aware of the project and were sent an email explaining the review, asking them to participate and attaching the review materials.

There was a possible risk that participating might raise doubts about the quality of their own education programmes. However, as they were already involved in examination of their programmes for another project, any additional risk was considered minimal.

### ***Student panel***

The student panel for the first phase was formed from people preparing to take the IBLCE exam who were contacted through colleagues of the author in four English-speaking countries. An initial email was sent to the educator colleagues with brief details of the project and a request for students to contact me if willing to participate, and then the review materials were sent directly to those students who responded.

The second-phase panel were similarly sourced, but the recruitment process also included a request for reviewers put on the international electronic discussion board for IBLCE exam candidates.

There was a possible risk that participating could create anxiety that they were not well-prepared for their forthcoming IBLCE exam. However, as their exam was six months away, did not involve an assessment of performance, and they were in regular contact with their educators, the risk was thought to be minimal.

### ***Mother panel***

The mother panel for phase one and two was recruited from community post-natal support groups facilitated by my colleagues in one country. The mothers' group was more likely than the other two groups to be affected by language and cultural bias and the instrument would need to be re-validated for a different population. The mothers were invited to participate via the support group facilitator who asked the willing mothers to contact me themselves or to give their contact details via the group facilitator. The review materials were sent by post for return in a provided stamped envelope or forwarded as an email with the forms attached, according to the mother's preference.

There was a small risk that participating in the review could raise doubts that they had received appropriate care themselves, or that they might have questions about learning to hand express. By accessing them through the support group facilitators the mothers had a suitable contact easily accessible to them if needed.

### 5.3.3.2 Process of gathering the evidence

Information including a cover letter detailing what the reviewers were asked to do, description of the purpose and proposed process of the assessment, and expected performance behaviours of the student was prepared in order to provide the review panel members with clear underpinnings for the instrument. The examiners and the students received the same materials phrased to reflect observation or self-assessment. The mother materials were similar, but in a simplified version and phrased to address the mother. Though primarily a quantitative format, additional comments were invited, as they can be very informative in development and review stages. See Appendix D for the materials.

Communication was by email and post. One follow-up request was sent by email or mobile phone text if the review forms had not been received by 48 hours after the date set for return. When needed, clarification of responses was sought by email or phone if a contact number was given.

#### *Phase One*

The purpose of Phase One was to obtain views from the examiners and students of the relevance, coverage, clarity, readability, and possible bias of the instrument and process, along with views of the standard for passing. The purpose of the mother panel was to obtain views of the clarity and readability of the instrument and instructions, views on participation, and views of the standard for passing. The mother panel were asked if there were any items that they thought needed to be added and were not asked to rate each item for content validity/ relevance. The Content Validity Index method (Lynn 1986) was used to score the relevance of the items and adapted for the readability review. A questionnaire gathered the views and comments on the standard for passing, which was also marked on a VAS.

#### *Phase Two*

Phase One responses were checked for completeness but were not analysed. However, it was clear that there was a wide range of views on the VAS for the expected standard and a very high rating for relevance. The following changes were made to the Phase One review materials:

- mis-spellings were corrected,
- the cover letter was re-formatted to increase clarity on what reviewers were asked to do,
- a category of “exceeds the expected standard” was added to the examiner and student form,
- the global rating statement clarified that the practice referred to that of a lactation consultant,
- questions on the standard required to pass were extended,
- question specifically asking about use of VAS was added,
- item-by-item questions on relevance were excluded as the relevance had been rated highly in Phase One.

The Phase Two focus was on the standard to pass and feasibility of using the process.

### 5.3.3.3 Analysis

Responses were entered into a Microsoft Excel 2003 spreadsheet. Due to variations in printers and photocopiers on some forms the VAS was up to 2 mm shorter than 100 mm and the right end-stop (towards fully meeting criteria) was used as the measuring point. This might give a slight over-estimation of the rating, however this method was considered more feasible for a review than calculating a proportional score for each line on each form. It was discovered that the forms marked electronically did not allow 100 to be marked and it may be that those measured as 99 were intended by the reviewers to be 100. Lines were measured as whole numbers, thus giving approximate, rather than exact measures.

Four examiners and one student did not mark the VAS for each item even after a follow-up request, but gave one percentage mark for all items. These percentages were converted to 100 units similar to the VAS measurements. One examiner marked the VAS but in addition, wrote a percentage at each mark. In this instance, that percentage was used rather than measuring the mark, as the respondent stated that the percentage more accurately reflected her views. The CVI was calculated. Having checked the assumptions were met as regards normal distribution, homogeneity of variances and independent samples, the VAS responses were analysed as scale data using SPSS version 14. VAS responses were further examined treating the data as ordinal data rather than scale data, with no significant change in the results. Qualitative comments were examined for recurrent themes and used to assist interpretation of quantitative responses.

### 5.3.4 Examining the evidence

#### 5.3.4.1 Response rate

The overall response rate across the panels ranged from 64 to 84% (Table 5.2).

**Table 5.2: Review panels respondents**

<i>Phase One</i>	Examiners	Students	Mothers
Received forms	11	10	12
Returned forms	9	6	6
<i>Phase Two</i>			
Received forms	14	9	10
Returned forms	12	7	8
<i>Overall</i>			
Received forms	25	19	22
Returned forms	21 (84%)	13 (68%)	14 (64%)

The self-administered questionnaires to gather views worked well, although no information was available about those who agreed to participate but did not return forms. Non-returns could be due to the forms being difficult to complete or the Phase One non-respondents may have been too busy as it was early to mid-December. Another reason may have related to sourcing the respondents through gate-keepers. The support group facilitators' presentation of the request may have been unclear when asking mothers to participate, and similarly the educators' request to their students. The response rate for students and mothers was better for Phase Two which was in mid-January. From the responses, the sample of mothers appeared to be generally well-educated, which may reflect the population who breastfeed in the area and the higher education level generally of mothers who attend mother support groups. In field-testing stages, it would be useful to collect the reason for refusals as well as making more efforts to involve mothers who are less educated.

Focus groups would have allowed more discussion of the view points, as demonstrated by McAllister (2005) in the development of an assessment process for Australian occupational therapists. However, focus groups were not feasible for examiners and students, as international views were sought.

### ***The assumptions tested***

For each of the four assumptions tested, firstly the findings for that assumption are stated. Secondly, these findings are discussed. There is further discussion in Chapter 6 when the overall conclusions are discussed.

#### **5.3.4.2 Assumption 1: The items in the instrument are representative of and relevant to expected behaviours**

##### ***Findings of Assumption 1***

The examiner and student panels in Phase One rated the items individually and as a unit. Using the Content Validity Index (CVI) with nine examiner reviewers the proportion rating as 3 or 4 would need to be seven (inter-rater reliability = 0.78) to reach a .05 level of significance and this level was exceeded. The six students rated all items and the entire instrument as 3 or 4 (inter-rater reliability = 1) (Table 5.3). This question was not asked of the mother panel. The items were developed from the earlier three-source study (Chapters 2 and 3). This review reinforced the findings of that study.

In response to an open question to the three panels, additional areas that are needed to assess the LC student's performance in assisting the mother to learn to hand express were mentioned by eight examiners, one student and one mother, including specific items in the assessment forms and general comments; and were sorted into three categories. (Table 5.4)

Table 5.3: Instrument relevance

Is the item relevant to determining the required level of performance of a LC student at the end of training? Is the entire assessment form relevant to determining the required level of performance of a LC student at the end of training?								
Number of members of each panel rating: E= Examiner (n=9) S=Student (n=6)								
Item number	1= not relevant		2 = unable to assess relevance without revision		3 = relevant but needs minor alteration		4= very relevant and succinct	
	E	S	E	S	E	S	E	S
1	-	-	-	-	3	0	6	6
2	-	-	-	-	1	0	8	6
3	-	-	-	-	2	2	7	4
4	-	-	-	-	2	0	6	6
5	-	-	-	-	2	0	6	6
6	-	-	-	-	1	1	8	5
7	-	-	-	-	1	1	8	5
8	-	-	-	-	3	2	6	4
9	-	-	-	-	0	0	9	6
Entire instrument	-	-	-	-	3	0	6	4

Table 5.4: Open responses of additional areas to be assessed

<p><b>Item to add:</b></p> <p>“Item 1: add mother’s privacy” (P1 Examiner 4)</p> <p>“Assuring that the environment was conducive to teaching the mother (i.e. privacy concerns)” (P2 Examiner 8)</p> <p>“Something more definite to be sure the student has asked the mother’s permission to view her breast or touch if needed” (P2 Examiner 8 &amp;11)</p> <p>“Arranges for comfort of the baby, if present, so as not to distract the mother from learning” (P2 Examiner 8)</p> <p>“Item 5: I feel the importance of preparation here has been omitted; washing hands, having appropriate receptacle prepared.” (P1 Examiner 4)</p> <p>“Starting with assessment of the basic initial contact and hand washing are very important and frightfully and woefully lacking in a lot of practice” (P1 Examiner 9)</p> <p>“It needs the steps in the demonstration of hand expression” (P2 Examiner 3)</p> <p><b>More detail needed in descriptors:</b></p> <p>Item 5: “coaching her through enough practice to assure competence without pain” (P1 Examiner 3)</p> <p>Item 7: “Used the educational materials in the discussion, or discussed them with mother as they were given; and that educational materials were congruent with everything the student discussed.” (P1 Examiner 4)</p> <p>“Checking the student has the arsenal of skills necessary to deal with resistance/frustration in mother” (P2 Student 7)</p> <p><b>Other comments:</b></p> <p>“I would like to see the student at the end of this teaching session ask the mother how she sees hand expression being a benefit/fitting into her life. Perhaps this could be included in #6. I know the mother is told how it can be of benefit to her, but if the mother is able to express/describe how she sees hand expressing fitting into her life would this not be a means of showing the mother anticipates finding this skill practical and useful?” (P1 Examiner 2)</p> <p>“Expression is a form of weaning and should be last resort. LC needs to make mother aware of benefits of breastfeeding and using feeding supplementer as opposed to expression” (P2 Examiner 12)</p> <p>“Perhaps something about the pumps available could be included” (P1 Mother 5)</p>
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***Discussion of Assumption 1: The items in the instrument are representative of and relevant to expected behaviours***

On the question of representation and relevance, this study found evidence that the instrument covered most areas effectively, though consideration will need to be given to including a specific item to cover general professional behaviour. This includes areas such as ensuring privacy, asking permission, and hand washing. The descriptors may need to be more detailed to assist marking of some items. Though it might be useful to include a general checking question asking the mother if she thought the skill would be useful to her, the examiner's comment about hand expression "fitting into her life" may imply that the mother is expected to be expressing regularly. The examiner who said the assessment form needs to include "the steps in the demonstration of hand expression" in order to check the student is performing to standard, may indicate a view that there is just one way to hand express that suits all mothers and that the student simply needs to recite this correctly. This view would be similar to the performance referred to in Dykes (2005) and discussed in Chapter 1. The comment regarding expression as a form of weaning and a last resort may reflect a poor understanding of why a mother might wish to express. Prior to any field testing of this assessment process, there may need to be a change in the education inputs for educators, examiners and students. This input would reinforce the principles of adult learning and tailoring learning to the individual mother's needs, as well as the reason for offering mothers assistance in learning about expression and realistic expectations.

Overall, the responses indicate that there is evidence to support the inference that the items in the instrument are representative of and relevant to the expected behaviours for a student LC at the end of training.

**5.3.4.3 Assumption 2: The tool is useable by the 3 groups**

***Findings Assumption 2***

**Examiner and student panels - Readability**

All examiners and students in Phase One rated the instruments and instructions as readable, clear, as suitable in various settings, and with one exception as appearing unbiased (Table 5.5). One examiner considered the term "fit for practice" to be offensive to people who were physically unfit or obese and asked for it to be reworded. Suggestions to improve the materials included the provision of space to record any factors affecting the learning/teaching, to note reasons that a practice was not carried out, and to allow the student to reflect on their practice. It was also suggested that the instructions be clarified to show who is responsible for feedback to the student and when it occurs.

In Phase Two, the focus was on the instruction sheet and guidelines sheet, which were generally judged as clear (Table 5.6). Two examiner's comments related to clarity regarding the scoring scale and will be discussed later in this chapter; other comments related to minor wording changes such as suggesting replacing "complete a sheet for her views" with "fill in a form on her views". One student comment related to scoring, and one student stated that the general principles sheet needs to "tell where to put fingers – back from nipple."

**Table 5.5: Readability Examiners and Students Phase One**

Question	Number of panel members marking the rating: E= Examiners (n=9) S=Students (n=6)							
	does not appear to measure		unable to assess without revision		appears to measure but needs minor alteration		appears to measure very well	
<b>'On the face of it' or first impression, does the instrument appear to be measuring the student LC's performance of assessing a mother learn to hand express?</b>	E	S	E	S	E	S	E	S
	-	-	-	-	1	1	8	5
	is not readable and clear		unable to assess without revision		is readable and clear but needs minor alteration		is very readable and clear	
<b>Is the instrument readable and clear to a clinical facilitator/assessor (who would be an IBCLC)? Examiner</b> <b>Is the instrument readable and clear to a student LC? Student</b>	E	S	E	S	E	S	E	S
	-	-	-	-	2	-	7	6
	is biased		unable to assess without revision		is not biased but needs minor alteration		is not biased and needs no change	
<b>Is there possible bias in the instrument? For example, are there terms used that might mean different things in different areas, is there a class, gender or cultural bias?</b>	E	S	E	S	E	S	E	S
	-	-	1	-	1	2	7	4
	is unsuitable		unable to assess without revision		is suitable but needs minor alteration		is very suitable	
<b>Is this instrument suitable for assessing the student LC's performance in different settings – postnatal, neonatal, community, and with mothers at different stages of lactation?</b>	E	S	E	S	E	S	E	S
					1		7	6

**Table 5.6: Instructions and guidance sheet**

Are the instructions for use of the observation assessment form clear? Is the sheet with general principles adequate and clear?	Phase One			Phase Two				
	Instructions			Instructions			Principles	
		yes	no		yes	no	yes	no
Examiners	n=9	7	2	n=12	7	5	10	2
Students	n=6	6	-	n=7	6	1	6	1

### Mother Panels - Readability

All mothers in Phase One rated the instruments and instructions as readable and clear suggesting some minor wording changes, though three mothers commented that the instrument and instructions might be too much to read for a tired new mother. Similarly, in Phase Two, four mothers replied the information page was easy to read and clear with four mothers saying it was

too long. Some mothers noted minor wording changes, though none suggested what could be omitted or changed to make the information sheet shorter (Table 5.7).

**Table 5.7: Readability Mothers**

<b>Phase One n=6</b>				
<b>When you first see the form “Giving Your View,” is it clear that the purpose of the form is for the mother to comment on the assistance or help that she got when she was learning to express her milk?</b>	Is not clear that this is the purpose	Needs a lot of changes for the purpose to be clear	Clear but needs minor changes	Very clear that this is the purpose
	-	-	4	2
<b>Is the form easy to read and clear with suitable words used?</b>	It is not easy to read and clear	Needs a lot of changes to be clear	It is easy to read and clear but needs minor changes	It is very easy to read and clear
	-	-	4	2
<b>Phase Two n=8</b>				
<b>Is the information sheet easy to read and clear what the mother is asked to do?</b>	no 4		yes 4	

### Feasibility and willingness

All the examiners and students in Phase Two replied that it would be feasible for them to use this form in assessing. This question was not asked in Phase One. A number of reviewers added comments indicating that it would be very useful, with one examiner saying: “adaptations could be used in other LC/mother teaching instances”.

In response to the question regarding willingness, all participants on the mother panels replied that mothers would maybe be willing or very willing to fill in the form, though it was emphasised that some might want some time to think about it (Table 5.8). One mother said she could not mark this as it depended on the mothers and that “most first time mothers might object, but once confident on second+ babies not a problem.”

**Table 5.8: Mothers’ willingness to rate student**

<b>Do you think that mothers would agree to fill in the form on how they were helped to learn to hand express?</b>	Not willing to fill in the form at all	Willing to fill in the form but not right after they were helped	Maybe willing to fill in the form right after they were helped	Very willing to fill in the form right after they were helped
<b>Phase One n=6</b>	-	-	2	4
<b>Phase Two n=8 *</b>	-	3	1	3

\* 1 mother replied “it depends”

In reply to the open question in Phase Two: *Do you think the mother would be willing for the teacher of the student to be present during the learning to hand express?* Six mothers replied “yes, the mother would be willing” and one replied “maybe”, explaining that the mother might feel that it was her being assessed. There was one reply of “depends on the mother”.

*Any other comments about asking mothers to give their views?*

In reply to this open question five mothers commented:

- it would be beneficial for the students to hear the mother's views,
- anonymity would be more likely to get truthful answers,
- staff consistently trained would help mothers,
- mother would be anxious to help other mothers,
- mothers may need some time before they know if they are happy with the skill, and
- hand expression needs to be offered as a useful skill for some mothers but not that they feel they have to accomplish it.

***Discussion Assumption 2: The tool is useable by the 3 groups***

The materials for the examiners and students were generally regarded as clear, though some minor changes were noted. There was a useful suggestion to include space for reflection by the student and for the examiner to write points of feedback. The mother panel generally rated the materials as readable and clear though some commented that the materials are long which may be a barrier for their completion and result in a biased sample, though no mother suggested that anything could be omitted. If the form were shortened to just a global rating, valuable feedback would not be available to the student. If mother does not consent to participate it may be useful for the examiner to check if she is unwilling to fill in the form due to tiredness, not wanting to assess a student, or if she is not consenting to a student being assessed while assisting her.

Overall, all groups considered the assessment process feasible and believed it likely that mothers would participate in marking the student. The concern noted in the previous chapter that mothers would be fearful of repercussions if they gave their views was not supported in this study in which none of the mothers expressed concern regarding this. The only concerns were around that mothers might be tired or overwhelmed soon after giving birth. This high level of willingness may be due to the self-selected mother respondents being a more self-confident group than average, more interested in helping students (as one respondent commented that mothers' views would be beneficial to the student), or the possibility that these mothers do not see themselves as patients but as users of a service. In further testing, it would be important to seek to include the views of less self-confident mothers.

Therefore, there is evidence to support the assumption that the tool is useable by the three groups.

### 5.3.4.4 Assumption 3: A poorly performing student is likely to be picked up

#### *Findings Assumption 3*

All respondents in the Phase One examiner panel, all but one of the examiners in Phase Two, and the student panels in both Phases, agreed that the assessment would provide a means of identifying problematic student performance (Table 5.9). One examiner, though replying “yes”, commented that there needed to be a space to record if the student behaved in a way that was potentially harmful or unsafe (as distinct from the end of the scale that said the behaviour was not done). The mother panel was not asked this question.

**Table 5.9: Identify problematic student**

Would this assessment form provide a means of identifying problematic student performance?	Phase One			Phase Two		
		yes	no		yes	no
Examiners	n= 9	9	-	n=12	11	1
Students	n= 6	6	-	n= 7	7	-
Total	n= 15	15	-	n= 19	18	-

#### *Discussion Assumption 3: A poorly performing student is likely to be picked up*

All the students and all the examiners except one responded that this tool would pick up a poorly performing student in this population, thus supporting this assumption. The examiner who replied that it would not pick up a poorly performing student thought a checklist would be needed to mark off if the student carried out the steps to demonstrate how to hand express. This comment was discussed in relation to Assumption 1 and items missing from the tool. The need to differentiate between an item that was not done at all and one that was done, but in an unsafe or potentially harmful manner, is a point to consider further.

### 5.3.4.5 Assumption 4: The cut-off score / performance standard is realistic and acceptable

#### *Findings Assumption 4*

This assumption provided the most data and the most interesting comments. The evidence examined for this assumption related to five questions:

- Should there be a minimum level required to pass?
- Is there value in a global rating?
- Whose view counts?
- What is the passing score or cut-off point?
- Should a visual analogue scale be used?

### Should there be a minimum level required to pass?

The majority of all respondents thought that the student should reach a minimum level on all items, with one student replying that passing any 6 out of the 9 items would sufficient for an overall pass (Table 5.10). Two examiners replied that only some items were required to reach a minimum level. Both thought item #9 (completes documentation) was a requirement, and one thought that in addition, items #4 (describes how hand expression works), and #5 (facilitates mother's practice) should be required. One mother noted that: "each student will have strengths and weaknesses and therefore an overall average is a more accurate score".

The majority of respondents said there should be no compensation that would allow high performance on one item to make up for low performance on another item (Table 5.10). Two examiners and one student replied that compensation should be allowed as long as all items reached a minimum. One examiner stated 50%, whilst the other examiner and the student stated 70%. Three mothers marked that compensation should be allowed with one noting, "only on some items" (but not saying which items), one noting that some items were not as important, "e.g. giving written information" and the third mother giving no further comment, though she may have thought none was needed as she had already made the previous comment on strengths and weaknesses of students.

**Table 5.10: Minimum level to pass**

Should there be a minimum passing level which must be reached to pass this assessment? <i>needs to pass on ...</i>		Phase One			Phase Two			
		all items	majority	some items		all items	majority	some items
Examiners	n=9	9	-	-	n=12	10	-	2
Students	n=6	5	1	-	n=7	6	1	-
<b>Should the student need to reach a minimum level on all these items to get an overall pass?</b>		yes		no				
Mothers	n=6	5		1	not asked			
<b>Should there be compensation allowed, i.e. a low performance by the student on one or more items could be compensated for by a high standard on other items so the average score was a minimum?</b>		Phase One			Phase Two			
		no	yes			no	yes	
Examiners	n=9	9	-		n=11	9		2
Students	n=6	6	-		n=7	6		1
Mothers	n=6	3	3		not asked			

### Is there value in a global rating?

Examiners and students were asked if and how the nine separate items for scoring and a global rating of fitness/readiness for independent practice on this topic, might be combined or not. The choices offered were:

1. What the student is marked on each item is useful for feedback to the student, but all that should count is the one global rating at the end of the form.
2. The examiner should not give a global rating of fit for practice unless all the items reach a minimum level.
3. The marks for each item and the global rating are different assessments, and the educational provider, employee or other grading authority, should take all these indicators into account when deciding if the student passes or fails the assessment/course.
4. Other (explain):

As Table 5.11 indicates, the majority thought the global rating should be informed by the separate items scores (choice 2). The ‘Other’ responses were an examiner who marked both option 1 & 3, and an examiner who said: “I am very tempted to select the second option in this category, but think there might be cases when there would be exceptions...again, I do think some assessment points would be show-stoppers and MUST be demonstrated as critical skills, while others could be less problematic if improvements are needed, but the student is on the right track”.

**Table 5.11: Global rating value**

Phase Two		1. Global counts	2. Items inform global	3. Items and global are indicators	4. Other
Examiners	n=12	1	8	2	2
Students	n=7	-	5	2	-

### Whose view counts?

The panels were asked if the scores should be treated as equal from all three views (mother, student and examiner), or if one person’s views should be given more value than the others. The highest response (19/47 – 40.4%) was that all views carried equal weight, closely followed by the examiner being the most important (18/47 – 38.2%). Treating the mother’s view as the most important received a few votes (5/47 – 10.6%), whilst the view that the student was most important received none, though some who had stated that the examiner view should be given more value, added that the examiner should take the other views into account (Table 5.12). Those marking the ‘Other’ category (5/47 – 10.6%) included the “examiner plus mother has equal value” option, chosen by two examiners, one student and one mother; and “examiner plus student”, chosen by one examiner.

**Table 5.12: Whose view counts**

Should the scores be treated as equal from all three people, or one person's views given more value than the others?												
	Phase One						Phase Two					
		Eq	M	Ex	S	O		Eq	M	Ex	S	O
Examiners	n=8	3	-	4	-	1	n=12	4	1	5	-	2
Students	n=6	3	-	2	-	1	n=7	1	1	5	-	-
Mothers	n=6	5	1	-	-	-	n=8	3	2	2	-	1
Total	n=20	11	1	6	-	2	n=27	8	4	12	-	3

Eq = the views of all three people have equal value and should be added together for an average score

M = the student should only pass if the mother gives a passing score

Ex = the student should only pass if the examiner gives a passing score

S = the student should only pass if they feel themselves that they have reached a passing score

O = other

### **Is there an acceptable passing or cut-off point?**

The review panels were asked to visualise a student at the end of their training. For each of the items, mark on the 100 mm VAS where they thought the pass level or cut-off point should be for a student to be considered as ready for practice.

#### *Comparison between Phases and Panels*

Examination of the data from the examiner, student and mother panels showed that the means and range of the cut-off points chosen by the panels across the items were similar in Phase One and Phase Two, and of normal distribution. The graphs that follow show the maximum, minimum and mean cut-off points marked by the panels for each item (Figure 5.3). The mean score for each item in Phase Two was lower for the examiners and higher for the students than in Phase One. However, the T- tests for each panel indicated no significant differences in the mean cut-off points marked between Phase One and Phase Two. Additional data is provided in Appendix D17-20. As there was no reason to believe that the respondents differed between phases in a quantifiable way that might affect the results, the respondents from both phases were combined in subsequent analysis.

Figure 5.3: Cut-off scores chosen for each item by panels

1E / 2E = Examiner Panel 1 / Panel 2

1S / 2S = Student Panel 1 / Panel 2

1M / 2M = Mother Panel 1 / Panel 2

Items 2, 9, 10 & 11 were not asked to all panels

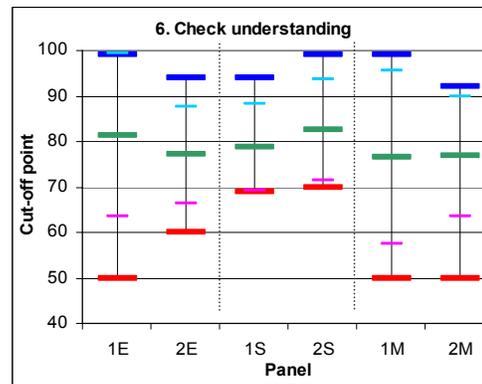
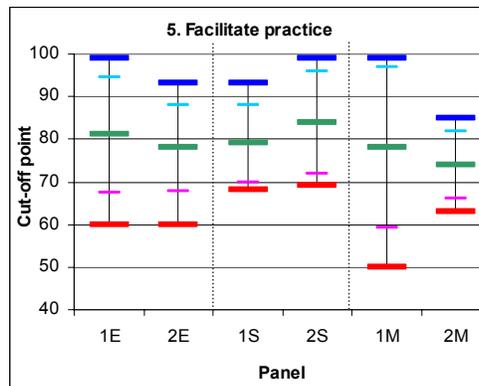
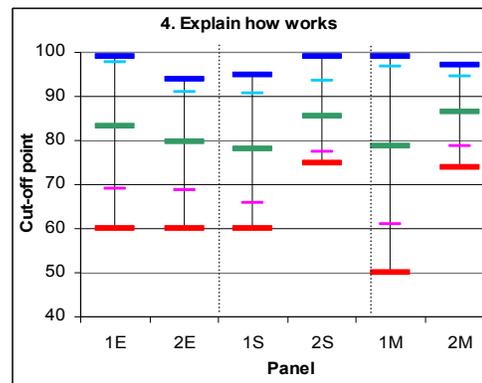
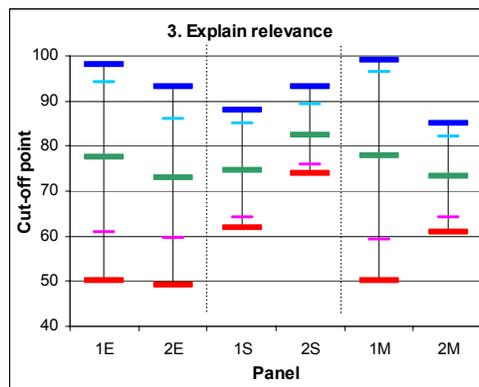
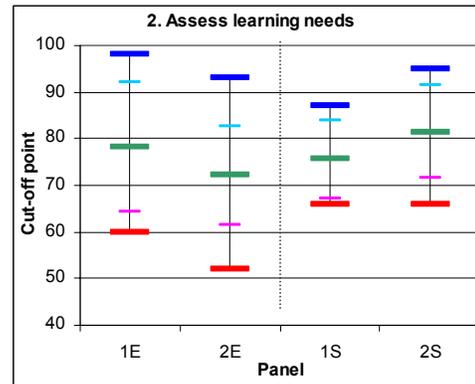
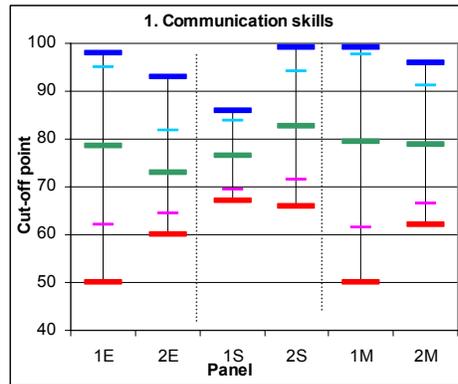
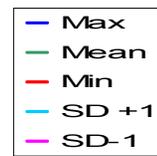
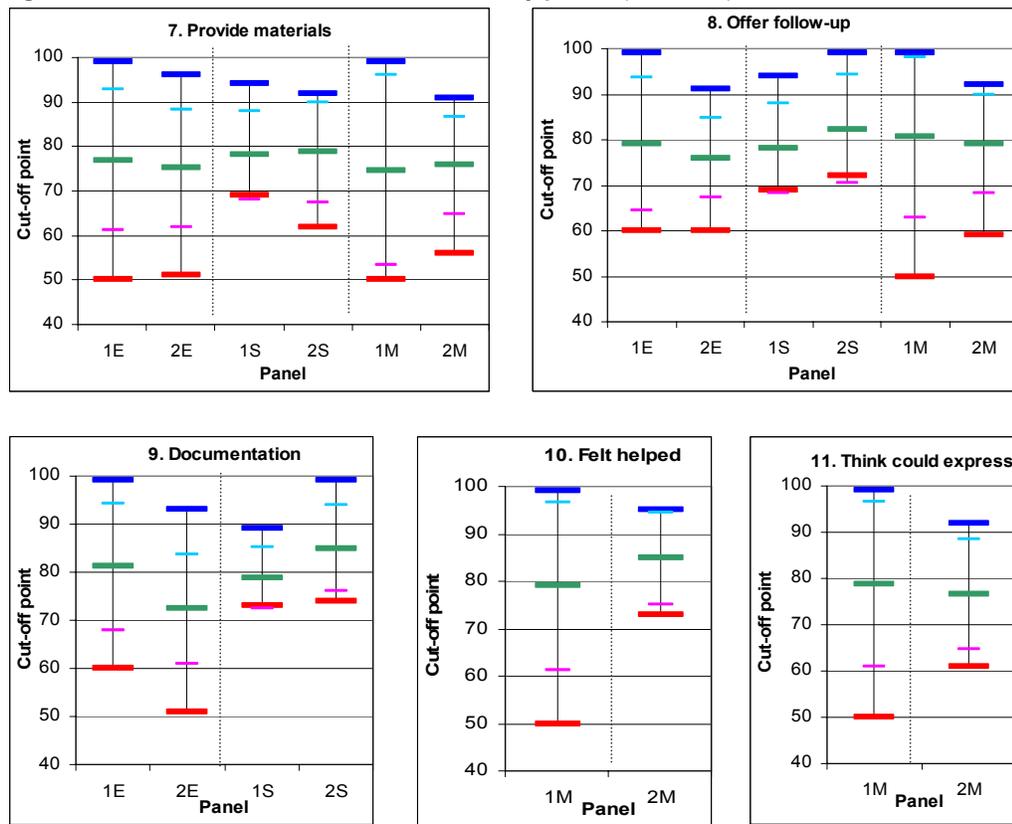


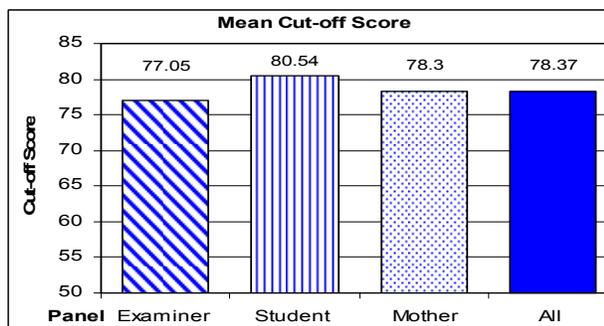
Figure 5.3: Cut-off scores chosen for each item by panels (continued)



*Comparison across panels*

The mean cut-off score for passing for all items across the three panels, with the two phases combined, was examined with a one-way ANOVA. No significant differences between the mean scores considered as the cut-off score for passing were identified across the panels for each item. The mean cut-off score across all the items and the panels was 78.37 (Figure 5.4). The mean cut-off score was lower for all items as marked by examiners (mean 77.05), than as marked by students (mean 80.54), or mothers (mean 78.30). However, the numbers in each panel are small and one person can cause an effect. The similarity of means is more notable than the differences.

Figure 5.4: Mean cut-off score for all items: Panels (combined phases)



### *Examination of individual items*

For all items there was a wide range of scores (49 to 99 across all panels) with little difference in mean score level between individual items (Figure 5.3). When all the panels' responses were combined across both phases, the item with the highest cut-off point (mean 82.11) was Item 4: *Describes how hand expression works (including demonstration, modelling, visual aids if needed) in a way that mother can understand*. However, individually only 14 out of 44 panel members gave this item a passing level that was as high as or higher than their other items. The item with the overall lowest cut-off point (mean 76.14) was Item 3: *Explains the relevance*, although again it was marked as the lowest or jointly lowest item by only 9 out of 44 panel members.

Item 7: *Providing supporting information*, had received open comments stating both that it was needed and that it was not as important. Overall, the panels' marks resulted in a low mean (76.39) and the lowest item from the student panels, though similarly to all items, the range was wide between respondents.

Only the mother panels were asked to indicate at what point on the VAS they thought the mother would need to mark for the student to be considered as reaching a passing standard for two items as more global indicators of the encounter. For the item regarding how they felt they were helped to learn, the mean cut-off point for passing marked was at 82.15, which made it the highest item for the mother panel. For the item about if they thought they could express if they wanted to, the mean cut-off point marked was 77.62, in the middle of the mean cut-off points marked by the mothers (Figure 5.3).

Two examiners (Phase 2 Examiners 4 & 5) noted that Item 9: *Records appropriate documentation* was an item that should be required to reach a passing level in a composition model of marking. However, one of these examiners (P2-Examiner 4) marked Item 9 on the VAS as needing a lower cut-off pass level than most other items and Item 8: *Providing follow-up*, which had a written-in comment stating that it was as not important, was marked higher. The other examiner (P2-Examiner 5) did mark Item 9 high in the VAS, thus providing a match to their written-in comment (Table 5.13).

**Table 5.13: Inconsistency in importance of documentation**

Item Panel Member	1	2	3	4	5	6	7	8	9	Personal mean
Phase 2 Examiner 4	66	52	59	68	71	68	68	68	64	64.89
Phase 2 Examiner 5	72	74	74	73	72	72	73	74	75	73.22

Additional comments related to scoring were made by two examiners and two students (Table 5.14). For one examiner (P1-Ex3), her comment reflected her high markings on the VAS ranging from 89 to 98. The comments from Phase 1 Examiner 9 indicated her view of the value of a term or number. She did not use the VAS or otherwise indicate a cut-off point, nor explain the remainder of the system she preferred (e.g. what number would indicate a pass or the length of the scale) despite follow-up. The students who commented also appeared to place a value on a number without any description. One student noted that this practice assessment should have a similar passing cut-off score to the multiple choice certification exam.

**Table 5.14: Open responses related to scoring**

<p>“Student has prior knowledge of the tool so should achieve a pass” (P1-Ex3)</p> <p>“With a numerical system it would be easier to answer this question ...example 1= does not meet standard, 2= minimally meets standard, needs improvement etc” (P1-Ex9)</p> <p>“[Pass mark should] ... be 67% which is similar to the minimum passing score for the IBLCE” and “numbering from 1 to 5 ... would be more fair as far as grading” (P1-S4)</p> <p>“Scale 0-10 would be less ambiguous” (P2-S1)</p>
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### Using a visual analogue scale (VAS)

There were some comments made in Phase One about using the VAS and therefore a specific question was added in Phase Two for the examiners and the students. The majority (13/19) responded that the VAS was easy to use and helped to show a continuum of practice / progress towards reaching the level of practice (Table 5.15). Three examiners and two students made comments about the VAS, two commenting that an “Exceeds” box was not useful (Table 5.16).

**Table 5.15: Using a visual analogue scale**

The Visual Analogue Scale (VAS) is easy to use and helps to show a continuum of practice / progress towards reaching the level of practice		Phase Two		
		yes	no	not sure
Examiners	n=12	9	2	1
Students	n= 7	4	3	-
Total	n= 19	13	5	1

**Table 5.16: Open comments on the use of a VAS scale**

<p>“It needs predictable definitions (validity &amp; reliability)” (P2-Ex1)</p> <p>“Add hash marks to identify passing area” (P2-Ex5)</p> <p>“The scale is fine visually but I would incorporate a number scale for ease of assessment and quantifying scores” (P2-S6)</p> <p>“I’m not sure what exceeding the outcome means, i.e. if the student is very good and reaches the end of the scale 100% is the box ticked?” (P2-Ex 4)</p> <p>“I don’t understand the need for a separate exceeds box. If the student exceeds, the line would be all the way to the right. I’d prefer number/rating so that each could be scored and averaged” (P2-S3)</p>
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***Discussion Assumption 4: The cut-off score / performance standard is realistic and acceptable***

Examining this assumption provided the most thought provoking findings and the evidence for supporting this assumption is mixed.

**Minimum level and compensation**

The majority of respondents thought that there should be a minimum level to pass reached on all items on the instrument, with no compensation between items. One mother noted, “each student will have strengths and weaknesses and therefore an overall average is a more accurate score”. This response appears to indicate that her concern for passing the student is paramount, whereas I would have expected a mother respondent to be more concerned that mothers were protected from the possibility of students with areas of weakness passing the assessment. Whilst two of the examiners commented that students would only need to pass on documenting the encounter with the mother, in my view it would be a poor assessment that allowed for a student to give incorrect information to a mother using poor communication skills and still pass provided that they wrote in the chart that the encounter had taken place.

It needs to be remembered that this assessment is designed as part of an assessment programme where this part focuses on performance. For example, while a written assessment might test the student’s recall of a list of reasons for milk expression, this assessment is testing how well the student can choose what is relevant to an individual mother, and present and discuss those reasons orally to the mother. This is a different skill than simply the recall of knowledge. As discussed in Chapter 4, students would undertake a set of these assessments of performance in assisting with hand expression in different settings, and would be expected to pass a minimum number of the assessments in full. Therefore, the place for compensation may be in the number of assessments needed to pass the topic overall, rather than allowing one or more weak areas to be passed in all the assessments by compensation.

The assessment can provide data towards a summative judgement; however it also has value as a formative assessment. The assessment takes place with a real mother interested in learning the skills of hand expression. Therefore, unless the student poses a risk to the mother, the student should continue to the end of the encounter. If the student does not reach the required standard on one item, they may need to be assessed in another encounter. However, they will hopefully gain information on items that they did achieve.

One mother summed it up well in her comment: “ I think for each student a running tally should be kept of the score a mother gives them, their teacher would easily see a pattern there, whereas one bad score could be attributed to a stressed mum, several would indicate a problem.”

**Global rating**

The respondents thought that a global rating should be informed by the individual items rather than used on its own. As discussed earlier (Section 4.4.4.3), rating the individual items concurrent with a global rating may assist the assessor to focus on the quality of the performance rather than just an overall impression, which is particularly valuable for feedback. If a global rating of “ready for practice” is given with low ratings on the individual items or vice versa, this may indicate that the examiner or student needs more training to recognise their professional responsibility as regards a judgement of readiness to practice.

**Whose view**

Results of this testing were generally positive as regards including the views of stakeholders. Whilst it was not surprising that some of the mothers thought their view should be paramount, the high number of respondents from all panels saying that the examiner should take the mother’s views into account, or that all views should be equal, was slightly surprising. This is especially so, given the history of examiners being considered as “the gold standard” to which other assessor views are compared. Though the mothers were asked about their willingness to rate a student’s performance, the students and examiners were not asked for their views on this. Therefore, that many thought the mother had a major say in the assessment is encouraging and is a starting point to work on solving some of the procedural challenges in actually obtaining the mother’s views.

**Cut-off point**

It was not surprising that the skill of explaining how milk expression works was marked as the highest mean passing score as this is the very core of the encounter. Explaining the relevance to an individual mother of learning to express achieved a low mean cut-off score. That finding could indicate that these respondents do not value the adult learning and individual mother-focused principles. There were mixed views on the importance of using educational materials to support the learning, with students viewing this activity as more important than did examiners or mothers. This may relate to experiences of leaflets being substituted for assistance, and the wish to avoid attaching undue importance to them.

There was a very wide range of views on what the cut-off point for passing should be. It is of concern that many of the examiners in particular did not appear to have an expectation that a student nearing completion of training would need to reach the outcome expected of an International Board Certified Lactation Consultant. Some examiners marked that half-way to achieving it was a passing standard.

To examine if a low acceptable pass point related to lack of understanding that the descriptor on the right indicated the IBCLC expected outcome, in the Phase Two instructions this was highlighted and a box was added to the examiner and student forms to mark if the student exceeded the end point of the scale. This did not result in increased use of the right-hand end points (higher marks) by the Phase Two panels. One examiner who gave a mean passing mark of 70 commented: "I'm not sure what exceeding the outcome means, i.e. if the student is very good and reaches the end of the scale 100% is the box ticked?" This indicates that they viewed 100% as above average rather than as the expected outcome for a student to achieve to become qualified. Similarly a student (mean passing point marked as 77.67) commented: "I don't understand the need for a separate exceeds box. If the student exceeds, the line would be all the way to the right," again indicating that the end of the line was not seen as the standard expected.

An alternative explanation for the lower pass point is that the expected outcomes are seen as too high or unachievable. Only three of the nineteen examiners marked above 90 for all the items, one of whom commented: "Student has prior knowledge of the tool so should achieve a pass" implying that fully reaching the criteria was considered achievable. However, comments such as that it was acceptable to pass a poor candidate "if they were on the right track" and that documenting the encounter with the mother was the only item that needed to be passed, reinforce the concern that low standards are accepted.

For any assessment of clinical performance to be seen as valid, further work would be needed on determining the expected standard, raising awareness of the standard, and gaining its acceptance. Though not directly asked, interestingly only one of the respondents (an examiner) commented that she needed more information on the expected standard in order to assess a student. Vignettes could be filmed for testing and training, though mothers would not be trained. The visualisation of the performance in this study yielded a quite similar view of the passing point from all panels. It could be interesting to explore whether, if students and examiners (and teachers if not examiners) were 'trained' to what was the expected outcome standard, they would differ from mothers in their scoring.

The panel members in this study were not scoring a performance, only their perception of how near to the expected outcome description they would find acceptable when visualising a performance. The question arises: were they visualising different performances, or do they have different standards (Kane 1994)? It remains to test how viewing/experiencing an encounter would be scored. If viewing an actual performance, would a panel member who believed that a student should reach all the way to the expected outcome give different scores to a panel member who thought that half-way along the scale was good enough?

**Visual analogue scale**

The majority of respondents rated the visual analogue scale as useful, though it generated some comments that indicated greater familiarity with scales that used numbers. This preconception of the value of a number reflects the views and potential bias discussed in the previous chapter (Section 4.4.5) and was one of the reasons for using a VAS in an attempt to move away from the preconceptions of a passing score. A good example is the student who commented that to her, a score of seven would indicate a pass, without giving any indication of the scale she was thinking of – 7 out of 7, out of 10, out of 100? It is worth noting that seven on a scale of ten is a similar proportion or place to 70 mm on a VAS of 100 mm.

Comments also indicated a perception that a term of itself had value, such as the examiner who stated that her preference would be for numbers indicating: “1= does not meet standard, 2= minimally meets standard, needs improvement ... etc”. Just as two people might not agree on the value of a number without further description, there might also be lack of agreement as to what performance was represented by “minimally meets standard” and if that was the same performance as “needs improvement.” Therefore, in conjunction with determining the standard, further work needs to be done in describing the standard to gain some common view of the meaning of intermediate points between clearly passing and clearly not passing in order to provide useful feedback to the student and others involved in training. I would use the VAS in pilot testing to see if it helped with this fine discrimination, though pointing out more clearly to assessors to view the scale as a continuum.

The use of this assessment for feedback did not seem to be considered by some respondents who focused more on one overall mark, with one student commenting that a number scale rather than a VAS would allow an overall mark to be calculated.

Thus, the evidence gathered does not allow a clear acceptance or rejection of the assumption that the score / performance standard is realistic and acceptable.

## 5.4 Amendments suggested to instruments

Respondents suggested a number of changes that could be considered for the instruments before they were used in pilot testing with actual students and mothers.

### *Word changes*

These were mostly minor changes that I would accept, such as:

- Use terms such as “form” or “page” rather than asking people to complete a “sheet.”
- Use the term “ready for practice” rather than “fit for practice.”
- Review the instructions page to reflect the actual process in use in the setting.
- Make it clear that the student is explaining, describing etc, to the mother and not to the examiner.
- Clarify that the student is informing the mother about sources of follow-up, not that the student is necessarily providing the follow-up themselves.

As regards the suggestion that the mother’s instruction page could use a term such as “student’s tutor” rather than “staff member” to indicate the person observing the student during the assessment, this terminology would depend on the situation in the facility using the assessment tool. Adapting this phrase to suit different settings is unlikely to have any effect on the results of the assessment.

### *Formatting:*

The suggestions seemed useful and could be easily accommodated. These included to:

- Add space for comments from the examiner with guidance questions such as what the student did well, what areas needed attention, and what suggestions as to how improvements could be made.
- Add space for the student to record their reflections on the encounter, and then to note if there was a reason for omitting any practice or item.
- Put as part of global rating (examiner and student) an option of “cannot rate this performance” and a space to explain why this performance could not be rated.
- Consider adding a place for examiner to indicate if the student performed at a level that was unsafe, inappropriate or offensive to the mother and should not be working unsupervised, or if there was immediate concern about the student’s practice.
- Place the “NA” box consistently.

***Additions to the tool:***

- Consider adding an item to cover general professional practice such as general politeness, attention to comfort of mother and baby, respect for privacy, asking permission before any touching, and hand washing.
- Include the point that assisting a woman in late pregnancy to learn could also be a suitable setting for an assessment.
- Descriptors would need to be reviewed as part of further examination of expected standard needed to pass.

***Rating and scoring:***

Suggestions as regards the VAS could be tried depending on further work to determine what assessors consider the right-hand end of the VAS means:

- Place the “exceeds” box differently on each line.
- Consider not using the “exceeds” box at all.
- Consider marking the point on the VAS for each item that is the level considered as the minimum passing level so that assessors know if they mark below that point the student has not passed that item.
- After field-testing using the VAS, I would re-consider the use of this scale and the suggestions to instead use a scale with numbers or words to indicate level reached. Again this consideration would follow more exploration of the standard and accepted meaning of terms such as “reaches standard” or “adequate.”

***Suggestions not planning to act on***

Some further suggestions were offered and were reported in Table 5.4. I considered some not relevant to this assessment, such as the suggestion to include learning how to use a pump, or to “make mother more aware of the benefits of breastfeeding and using a nursing supplementer as opposed to expression.” The suggestion to ask the mother how she saw expression fitting into her life might be relevant in the situation where the mother would be expressing frequently and long term, but would not be relevant if the mother was expressing a few drops to assist latch-on. Therefore this point would be better included in discussions during the student’s learning about assisting learning and the need for relevance to the situation rather than as an item to be included in the assessment of performance.

## 5.5 Chapter 5 Summary

This chapter used a model of enquiry to gather and examine evidence via two phases of self-completed questions to stakeholder panels of examiners, mothers and students to support interpretations made as regards the validity or strength of the instrument and process proposed, as a stage in examining the overall validity of the assessment. Aspects such as reliability, correlation, predictive validity and other aspects mentioned in (Section 4.5.2.2) can only be examined after field testing provides data.

The responses indicate that there is evidence to support the inferences that:

1. the items in the instrument are representative of and relevant to the expected behaviours for a student LC at the end of training,
2. the tool is useable by the three groups – examiners, students, mothers,
3. this tool would pick up a poorly performing student in this population.

As regards the Assumption 4 that was tested: The score / performance standard is realistic and acceptable, the evidence examined for this assumption related to five questions:

- Should there be a minimum level required to pass? The responses indicated there should be a minimum level to pass reached on all items, with no compensation between items.
- Is there value in a global rating? The responses indicated that a global rating should be informed by the individual items rather than on its own.
- Whose view counts? The responses indicated that the views of all three people – examiner, student and mother were valued in the assessment.
- Is there an acceptable passing or cut-off point? There was a very wide range of views and the evidence did not clearly indicate a realistic and acceptable passing score / performance standard. This aspect needs future exploration.
- Should a visual analogue scale be used? The majority responded that it was easy to use and helped to show a continuum of practice / progress towards reaching the level of practice.

The final section of this chapter noted the amendments suggested to the instrument.

## **Chapter 6: Summary and conclusions of the thesis**

The preceding chapters examined existing research, highlighted gaps in the evidence, conducted original research and explored the resulting findings. Each of these chapters included discussion of the findings of that chapter. This closing chapter reviews the objectives of my work and brings together links between my findings and the work of others. It discusses my contribution to the body of research, the limitations of this thesis, and possible future directions.

### **6.1 Why and how the research was done**

#### **6.1.1 Background to this work**

As outlined in Chapter 1, breastfeeding is important for the health of the child and the mother, both in the short and longer term. However, despite widespread recognition of this statement many children do not start their lives breastfeeding. Infants who are vulnerable due to illness, prematurity, feeding difficulties, separation from their mothers, or are otherwise unable to feed at the breast, may need expressed milk. Mothers may express for breast comfort and for other reasons. Breast pumps are marketed widely, are frequently used, and there are some research publications on their use, although there are reasons for mothers to learn to hand express including affordability, accessibility, effectiveness, safety, empowerment and personal preference. However, hand expression does not appear to be widely used in areas where pumps are marketed, and there is little research published on why to hand express, what skills are involved, and how learning of hand expression is best assisted.

As outlined in Chapter 1, there are many inter-linked factors that can influence if a mother expresses her milk. When discussing milk expression (or avoiding discussion of it), both the mother and the health worker bring their individual knowledge, socio-cultural backgrounds, experiences, motivation as well as the aspects of the particular situation such as the health of the mother and baby, and the setting. I examined one of the possible aspects – if effective assistance is available to mothers to learn the skills of hand expression.

Hand expression is valued in the global WHO/UNICEF Baby Friendly Hospital Initiative and offering all mothers assistance to learn to hand express is one of the standards or criteria that hospitals must meet to be accredited. Skills in assisting mothers to express their milk are also expected by the International Board of Lactation Consultant Examiners, as are techniques of adult learning and building a mother's self-efficacy. However, there are indications that the assistance provided to mothers may not always be skilled and effective.

Assessment provides a means of checking the student's knowledge and skills, and the inclusion of a topic for assessment can ensure it appears on a course syllabus and that it receives attention from faculty and students. Assessment also provides evidence that the student has reached an appropriate standard and is considered ready for safe practice, and it can assist the student to be confident in their practice.

A variety of health workers may assist mothers and each discipline may have its own expectations of performance. For this study, the focus was the student preparing for international board certification as a lactation consultant (IBCLC). At present, the international summative assessment is one 200-item multiple-choice exam, and the preparation requirements are a structure- and process-based education system, rather than a competency-based system. There is no requirement to demonstrate clinical skills with real mothers and babies.

In exploring the literature on health worker performance assessment generally, I found little that included valuing the patient's or service user's view of the student's performance. It seems clear to me that if the aim is to assess how effective the student lactation consultant is at assisting a mother to learn a skill, then it is important to include the mother's viewpoint.

### **6.1.2 The objectives and framework**

The gap in published research generally on hand expression, the need to facilitate mothers to learn skills to assist them to express their milk if they wish to, the apparent lack of information on performance assessment of student lactation consultants, and the lack of research on valuing the mother's view of the assessment, provided me with an original area to study.

I set out to explore if a mother-centred framework can be used to develop a method that assesses a lactation consultant student's performance, specifically in assisting a mother to learn skills for hand expression of her milk. My objective was to develop a workplace based performance assessment process that:

- reflected the skills the mother needed;
- focused on assisting the mother's learning;
- included the mother's view, as well as those of the faculty or other examiner, and the viewpoint of the student; and
- had utility and feasibility in diverse health settings.

It was hoped that this exploration and ensuing assessment process would thus contribute to:

- the infant receiving mother's milk, and/or to meeting the mother's needs for expressing,
- future learning and teaching and the development of professional practice,
- the body of research available related to training and assessment of IBCLC and other health workers, and to hand expression.

The assistance with learning to hand express was used as an example, though with the intention that the method could in future be applied to other areas of assisting learning related to breastfeeding or other topics.

To guide my work, I developed a framework that placed the mother central to the exploration. This was described in Chapter 1 and is reprinted here (Figure 6.1).

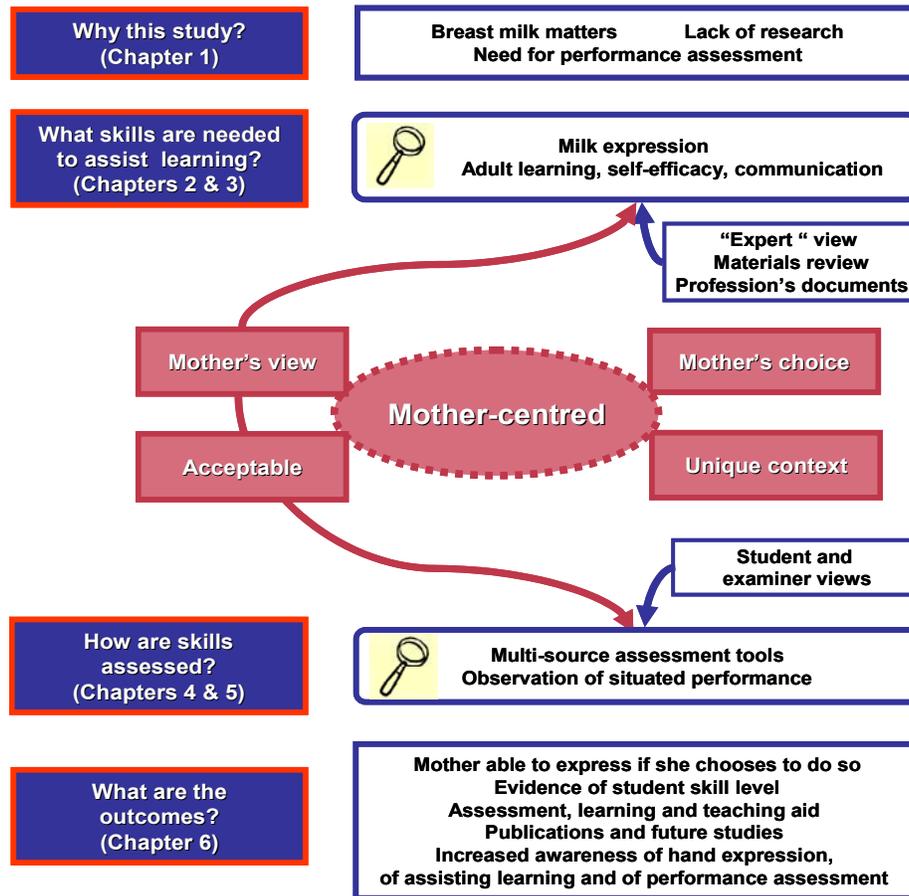


Figure 6.1 Study Framework

### 6.1.3 The research activities

This exploratory study was composed of a number of sections, using different methodologies and techniques as appropriate.

Three sets of literature searches and review established the current position regarding milk expression, and assisting learning of skills. Data related to the skills was collected by means of the following: self-administered questionnaires completed by two different sources, videotaping and analysis of mothers hand expressing, and an analysis of education materials. A three-phase Delphi exercise by email provided insights into the skills a mother needed. The data collected helped to answer the questions of what skills of hand expression were considered important by

the various sources and to identify the similarities and differences among them. It was also used to answer questions regarding supports and barriers to assisting learning of these skills. These findings were then used to develop a composite list which informed the construction of the assessment tool.

Another three sets of literature searches and review were undertaken regarding assessment. A two-phase, three-source process using self-administered questionnaires provided data on the acceptability, feasibility, and expected standard. This was analysed to provide evidence for the validity of the assessment process and tool. The findings were then discussed and conclusions drawn.

In addition to contributing to knowledge, practice and wider discussion, the output from this work included the assessment process and tools, the guidance sheet which also contributed to global and local BFHI materials, conference posters and presentations, and publications on the process and the findings.

## **6.2 Discussion of the findings**

### **6.2.1 Establishing the skills**

#### **6.2.1.1 Skills of hand expression**

Preliminary discussions with colleagues highlighted that though there has been a step-by-step behavioural learning approach to learning to hand express widely circulated for the last thirty years, many practitioners assist mothers in ways different from this approach, whilst also differing among themselves. I addressed the challenge of establishing the skills the mother needs to learn by undertaking a three-round Delphi exercise. This provided a structured approach to gathering views from 21 ‘experts’ involved in teaching hand expression regarding the statement “*In order to hand express a mother needs to know/do ...*”. This resulted in a list of skills agreed as important, as not important, and for which no agreement was reached. The Delphi technique via email provided me with a timely and cost-effective means to include geographically distant people, who could put forward views with anonymity and equality. It also provided iteration with feedback, and facilitated statistical analysis of the results.

From then, I compared and contrasted the views of the Delphi participants with the findings from reviewing the videotapes I had made of six mothers hand expressing and an evaluation of the content of 12 items of learning materials on hand expression for mothers and for health workers. These three-pronged explorations of the skills of hand expression were discussed in detail in Chapter Two, with the similarities and differences from the sources explored in Section 2.6.

It was particularly notable that the Delphi experts were unanimous in saying it was very important for the mother to know that expression should not hurt and to seek help if it did. A question asked the 'experts' to identify indicators that the mother was competent at hand expression, and as reported in Chapter 3, "comfortable/no pain" was found to be the most frequent response. This may indicate that those with experience of assisting mothers see pain as a likely occurrence with hand expression; yet the point to seek help if it was painful, was missing from half of the educational materials. Whilst this may be considered common sense and thus not mentioned in some educational materials, it is not uncommon to hear mothers learning to breastfeed say that they were "waiting for their nipples to toughen up" or that "the pain was tolerable" when asked why they did not seek help earlier for their sore nipples. Health workers may also accept pain or discomfort as normal in learning to breastfeed (Hall and Hauck 2007). This discordance between pain as common and pain as indicating the need for help may benefit from further research.

Some form of breast massage was viewed by the 'experts' and the materials as an important technique for the mother to learn, although back/shoulder massage was viewed as not important for assisting the milk ejection reflex. An illustration of back massage is included in the WHO breastfeeding course materials (WHO/UNICEF 1993) as a useful technique to assist milk flow. One of the course developers explained that this could be beneficial as general relaxation of the mother, or may act on specific neural pathways either side of the upper spine (Savage, F, personal communication). General relaxation has been shown to assist milk production (Feher et al. 1989; Mersmann 1993), however relaxation was not mentioned by the Delphi respondents. Further research could explore techniques for assisting milk flow that focused on the whole person, such as relaxation, therapeutic touch and back massage, in contrast to those focused solely on the breast.

The Delphi process proved interesting as regards the effect of seeing what others said and resultant changes in views. The statement that a mother needs to know where to find the lactiferous sinuses, (whose existence was a debated item in research at the time), provides one example. The results indicated that in the Delphi Round Two, 11 of the 21 participants (52%) rated this statement as important, whereas after the feedback and comments, in Round Three only five participants (25%) still thought this was important. This change in rating indicates the value of the iterative process and shows that the comments of others can change views. In addition, it may highlight an area that could be researched further, namely exploring lactation consultants' acceptance and use of new research.

Another example of the changes of view is that at the start of the Delphi rounds some of the responses indicated a belief there was one way to teach hand expression and that it suited all mothers. By the end of the rounds many of these respondents had moved to the "it depends on the individual situation and mother" view and emphasised the need for individualisation of the

assistance. If this short Delphi process could change respondents' views from a mechanical or behavioural stance to one that accepted individuality merely by offering another viewpoint to consider, there is hope for wider change if education sessions were to offer alternative viewpoints for consideration.

### **6.2.1.2 Skills of assisting learning**

The three-prong data collection did not give a step-by-step list of hand expression skills to learn, but instead highlighted the need for a flexible "teacher" addressing the mother's individual needs and assisting her to learn the cues and responses of her own body regarding milk expression. This led to the next area of exploration related to assisting learning.

Whilst undertaking the searches specific to learning skills of hand expression and to assessment of assisting skill learning, I was surprised at how little the literature reported on assisting the learning of any health skills using client-focused methods. There was a focus on compliance with directions with scant consideration of adult learning or empowerment methods. The literature review in Chapter 3 indicated that adult learning methods and developing self-efficacy assists learning in general. That chapter also reported the results from the self-completed questionnaires distributed to the 'expert' participants in the Delphi process and to the videotaped mothers. When asked about ways that learning could be assisted, the results indicated that one-to-one assistance including supervised practice was more valued than group sessions, leaflets and videos. The mothers also reported that educational materials had generally provided little assistance in learning to hand express. Though previous research has shown that leaflets and videos on their own, and "talking at" mothers do not provide enough assistance for learning skills of breastfeeding, these methods remain very common (Nikodem et al. 1993; Hauck and Dimmock 1994; Coombs et al. 1998; Hoddinott and Pill 2000; Dykes 2005).

The major barrier to a mother learning and to assisting her learning was given by nearly all the 'experts' as: "the health workers' lack of skill/knowledge/motivation" (Table 3.6). Hopefully my work will provide health workers with skills for changing their practice to more active and individual assistance of mothers' learning and reduce the reliance on leaflets and recitation of generic instructions.

Chapter 3 also described an examination of the learning theories underpinning the educational materials highlighted by respondents. It needs to be remembered that the publication dates of the materials reviewed ranged from a leaflet originating in 1978 (with minor updates since then) to 2005. Since these were reviewed, at least two are known to have been updated. The majority of the materials explained how the breast produced milk (frequently with diagrams of breast anatomy), and instructions where to place fingers and compress. They also advised mothers to use both breasts, to choose a suitable container for the milk, and to wash hands well before starting. Detailed instructions on timings to express each breast were found in some of the

materials examined. This focus on mechanistic learning of techniques and timing, combined with defining success in terms of quantity produced, portrays the breast as a milk-producing machine with little regard for the mother's experience of expressing. This is what has been described by Sweet as objectification of the milk (Sweet 2006). The choice of educational materials, or their development, may reflect the health worker's stance on assisting learning and on milk expression. Training of health workers may need to provide opportunities to reflect on how a personal stance can affect practice, how attitudes develop, and how learning can be assisted.

My findings on the skills of hand expression, the information on assisting learning, and the lactation consultant professional practice documents were then blended to produce the foundation on which to construct the tool for assessing a mother-focused learning encounter (Table 3.11). A page with the guiding principles of hand expression and of assisting learning was produced to assist educators and students in their preparation towards the assessment, and to assist examiners (Appendix D16).

### **6.2.2 Developing an assessment process**

The first part of my work explored the skills to be assessed, whilst the second part explored the development of a method of performance assessment. Chapter 4 reviewed the existing assessment strategies for those who assist mothers with breastfeeding, highlighting the lack of performance assessment. Workplace performance can provide authenticity, thus giving strength or validity to decisions from the assessment.

Assessment by observation of performance does not fit neatly into a psychometric framework that relies on a "correct" response expected of the student. My assessment values the flexibility of the student and their response to the needs of the individual mother. The chapter then explored a model built on a view of assessment as providing evidence, addressing the grounds for judgement (including the number of observations and who did the assessing), the nature of the judgement, and the process of providing evidence to inform and support judgements that would be fair and defensible.

I continued this concept of examining the evidence by outlining a validation process to test the strength of the conclusions that could be drawn from the evidence generated by the assessment. Ten assumptions and interpretations were listed. Six of these can only be examined when there is assessment data available after a period of use of the assessment process, and thoughts on this future enquiry are outlined in Chapter 4. The first four of the assumptions related to the internal validity of the assessment tool and process. These four were tested and this was described in Chapter 5.

### 6.2.2.1 Validating the assessment with stakeholders

Building on the findings from the skills chapters and the research reviewed in Chapter 4, I developed a set of assessment tools with nine items, each rated on a visual analogue scale, as well as a global judgement. These are to be marked by the mother, the student and the examiner/clinical facilitator after the encounter. In Chapter 5, continuing the model of enquiry, the purpose and population for the assessment was explained and the four assumptions related to internal validity were described. Evidence to test these assumptions was gathered in a 2-phase approach with stakeholder panels composed of educators, students and mothers. This evidence was analysed and the findings discussed in detail in Chapter 5. These assumptions are discussed here in relation to two of my overall objectives to develop an assessment that:

- included the mother's view as well as those of the faculty or other examiner, and the viewpoint of the student; and
- had utility and feasibility in diverse health settings.

#### *Utility and feasibility of the assessment*

Examining the utility and feasibility of the assessment included ensuring that:

- the instrument was representative and relevant to the behaviours expected of the student lactation consultant in assisting a mother to learn to hand express;
- it was useable by the three groups of mothers, examiners and students;
- the instrument would pick up a poorly performing student.

The findings of the validation process supported these three assumptions. The majority of respondents indicated that the visual analogue scale helped to show a continuum of progress towards reaching the required level of practice and was easy to use (Table 5.15). However, some responses indicated there would need to be particular attention in the further testing of the assessment to explaining why it was used and instructions for its use.

In addition to examining the assessment tool for comprehensiveness and readability, the assessment process was also tested for feasibility and the willingness to participate. All the examiners and students replied that it would be feasible to use this assessment, and all participants on the mother panel replied that mothers would be willing to participate (Table 5.8); with additional comments indicating the respondents had put thought into their replies. Though some authors have suggested that clients are unwilling to comment on care (Calman 2006; Speers 2008), when the clients were asked directly if they would be willing to comment, this view was not substantiated as indicated by the exploratory study regarding clients of mental health services (Speers 2008). Similarly, my findings with the mothers' panels in this testing did not indicate that mothers might be unwilling to participate in an assessment for fear of repercussions if they gave views that were negative. However, it does need to be borne in mind that the clients who volunteer to participate in these studies may be a more confident sample. It

would be important in piloting and field-testing of this assessment to examine if mothers of ill infants are more hesitant about assessing students because they fear this might affect the care of their child.

This difference between previous articles and the recent work of Speers and myself may indicate greater willingness amongst some researchers to accept that the clients' views are of value, and that incorporating clients' views is important, and thus worthy of research effort to include their views directly. Alternatively, it may reflect increased awareness of the role of clients in their own care and greater value being placed on their views. Hesitancy to value clients' views may indicate a fear that the clients' views might be negative or require change in practice. For there to be a change to including and valuing clients' views in assessments, there may firstly need to be discussion of the issues, including fear, with all those involved.

### ***Valuing viewpoints***

The findings indicated that all three views (examiner, student and mother) were considered of value, with 19 of the 47 respondents replying that the views of all three assessors should have equal value in the assessment. There were five replies (out of 47) that the student should only pass if the mother gave a passing score.

There may be willingness to use an assessment, but that assessment must also be useful in determining if the student had reached the required standard. The fourth assumption to be validated was that the passing score or performance standard was realistic and acceptable. The majority of the panels' respondents indicated that a minimum level should be reached on all items in order to pass and that the global rating should be informed by the individual item ratings. This may reflect views that all the areas of the assessment were important.

Initially, many of the respondents seemed to picture an "overall score" from the assessment that would be used as a summative mark for the student, with comments referring to combining scores from each assessor to get an overall average. To give mothers the final say might be too great a change from current practice where the examiner's view has primacy. The examiner taking into account the rating by the mother and student might be more acceptable as an initial measure, if a summative result is needed from each encounter.

Informal discussion with some of the educator/examiner panel members about how the process might work in practice also highlighted a stance that assessment meant one summative mark. My suggestion that feedback would be more valuable if the source of the rating remained distinct, and that if a pattern could be discerned over a few encounters, was well received. (In this context a pattern of concern might be defined as several poor ratings from mothers, or one item on which the student consistently performed poorly.) In addition, the distinct ratings would facilitate praise for areas in which a student did well. One possibility would be for the student to undertake a number of these assessments with mothers in different situations and settings, and

then for the student to discuss with their clinical facilitator (or similar) what pattern was appearing. As discussed in Chapter 4, a simple probability calculation may provide sufficient evidence that an individual student is fit for independent practice.

Collecting a number of observations would assist a clinical facilitator to have an evidence base for a clinical practice summative judgement. This could be used to “sign off” on achievement of this skill in a similar manner to the STAR (Statement of Awarded Responsibility) suggested by Ten Cate and Scheele (2007). Field-testing will provide more insights into combining or assigning primacy to a view.

Part of the testing of this fourth assumption related to what was an acceptable standard for the student to reach. Views were sought from the panel members, who included mothers, students and examiners/educators, who were asked to mark what they thought represented a cut-off score for passing on each item. The cut-off score marked across all the items and all the panels was very similar (mean 78.37, range 77.05 to 80.54). Whilst there was a range of individual item cut-off scores from 49 to 99, there was little difference in the mean cut-off scores for any item. The cut-off score for passing could be set at different levels for different items to allow for weighing of more critical items, and many of the panel members did vary their marks. However, it was not apparent from this testing that any items had a lower standard that was acceptable to the majority of the panel members.

Chapter 4 discussed correlation between the views of different types of assessors and highlighted the variables to consider when comparing views, including if all were assessing with the same purpose in mind, and whose view is taken as the “gold standard” to which the other views are correlated. This concluded that with observation of a performance it might be too much to expect a useful numerical correlation. I found similarities across the panel members on their visualisation of the cut-off point for each item. However, it remains to be tested if these similarities remain when they are involved in a real encounter. If the data were to show the judgements diverging, the discussion could establish the reasons behind this. It may be that some assessors’ views are “unreliable” compared to other assessors, that student skills valued by mothers are different from those valued by examiners, that the assessment instrument is interpreted differently by some assessors, that there is a natural difference in views of the same event, or many other explanations.

### **6.3 My contribution**

My work has the potential to contribute to mother and child well-being, to the practice of lactation consultants and other health workers, to research and to education and assessment.

Assessment drives learning. Lack of assessment of performance may lead educators and students to believe that practical skills are not as important as the more frequently assessed theory or ‘book knowledge’. My literature search found no research on performance assessment

for lactation consultants, and a reliance on testing knowledge or application of knowledge through written assessments alone. Currently, there appears to be no formal performance assessment for lactation consultants in use. My performance assessment process provides a means of assessing practice in the workplace that can be used for student lactation consultants and other health workers, or for continuing professional education.

Student assessments that involve the recipient of care, or service-user, giving their view of the care, are limited. My objective to develop a mother-centred assessment was achieved. I sought the perspective of mothers in establishing the skills of hand expression that the mother would need to acquire, and their views on how the assistance with learning these skills could be best provided. The views of mothers were also sought during the process of validation of the assessment. This included their views on acceptability of participation and on the standard of student performance expected.

In addition to the mothers' views, students and educators/examiners also participated in the development of the assessment process and tools. This obtained their perspectives and may increase the likelihood of the assessment being accepted into practice. The comments received from some of the educators/examiners indicated their interest in using the assessment in the future.

Developing personal skills for health was a key aspect to the Ottawa Charter (WHO 1986), and this combined with the involvement of service users in assessment of student performance, has relevance in areas broader than hand expression. My presentation to an international conference on competencies in health promotion sparked discussion related to the lack of research on assisting skill acquisition, the performance assessment for students, and for the need to not just teach students about the theory of empowering clients, but to demonstrate this by seeking and valuing the views of the clients in student assessments.

This study represents the first multi-country and multi-focus agreement on the skills and knowledge for assisting a mother to acquire skills of hand expression. The process of my research to establish the skills of hand expression involved contact with key individuals internationally. Some participated in the Delphi study, some suggested research papers to read, and some gave their comments and discussed my ideas. As the list of skills was refined, it was presented at conferences, and a poster abstract was published in an international peer-reviewed journal. These activities generated more interest and discussion. The gaps in the research on milk expression in general were highlighted through a Cochrane systematic review (Becker et al. 2008). Hopefully an outcome of my research will be an increased awareness of the importance of hand expression, with discussion and action towards best practice in assisting mothers. The next steps are of piloting and field-testing the assessment with additional interested and expert lactation consultant educators, their students, and the mother they serve.

This will provide further information and discussion to enhance the validity and reliability of the findings related to the skills of expression and of assisting learning.

The objectives for this thesis were therefore achieved. A mother-centred framework can be used to develop a method to assess a lactation consultant student's performance in assisting a mother in learning skills for hand expression of her milk. The assessment process appears feasible, and it is ready for piloting. I have contributed to the body of research on assessment, on mother-centred care, on assisting learning and on hand expression. Hopefully, my work will contribute towards future work in these areas and in broader areas related to student learning, attitudes to milk expression and the valuing of mothers' views.

Health workers that are skilled and confident in assisting mothers may increase the number of women who have skills to hand express their milk, which in turn may assist infants to receive human milk and increase the duration of breastfeeding

#### **6.4 Limitations of this thesis**

The thesis has some limitations.

As there was no research specific to lactation consultants, research from other health professions informed the work, and while there appeared to be many similarities between the professions and their approach to assessment of performance, the breadth of research limited the depth of search and review of this literature. The scant research on assisting learning of skills of hand expression skills posed limitations to the literature review.

The sample size was not large, though the students, educators and materials were drawn from three continents. The participants were self-selected and may represent a particularly confident and interested group. With field-testing, it would be important to include educators and students who were less interested in hand expression and in exploring methods of assessment, and to involve mothers who were less educated and less confident than the mothers in the studies appeared to, be in order to strengthen the generalisation of the findings. As the background and environment of the participants predominantly reflected one culture, the assessment process would need to be examined when used in a different culture.

The mothers who were video-taped were experienced mothers with older infants. It remains to be explored if mothers hand express differently in the early weeks after birth and when first learning the skills.

This thesis addressed only one aspect of milk expression, that of effective assistance with learning. Even if there is an effective assessment process, it may have little effect if other influences are not also addressed such as health care policies (including time allocated to assist mothers' learning), and attitudes to breastfeeding and milk expression amongst the health workers, the mothers and those that influence them.

Learning, and thus assessment, is on-going, evolving and situated. Whilst I attempted to develop an assessment that would be useable in many settings, its use would need to be reviewed in the context of a specific setting and time, as a different situation might produce different results.

Evidence for the validity of other aspects including correlation with other tests, prediction of future performance of the student, or of the mother's use of the skills, and the effect of the assessment on learning and teaching, were discussed in the thesis. However, these validations, and an examination of reliability, cannot be done until there are results available from the use of the assessment in field-testing.

## **6.5 Future directions**

Moving further with this project requires a number of activities to continue, expand or commence.

### **6.5.1 Education**

As a precursor to any change occurring, there is likely to be a need to raise awareness of the value of hand expression, the need for changes to teaching about hand expression, and the importance of both performance assessment and of including the views of mothers. The underpinning knowledge, attitudes and skills of the students (and of their educators) needs to be in place prior to assessment. The variety of views found on assisting the learning of hand expression indicates a need for educational materials for educators and students that present hand expression in a manner suitable for adult learning. These should explain why it is of value, the variety of reasons why it might be useful to learn, what techniques may assist in acquiring the skills, and realistic expectations.

Carried out in tandem with the learning for educators and students would be the development of materials for mothers to be used in a self-efficacy and adult learning framework. These materials would reflect the findings of this thesis, in particular, that hand expression should not hurt, and that general principles are offered for mothers to use in finding what suits them best.

### **6.5.2 Pilot and field-test of the assessment**

When awareness is increased, educators and students have the underpinning learning, and there are suitable supporting materials for mothers, the assessment of performance can commence.

The purpose of the pilot and then wider field-testing, is to test if the mother-centred method that was developed can be used in a real setting to assess a student lactation consultant's performance in assisting a mother in learning skills for hand expression of her milk. This pilot would gather information on the feasibility of the assessment process, highlight changes that may be needed before wider field-testing, and provide data for consideration. Using a model of enquiry (adapted from Kane, 1992), this pilot would test the validity of the assumptions and

interpretations which could be made of the assessment process, described in Chapter 4. A detailed proposal for a pilot is included in Appendix E1.

Field-testing would provide further information, and as the numbers would be larger, would allow more conclusions to be drawn. Areas to explore and examine include:

- reliability of encounters in different settings and situations and with different mothers and examiners;
- comparison of mother views to those of the examiner and student, and examine the differences depending on which is used as the 'gold standard' for comparison;
- highlight any areas of the assessment where marked inconsistencies between assessors occur, and examine to see if the assessment tool or process is contributing to the inconsistencies, and could be adjusted;
- establish if there is a learning gap generally among students (or their educators) or other sources of incorrect information, which could be remedied;
- examine correlation between findings of this assessment and other assessments, and if knowledge predicts performance;
- explore if the assessment process can discriminate between early training and more experienced, between lactation consultant and other health workers;
- establish if the process of feedback happens and whether it is helpful;
- examine the willingness of mothers to give views on student performance, and if how the request is phrased makes a difference.

After sufficient field-testing, review of standard settings and other validation of the assessment, an assessment pack could be produced in both paper and electronic formats, to facilitate wider distribution. This assessment process could be used to demonstrate performance of the specific task related to hand expression, as evidence of skills of communication, application of knowledge to practice, integration of skills, or other more generic competence, and the findings may blend with other assessments. These decisions would be made at the individual educational establishment level.

### **6.5.3 Research**

My work was exploratory and one of its aims was to establish areas for future investigation. The pilot and field-testing stages of my work will provide information on many areas related to the assessment, and these could be explored in more depth. A procedure similar to mine could be used to develop an assessment process for other topics such as assisting a mother to learn skills of breastfeeding, or cup-feeding, for example.

As the research I found related to hand expression was limited, there may be scope for more research on the topic generally. This could be wide-ranging, including attitudes, physiology, and education. Many years ago, Morse and Bottorff (1988) and Drane et al (1994) highlighted areas

needing further research. Most of these areas remain under-researched and would benefit from attention. More recently, a Cochrane review (Becker et al. 2008) has recommended areas needing evidence related to milk expression, in particular research that examined beyond merely the performance of new pumping equipment in comparison to other pumps.

Milk expression and assisting learning are both complex topics. A variety of research techniques were used in this thesis to explore them, and these techniques may be useful in further work. My study appears to be the first to use a Delphi technique to seek agreement among lactation consultants on a practice, and there are other areas of practice that could be addressed using this technique. For example, nearly one-third of the ‘expert’ source thought placing their own hands on the mother’s breast was the most helpful way to teach the mother to express, in contrast to other evidence indicating that mothers find this unpleasant. Agreement regarding handling a mother’s breast as a recommended practice could be explored with a wider group using Delphi techniques. There are many instances where triangulation of views, including those of the mother, could be an effective research technique.

Theses are often read by those considering undertaking research of their own, or those who guide emerging researchers. In an attempt to contribute to the wider and on-going research community, I have listed some possible further research questions in Appendix E2 that arose from my work.

## **6.6 Conclusion**

This thesis examined assessment of assistance to mothers with learning to hand express. It established the skills needed to hand express and the skills of assisting learning. It developed an assessment process and instruments that valued the views of mother, student and examiner, to the stage of “ready for pilot-testing”. This exploration of performance assessment is a new direction in lactation consultant training.

I hope that the work achieved by and arising from this thesis will help to:

- raise awareness of the value of hand expression;
- train effective and confident lactation consultants and other health workers;
- highlight the need for individualised learning using adult learning techniques and developing self-efficacy;
- value the mother’s view and involvement in student assessment;
- make it easier to study other aspects of hand expression with suitable sample sizes;
- provide a model for performance assessment as a part of the training and continuing education of those who assist mothers with breastfeeding.

However, the most important effect will hopefully be that this assessment may assist infants to receive mothers’ milk, and thus contribute to the health and well-being of children and their mothers.

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**Appendix E: What next?**

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- E1. Draft proposal for pilot testing of assessment
- E2. Possible areas for further research

## Appendix A: Literature searches

Searches were undertaken to explore what the literature had to say about:

1. Skills of hand expression (Discussed in Chapters 1 & 2)
2. Existing tools and methods of assessment of health workers related to milk expression and to breastfeeding (Discussed in Chapters 1 & 4)
3. Content of education materials regarding skills of milk expression (Discussed in Chapter 2)
4. Assisting patient learning of skills (Discussed in Chapter 3)
5. Methods of performance assessment of health workers (Chapter 4)
6. Patients / service users as assessors of practice (Chapter 4)

In addition to the electronic searches listed, the first three searches also involved hand searching of the Journal of Human Lactation from 1985 and Breastfeeding Review from 1992, as well as conference proceedings from the International Lactation Consultant Association and the Australian Lactation Consultant Association. Experts in the field, as well as web site notice boards, e-lists, and journals of professional and voluntary organisations related to breastfeeding were used to seek additional published or unpublished studies. For all searches, reference lists of all relevant retrieved articles were examined to identify further studies, and colleagues were asked about further sources. Automatic monthly alerts were set up.

### A1. Skills of hand expression

(Discussed in Chapters 1 & 2)

Question to answer: What are the skills involved in hand expression, with particular focus on how to learn or teach the skills?

Electronic databases searched via Ovid:

CINAHL - Cumulative Index to Nursing & Allied Health Literature <1982 to Dec Week 1 2007>

EMBASE <1980 to 2007 Week 52>

Ovid MEDLINE(R) <1996 to November Week 2 2007>

Ovid MEDLINE(R) <1950 to 1995>

PsycINFO <1985 to December Week 3 2007>

Search process:

	terms	hits
1	(milk adj2 (express* or extract* or remove*)).mp.	1883
2	(breast adj2 (express* or extract* or remove*)).mp.	5264
3	1 or 2	6691
4	3 and (manual or hand).tw.	166
5	limit 4 to human [Limit not valid in: British Nursing Index,British Nursing Index Archive,CINAHL; records were retained]	143
6	5 not (gene* or cancer or carcinoma or cyto* or cataract).tw.	56
7	remove duplicates from 6	35
8	7 and (educat* or teach* or learn* or instruct* or skill or assist* or support*).tw.	6

As there were only 6 items, the 35 items one step back in the search were also examined. Twenty-nine were excluded as unrelated to the specific focus of skills of hand expression. One possible master's thesis from the mid-west USA could not be obtained for full review: Soemaker, C L (1983) Manual expression of milk by breast feeding mothers. Winning research project 1983. Nevada RNformation, 12, 15.

Reasons for exclusion:

Breast tumour	2
Biochemistry or bacteriology of milk	11
Breastfeeding at work in general	3
Reviewed or compared pumps only	4
Misc. (reviewing a web site on pump info, milk exclusion diet, milk removal to treat mastitis, characteristics of breastfeeding women, experience of reflecting on practice)	5
Comparisons of pump and hand expression (not information on how to express)	4
Not available	1
Excluded	30

This step-back resulted in three additional articles (\*) for review in addition to the six existing articles (#). After review, four non-research articles and one educational video remained on how to hand express. None were research studies. These five items are discussed in Chapter 2.

#### A1. Skills of hand expression findings

study	content	result
Auerbach, K. G. (1990). Assisting the employed breastfeeding mother. <i>Journal of Nurse-Midwifery</i> 35(1): 26-34.	how-to article not research	* include
Frantz, K Breast Feeding Techniques That Work! Volume 6: Hand Expression. Kittie Frantz. 1988	how-to video (commercial) not research	# include
Glynn, L & Goosen, L (2005) Manual expression of breast milk. <i>Journal of Human Lactation</i> , 21, (2) 184-185.	how-to article not research	* include
Minter, A (2005) Teaching and assessing: reflection upon planning, delivery and evaluation. <i>British Journal of Midwifery</i> , 13, (11) 722-725.	reflection on the use of a reflective process, not reflection on specific teaching and assessing	# exclude
Otter, J A, Klein, J L, Watts, T L, Kearns, a M & French, G L (2007) Identification and control of an outbreak of ciprofloxacin-susceptible emrsa-15 on a neonatal unit. <i>Journal of Hospital Infection</i> , 67, (3) 232-239)	bacterial content of expressed milk	# exclude
Riordan, J & Countryman, B. (1980) Basics of breastfeeding. Part II: the anatomy and psychophysiology of lactation. <i>JOGN Nursing</i> , 9, (4), 210-213.	how-to article, part of series on breastfeeding not research	* include
Schwartz, K, D'arcy, H J S, Gillespie, B, Bobo, J, Longeway, M & Foxman, B (2002) Factors associated with weaning in the first 3 months postpartum. <i>Journal of Family Practice</i> , 51, (5) 439-444.	characteristics of breastfeeding women including if or when they had used hand expression	# exclude
Terry, J. (2004). Teaching mothers to express and store breast milk. <i>The Journal of Family Health Care</i> 14(5): 121-3.	how-to article not research	# include

## A2. Existing tools and methods of assessment of health workers related to milk expression and to breastfeeding

(Discussed in Chapter 1 & 4)

Question 1: What are the assessment methods / tools / programmes for lactation consultants?

Question 2: What are the assessment methods / tools / programmes for any health worker related to milk expression?

Question 3: What are the assessment methods / tools / programmes for any health worker related to breastfeeding?

Electronic databases searched via Ovid:

CINAHL Cumulative Index to Nursing & Allied Health Literature <1982 to Dec Week 1 2007>

EMBASE <1980 to 2007 Week 51>

Ovid MEDLINE(R) <1996 to November Week 2 2007>

PsycINFO <1985 to December Week 3 2007>

Search process:

	terms	hits
1	(lactation consultant and education).mp.	79
2	((assess\$ or evaluat\$) and (competenc\$ or performance or skill)).mp.	362278
3	1 and 2	3
4	remove duplicates from 3	3*
5	(breastmilk or (breast adj milk)).mp	18631
6	(express\$ or pump\$ or extract\$).mp.	2962614
7	5 and 6	2267
8	2 and 7	45
9	remove duplicates from 8	35 #
10	(breastfeed\$ or breast feed\$).mp.	48565
11	2 and 10	459
12	remove duplicates from 11	314
13	(educat\$ or train\$).mp.	1493111
14	12 and 13	118
15	remove duplicates from 14	118
16	limit 15 to human [Limit not valid in: British Nursing Index,British Nursing Index Archive,CINAHL; records were retained]	117

Question 1 was answered at this point: \* 3 articles, including a duplicate, involved lactation consultants teaching doctors and were excluded.

Haughwout, J C, Eglash, A R, Plane, M B, Mundt, M P & Fleming, M F (2000) Improving residents' breastfeeding assessment skills: a problem-based workshop. *Family Practice*, 17, (6), 541-546.

Bunik, M, Gao, D & Moore, L (2006) An investigation of the field trip model as a method for teaching breastfeeding to pediatric residents. *Journal of Human Lactation*, 22, (2), 195-202.

Search was then broadened to include assessment of any health worker related to expression of milk, Question 2.

# All 35 articles related to evaluating lactation performance or milk constituents, and thus were excluded. None related to education.

Search broadened further to include assessment of any health worker related to breastfeeding, as Question 3.

Titles reviewed for 117 items

Excluded if clearly not related to assessment of health workers:

Assessment of general hospital practices to support breastfeeding, behavioural assessment of children who were breastfed, assessment of mother/baby breastfeeding performance  
= 38 remaining

38 abstracts reviewed

Excluded if not relevant:

Course or programme description: 3

Learning needs assessment or descriptive study / survey of knowledge regarding breastfeeding:  
21

Post training questionnaire on knowledge/course evaluation: 7

= 7 remaining:

Nyquist et al. 1994; Haughwout et al. 2000; Moran et al. 2000; Chiu et al. 2003; Paterson et al. 2004; Moran et al. 2005; Law et al. 2007.

Hand search of *Breastfeeding Review* found one relevant letter to editor: Tweedie 2000

Resulting in 8 articles for in-depth review; discussed in Chapter 4.

### **A3. Content of education materials regarding skills of milk expression**

(Discussed in Chapter 2)

Question: Are there reviews or evaluations of the content of educational materials regarding skills of hand expression, or how to learn / teach hand expression?

Electronic databases searched via Ovid:

CINAHL - Cumulative Index to Nursing & Allied Health Literature <1982 to Mar Week 1 2008>

EMBASE <1996 to 2008 Week 11>

Ovid MEDLINE(R) <1996 to March Week 1 2008>

PsycINFO <1985 to March Week 1 2008>

Search process:

	<b>terms</b>	<b>hits</b>
1	Textbook/ev [Including Related Terms]	2702
2	(breastfeed\$ or breast feed\$ or breastmilk or breast milk or human milk or expressed milk or milk express\$).mp. [mp=ti, hw, ab, it, sh, tn, ot, dm, mf, nm]	37309
3	(content adj analysis).mp.	17898
4	(evaluat\$ adj2 content).mp. [mp=ti, hw, ab, it, sh, tn, ot, dm, mf, nm]	2392
5	2 and 3	168
6	2 and 4	18
7	1 and 2	20
8	5 or 6 or 7	197
9	remove duplicates from 8	164

Titles reviewed for 164 -

15 appeared to have some relation to materials and the abstracts were reviewed

Excluded after abstract review:

- 2 evaluating website material for readability and graphics, no content details
- 5 reviewed general media portrayal of breastfeeding
- 4 reviewed historical material on breastfeeding
- 1 related to bonding

3 remained: Cooke et al 2003, Philipp et al 2004, 2007

Plus known reports: Courant 1993 and Blaauw 2000 (limited publication, did not appear in electronic search)

These five articles are outlined overleaf and discussed further in Chapter 2.

### A3. Content of education materials regarding skills of milk expression

Study	What evaluated	How evaluated
Cooke, M, Cantrill, R & Creedy, D (2003) The first breastfeed: a content analysis of midwifery textbooks. <i>Breastfeeding Review</i> , 11, (3), 5-11.	Five midwifery textbooks published between 1997 and 2000 in common use in Australia	building on the work of Gupta and Kumar (1999), developed an "adequacy of information" evaluation criteria for information related to breastfeeding initiation
Blaauw, M (2000) Breastfeeding in medical handbooks and teaching materials in the Netherlands, Amsterdam, <i>Zorg voor Borstvoeding</i> , Netherlands.	Seventeen textbooks published between 1992-1999, used by training schools for maternity nurses, nurses, midwives and general practice medical doctors in The Netherlands	based on the evaluation criteria of Courant (1993) updated. Criteria covered eleven aspects of breastfeeding.
Philipp, B L, McMahon, M J, Davies, S, Santos, T & Jean-Marie, S (2007) Breastfeeding information in nursing textbooks needs improvement. <i>Journal of Human Lactation</i> , 23, (4), 345-349.	Six maternal-child nursing textbooks published between 1999 and 2006 in popular use in authors' training hospital in Boston, USA	authors independently scoring each book for the inclusion of 20 basic breastfeeding criteria based on the American Academy of Pediatrics breastfeeding policy statement and the WHO/UNICEF Ten Steps to Successful Breastfeeding
Philipp, B L, Merewood, A, Gerendas, E J & Bauchner, H (2004) Breastfeeding information in pediatric textbooks needs improvement. <i>Journal of Human Lactation</i> , 20, (2), 206-209.	Seven paediatric textbooks published between 1999 and 2002 popular with medical students and paediatric residents in School of Medicine authors' associated with in Boston, USA	authors independently scoring each book for the inclusion of 15 (paediatric) basic breastfeeding criteria based on the American Academy of Pediatrics breastfeeding policy statement and the WHO/UNICEF Ten Steps to Successful Breastfeeding
Courant, G (1993) An evaluation of the breastfeeding content of selected medical textbooks, Toronto, WHO/IBFAN.	23 medical textbooks selected by sending a questionnaire to all English, French and Spanish medical schools worldwide, asking which textbooks they used to teach infant nutrition. Of those that responded, the books most often cited were reviewed	criteria developed from the published work of international writers on breastfeeding and covered eleven aspects including physiology, management, lactation problems, weaning, support and marketing of breast milk substitutes.

#### A4. Assessment of assisting patient learning

(Discussed in Chapter 4)

Question: What methods / instruments have been used to assess any health professional in assisting a patient to learn a health related skill?

Electronic databases searched via Ovid:

CINAHL Cumulative Index to Nursing & Allied Health Literature <1982 to Apr Week 4 2008>

EMBASE <1980 to 2008 Week 17>

Ovid MEDLINE(R) <1950 to April Week 3 2008>

PsycINFO <1985 to April Week 4 2008>

Search process:

	terms	hits
1	*education, medical/ or *education, nursing/ or *education, occupational therapy/ or *education, physical therapy/ or *education, pharmacy/ or *Education, Dietetics/ or *Education, Midwif*/	96360
2	*patient education/	37085
3	1 and 2	212
4	*health education/	40174
5	1 and 4	383
6	2 or 4	76552
7	1 and 6	587
8	limit 7 to abstracts	239
9	limit 8 to english language	207
10	limit 9 to human [Limit not valid in: CINAHL; records were retained]	182
11	remove duplicates from 10	177

117 Abstracts were reviewed. 94 were excluded as not related to assessment of the health worker, which left 23 that were reviewed in full.

Further exclusions reduced this to 3, which all related to aspects of the same project. (Stetson et al. 1992; Schlundt et al. 1994; Boswell et al. 1996)

References in other studies resulted in addition of Speros 1986.

These studies are described in Chapter 4 (4.4.1.4).

## A5. Existing tools and methods of assessment of health workers related to workplace / clinical performance assessment

### (Discussed in Chapter 4)

Question: What methods / instruments are used for assessment of performance of other health workers?

Electronic databases searched via Ovid:

CINAHL - Cumulative Index to Nursing & Allied Health Literature <1982 to Apr Week 4 2008>

EMBASE <1980 to 2008 Week 17>

Ovid MEDLINE(R) <1950 to April Week 3 2008>

PsycINFO <1985 to April Week 4 2008>

	terms	hits
1	*education, medical/ or *education, nursing/ or *education, occupational therapy/ or *education, physical therapy/ or *education, pharmacy/ or *Education, Dietetics/ or *Education, Midwif*/	103550
2	performance appraisal {Including Related Terms}	12963
3	educational measurement {Including Related Terms}	2582
4	2 or 3	15452
5	1 and 4	663
6	limit 5 to English, human, abstracts, yr="1987 - 2007", remove duplicates	552
7	(proficien* or assess* or competenc* or perform* or evaluat*).ab.	5733859
8	1 and 7	14837
9	limit 8 to abstracts, English, human, yr="1987 - 2007"	9304
10	tool or instrument {Including Related Terms}	5394
11	9 and 10	21
12	6 and 10	5
13	11 or 12	21

On review of the 21 abstracts, 3 were related to assessment of performance that had a patient-health worker interaction. (Straube and Campbell 2003; English et al. 2004; Tsuda et al. 2007) These 3 articles described aspects of the use of the American Physical Therapy Association Clinical Performance Instruments, such as the type of comments written by clinical instructors on the forms, though the known studies of the development and testing of these instruments did not appear in these 21 studies.

It was decided that this search strategy was not finding articles successfully.

## A6. Patient/service user involvement in assessment of health worker performance

(Chapter 4)

Electronic databases searched via Ovid:

CINAHL Cumulative Index to Nursing & Allied Health Literature 1982 to Dec Week 1 2007

EMBASE 1996 to 2008 Week 03

Ovid MEDLINE(R) 1996 to January Week 2 2008

PsycINFO 1985 to January Week 2 2008

Search process:

	terms	hits
1	((("service user" or patient or consumer) adj (participat* or involve* or view)).tw	3797
2	(student or education).tw	395796
3	1 and 2	2540
4	remove duplicates from 3, limit to abstracts, english language, humans, yr="1996 - 2007"	267

These 267 articles were reviewed via the titles, excluding any clearly not relevant, then the abstracts, and if this was not clear, by scanning the full article.

Reasons for exclusion	removed
student is not a health student (i.e. school students participating in health programme), or where the student is the patient	80
patient education not health worker education	106
general discussions about or with service users and involvement	28
patient with passive involvement (i.e. being taught 'on')	22
patients as teachers (i.e. in classroom) no role in assessment stated	22
simulated patients as assessors in OSCEs	2
<i>Remaining articles for full review</i>	7

Study	Service-user assessors	Description
<p>Advocacy in Action, Charles, M, Clarke, H &amp; Evans, H (2006) Assessing fitness to practise and managing work-based placement. <i>Social Work Education</i>, 25, (4) 373 - 384.</p> <p>Exclude: no details of assessment tools / process</p>	<p>Community social worker services-users, carers and other eligible citizens, drawn from diverse community settings, briefed beforehand and offered training if required, and supported throughout their involvement, which is financially reimbursed.</p>	<p>Descriptive report of developing joint working project assessing:</p> <ul style="list-style-type: none"> <li>- one-to-one student interview with user or carer;</li> <li>- individual exercises and student group tasks; and</li> <li>- a joint activity between students and service users/carers.</li> </ul> <p>Client assessors rate interview using a 5-pt pictorial scale. No info on rating criteria or reliability.</p>

<p>Advocacy in Action &amp; Staff and Students from the University of Nottingham (2006) Making it our own ball game: learning and assessment in social work education. <i>Social Work Education</i>, 25, (4) 332-346.</p> <p>Exclude: no details of assessment tools / process</p>	<p>Same group as above</p>	<p>Descriptive report of the development of user-led experiential assessment framework which can be applied to most student learning and practice situations. no assessment described</p>
<p>Bailey, D (2005) Using an action research approach to involving service users in the assessment of professional competence. <i>European Journal of Social Work</i>, 8, (2) 165 - 179.</p> <p>Exclude: no details of assessment tools / process</p>	<p>Mental health services users</p>	<p>Descriptive report of  a. users perceptions of the written/portfolio work submitted by the students on a masters' training programme in mental health;  b. users experience of being involved in the process of giving feedback; and  c. participants views of receiving feedback from a user perspective</p>
<p>Brown, K &amp; Young, N (2008) Building capacity for service user and carer involvement in social work education. <i>Social Work Education</i>, 27, (1) 84 - 96.</p> <p>Exclude: no details of assessment tools / process</p>	<p>Social work services users</p>	<p>Description of a 6 module course for service users on involvement in training of social workers which includes involvement in assessment.</p>
<p>Calman, L (2006) Patients' views of nurses' competence. <i>Nurse Education Today</i>, 26, (8) 719-725</p> <p>Exclude: no details of assessment tools / process</p>	<p>Patients in acute teaching hospital</p>	<p>Report of research to generate a grounded theory of patients' construction of competence of nurses to inform and generate evidence for future planning of patient involvement in nurse education.</p>
<p>Davis, D &amp; McIntosh, C (2005) Partnership in education: the involvement of service users in one midwifery programme in New Zealand. <i>Nurse Education in Practice</i>, 5, (5) 274-280.</p> <p>Exclude: no details of assessment tools / process</p>	<p>Pregnant women</p>	<p>Descriptive report of how midwifery student 'follows' pregnant woman for weeks assisting in care. Feedback (not described) sought from pregnant woman via supervising midwife.</p>
<p>Edwards, C (2003) The involvement of service users in the assessment of diploma in social work students on practice placements. <i>Social Work Education</i>, 22, (4) 341 - 349.</p> <p>Exclude: no details of assessment tools / process</p>	<p>Unspecified social worker service users</p>	<p>A qualitative survey of the views of practice teachers on the main principles, issues and practical implications of service user involvement in the assessment of students.</p>

## Appendix B: Lactation Consultant practice documents

### B1. IBLCE Competency Statements

(downloaded Feb 26, 2007) [www.iblce.org](http://www.iblce.org)

**The following competency statements identify and summaries the special knowledge and skills included in the role of an International Board Certified Lactation Consultant (IBCLC).**

1. Possess the skills, knowledge, and attitudes to provide competent comprehensive consultation and education in routine and special circumstance lactation, from preconception to beyond twelve months.
2. Integrate additional knowledge from the following disciplines in providing care for breastfeeding families:
  - Maternal and Infant Anatomy
  - Physiology and Endocrinology
  - Nutrition and Biochemistry
  - Immunology and Infectious Disease
  - Pathology
  - Pharmacology and Toxicology
  - Psychology, Sociology, and Anthropology
  - Growth Parameters and Developmental Milestones
  - Interpretation of Research
  - Ethical and Legal Issues
  - Breastfeeding Equipment and Technology
  - Breastfeeding Techniques
  - Public Health and Advocacy
3. Utilize knowledge of personality, counseling skills, and family and group theory when providing breastfeeding support.
4. Integrate cultural, psychosocial, nutritional, and pharmacological aspects of breastfeeding into lactation consultant practice.
5. Utilize appropriate communication skills in interactions with clients and health care providers.
6. Maintain a collaborative, supportive relationship with clients, emphasizing individualized family care, client autonomy, informed decision making, and optimal health care.
7. Act as an advocate for breastfeeding in the community, workplace, and within the health care professions.
8. Utilize adult learning principles when providing educational experiences for clients, health care providers, and the community.
9. Interpret current research findings to determine appropriateness for application to practice.
10. Function and contribute as a member of the health care team, provide follow-up plans, and make appropriate referrals to other health care providers and community support resources.
11. Maintain comprehensive client records.
12. Follow a professional Code of Ethics, local laws and codes, and maintain appropriate standards of hygiene.
13. Observe the guidelines for health workers outlined in the WHO International Code of Marketing of Breast-milk Substitutes.
14. Maintain and enhance knowledge and skills with appropriate and regular continuing education.

**Sections of the documents from the International Lactation Consultant Association (ILCA), the professional body, and International Board of Lactation Consultant Examiners (IBLCE), the certifying agency, are included here statements which refer to communication/ education/ counselling and to hand expression.**

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## **B2. Clinical Competencies for IBCLC Practice**

(selected)

“This checklist includes most of the clinical/practical skills that an entry level IBCLC needs in order to be satisfactorily proficient to provide safe and effective care for breastfeeding mothers and babies... Clinical instructors will be able to use this checklist as an appropriate guide in providing individualized education.

### **COMMUNICATION AND COUNSELING SKILLS**

In all interactions with mothers, families, health care professionals and peers, the student will demonstrate effective communication skills to maintain collaborative and supportive relationships.

*The student will:*

- Demonstrate appropriate body language (i.e., position in relation to the other person, comfortable eye contact, appropriate tone of voice for the setting, etc.)
- Elicit information using effective counseling techniques (i.e., asking open-ended questions, summarizing the discussion, and providing emotional support)
- Provide individualized breastfeeding care with an emphasis on the mother’s ability to make informed decisions.
- Use adult education principles to provide instruction to the mother that will meet her needs
- Select appropriate written information and other teaching aids. “

Published by the International Board of Lactation Consultant Examiners, Inc. Downloaded Feb 26, 2007 www.iblce.org

## **B3. Standards of Practice for International Board Certified Lactation Consultants (IBCLC)**

(selected)

### *Standard 3. Clinical Practice*

The clinical practice of the IBCLC focuses on providing clinical lactation care and management. This is best accomplished by promoting optimal health, through collaboration and problem-solving with the client and other members of the health care team.

- 3.3.1 Implement the plan of care in a manner appropriate to the situation and acceptable to the mother
- 3.3.4 Provide appropriate oral and written instructions and/or demonstration of interventions, procedures and techniques.

### *Standard 4. Breastfeeding Education and Counseling*

Breastfeeding education and counseling are integral parts of the care provided by the IBCLC

- 4.1 Educate parents and families to encourage informed decision-making about infant and child feeding
- 4.2 Utilize a pragmatic problem-solving approach, sensitive to the learner’s culture, questions, and concerns
- 4.3 Provide anticipatory guidance (teaching) to:
  - Promote optimal breastfeeding practices
  - Minimize the potential for breastfeeding problems or complications
- 4.4 Provide positive feedback and emotional support for continued breastfeeding, especially in difficult or complicated circumstances

(3<sup>rd</sup> edition 2005) published by the International Lactation Consultant Association (ILCA)  
Downloaded Feb 26, 2007 www.ilca.org

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## Appendix C: Skills of hand expression data

### C1. Source A Questionnaires

#### Questionnaire A

Thank you for responses to the Delphi exercises so far. Would you provide some general information on yourself please? This will help in my thesis to acknowledge your expertise as a member of the expertise panel and for demographics. Thank you.

1. Number of years working in education of health workers\* related to breastfeeding: \_\_\_\_\_
2. Approximate number of health worker\* teaching sessions per year that you teach in which hand expression would be discussed: \_\_\_\_\_
3. Have you published/produced materials on hand expression –
  - Research/peer review journal
  - Other professional publication
  - Health Worker\* information guidelines/training materials
  - Mother information leaflet/internet material/ magazine article
  - Other (please specify)
4. Have you presented at a workshop/conference or other event on hand expression?
  - Major conference for health workers\*
  - Local conference/workshop for health workers\*
  - Event aimed at mothers who were not health workers
  - Other (please specify)
5. Are you
  - a currently certified IBCLC
  - certified in past but not current
  - never certified
6. If you assist mothers directly, approximately how many mothers would you assist with hand expression per month? \_\_\_\_\_
  - Do not directly assist mothers

\* The term health worker is used to cover everyone who assists mothers in health areas. This includes trained mother-to-mother support workers/counsellors/Leaders as well as midwives, doctors, nurses, nutritionists, etc.

Thank you

## Questionnaire B

Your responses to the following questions would be very valuable.

1. Please rank the following (you may add more points) for when you think it is best for mothers to learn the skills of hand expression. (1 indicates best.)
  - Ante-natal
  - Early perinatal (day 1 or 2)
  - Later postnatal (after milk supply develops)
  - Any time is as good as any other time
  - Other (specify)
  
2. Please rank the following (you may add more points) as how you think mothers are best assisted to learn the skills of hand expression. (1 indicates best.)
  - Leaflet with text only
  - Leaflet with pictures only
  - Leaflet with both text and pictures
  - Video of mother being assisted to learn skills of hand expression
  - Video of mother hand expressing by herself
  - Explaining verbally how to express with no written/visual material
  - Using a cloth/knitted breast model to demonstrate
  - Using a full size breast model that ‘expresses milk’ when correct techniques are used
  - Placing your hands on the mother’s breast to show her where to put her fingers and how to compress her breast
  - Explaining where to put fingers/how to compress and observe how mother does this on her own breast
  - Other (specify)
  
3. Please rank the following (you may add more points) as the setting that you think is best for mothers to learn skills of hand expression. (1 indicates best.)
  - One to one session with a health worker
  - One to one session with experienced mother
  - One to one session with an IBCLC/specially trainer person
  - Small group session (2-4 mothers) with a health worker
  - Small group session (2-4 mothers) with experienced mother
  - Small group session (2-4 mothers) with an IBCLC/specially trainer person
  - Large group session with a health worker
  - Large group session with experienced mother
  - Large group session with an IBCLC/specially trainer person
  - Learn by herself from written or visual resources
  - Other (specify)

4. From your point of view, if you were assisting a mother to learn how to hand express, what would indicate that she was competent at hand expression?
  
  
  
  
  
  
  
  
  
  
5. From the mother's viewpoint, what do you think would constitute effective hand expression/competency in the skill of hand expression?
  
  
  
  
  
  
  
  
  
  
6. What do you perceive to be the main barriers to women learning skills of hand expression?
  
  
  
  
  
  
  
  
  
  
7. What do you perceive are the main barriers for health workers in assisting mothers to learn the skills of hand expression?
  
  
  
  
  
  
  
  
  
  
8. Please list any resources/materials that you consider addresses the points/principles of hand expression that you think are key for assisting learning the skills of hand expression -

For assisting health workers to learn these skills:

For assisting mothers to learn these skills:

## **C2. Source A Delphi Round 1**

### **Invitation to participate as an 'expert' in Delphi study**

Dear colleague,

As a highly regarded practitioner /trainer /researcher in the area of expression of milk, your opinion is very valuable. Would you be willing to participate in a survey as part of my PhD? There are only 20 international experts invited to participate in this survey, so your individual input is important. Participation involves the completion of an email survey on three occasions over the next two months. Each survey should require no more than 20 minutes of your time.

The overall project explores what is best practice in assisting a mother to learn the principles and skills of hand expression of breast milk and how a midwife/other health worker/volunteer counsellor can develop competency in assisting learning of this skill. A first step is to develop a consensus of what the mother needs to learn to be competent with hand expression.

Virtually no published studies could be found on acquiring the skill of hand expression, though this skill is a component of the BFHI. However, lack of publications does not mean lack of knowledge. I will use a Delphi process to capture the collective knowledge held within the expert group that may not have been verbalised or published. This will involve three or four e-mail questionnaires over a period of approximately 6-8 weeks, which ask you to firstly contribute your views, and then to consider and rate the group opinions on the topic. Each round will consolidate and clarify the views of the previous round. In this way it is hoped to establish a collective 'expert' view.

Participants will be anonymous to each other and only known to the researcher. This anonymity allows participants to present and react to ideas unbiased by the identities and pressures of others in the group. I am seeking your own views, not those of your hospital, colleagues, or other group.

The questionnaire will be sent during the period May 1<sup>st</sup> to July 1<sup>st</sup>, 2004. You are asked to respond to each questionnaire within 14 days. This rapid turnaround keeps the process active and limits your time commitment to the process. After each round in the process, you will receive feedback on the opinions and comments of that round.

The findings of the Delphi study will inform other aspects of my PhD and hopefully I will write a paper for publication on the use of the Delphi process to gather expert views. It is hoped that the findings of the overall research will assist breastfeeding mothers to learn the skills to hand express and will increase the confidence and competency of those who assist them to learn these skills. This in turn will facilitate more infants to receive breast milk.

I thank you for your participation in this work and for your responses. If you are unable to participate in this survey, please let me know so I do not continue to bother you with follow-up emails.

The first questionnaire is attached. **Please return it by May 14<sup>th</sup>.**

If at any time you would like more information or have a question on the project, please contact me at [midgb@medphysics.leeds.ac.uk](mailto:midgb@medphysics.leeds.ac.uk)

Thank you for your assistance.

Genevieve Becker, PhD student  
Maternal and Infant Research Unit  
University of Leeds  
22 Hyde Terrace  
Leeds LS2 9LN  
England

**Initial round**

This is the first of a series of Delphi exercises. The overall aim of this Delphi exercise is to explore and assess the skills a mother needs to hand express effectively. As far as possible, I am looking for the overall principles rather than the techniques an individual mother may use. For example, 'warm the breast to assist let-down' is a principle rather than 'to use a face cloth wrung out in hot water to warm the breast', which is a technique. At the end of the overall process, I hope to have a list of key principles that the health worker can assist the mother to understand and adapt to her individual situation and thus develop individual techniques that best suit that mother.

In this first round, you are presented with an open-ended question in order to generate ideas and identify issues. In your reply to this question, please list each item in a brief, concise manner and email your response to me by May 14<sup>th</sup>. You may give up to ten points/items. You do not need to evaluate or justify your items at this point in time. Your ideas will be anonymously included in the next round, at which time you will be asked to rank and comment on the ideas of the group.

Please note that this project is exploring hand expression only, not pumping.

If you think that the information/technique would differ depending on the age/health of the baby, please indicate these differences.

***In order to hand express effectively, a mother need to be able to do and/or to know the following:***

Item 1:

Item 2:

Item 3:

Item 4:

Item 5:

And so on

### **C3. Source A Delphi Round 3**

#### **Statements for rating by participants at start of Round 3 showing Round 2 medians, Inter-Quartile Ranges, and comments.<sup>1</sup>**

##### **Delphi Hand Expression - Third Exercise** (sent to participants early July 2004)

Thank you for your input to the second exercise. I realise this takes time and I appreciate your assistance. It is nearly over!

In Round 1, you were asked to complete a broad open statement. Some respondents replied with 1-2 statements and some sent 10. These responses were divided into themes and duplicates removed. These statements are not my opinions, they were what the group sent back. Part of the research is to highlight there are differences, and that these differences can cause disagreement. Your responses to Round 1 were collated and sent back as Round 2.

In Round 2, you were asked to score these statements as to how important you thought they were. Your scores were analysed (with SPSS), a median and measure of dispersion (spread) were calculated. This analysis is now sent back to you for this round.

The median (marked M) indicates that half the scores have a value equal to or greater than the median and half a value equal to or less than the median – the value of the middle item in list of scores (distribution) or the “centralness”. This is not the same as the mean, which is the average of all the scores. However, the median gives no indication as to how far to either side of the median the other values extend.

The dispersion or spread is measured by quartiles – the values of the items one-quarter and three-quarters of the way through the distribution (the list of the scores you gave). A quarter of the values are below the first quartile and a quarter of the values are above the third quartile. Thus, half the responses must be between the two quartiles. The shaded area indicates the range between the two quartiles. Therefore, 50% of the groups’ scoring was within this shaded area. If the M (median) is to one end of the shaded area it means more people scored the statement at that end of the range.

In Round 3 (this round), you are asked to look at the same statements as the previous round. Many people gave reasons for their score. Where there is a wide spread of scores (an interquartile range more than 1.5), these comments are included. Please again score the statements taking into consideration the views of others in the group. You can score the same as you did the first time or change.

You are welcome to add comments if you wish, but do not feel that you must comment; you can just mark the number, or the box “no view”. You are scoring each item as a separate item. You do not need to decide if one item is more important than another item in the list.

You also received a demographics questionnaire (thank you to those who have sent it back) and there is another short questionnaire to come in a week. In a few months, (hopefully around the end of September) you will get a report on the process and results of this Delphi.

Thank you.

***For each statement mark an X next to the number you think is appropriate:***

**How important is this statement as a key principle that a mother needs to know/be able to do in order to hand express?**

*Note: Spacing is reduced in these documents to reduced space in thesis*

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<sup>1</sup> Round 2 and Round 3 statements were the same as Round 3

**Section 1: psychological****1.1 In order to hand express, a mother needs to believe that breast milk is important.**

Not important Very important No view  
 1 2 3 4 5  
 [M]

Your comments: **1.2 In order to hand express, a mother needs to believe that hand expression will work for her**

Not important Very important No view  
 1 2 3 4 5  
 [M]

*She can still do it without believing it will work for her. This depends on a definition of her purpose for hand expressing*

*Hand expressing takes time & practice, so a mother may not get immediate results*

*I suppose it is helpful to believe that milk expression is an easily mastered technique but many women are sceptical initially and are surprised by the result when they have a go.*

*Depends entirely on why the mother is expressing, and how long she needs or plans to continue to do it. Some mothers may believe that it does not work for them because they have been badly instructed – they may be amazed at how well it works if they can be persuaded to try again with better help.*

*When I teach a mother to HE, she almost always walks away knowing that it will work for her. On rare occasion, she doesn't quite have the Technique down and is instructed to practice it. I assume those mothers are not 100% convinced it will work, but they've seen me get a stream of milk out of their breast, so they already know that their breasts work.*

*Belief in the process will generally mean that the mother is relaxed, so assisting the oxytocin reflex, and that she is prepared to keep trying if she doesn't immediately get the 'knack'.*

*This hardly matters if she knows the above. She can be shown that hand expressing will work. It may not work the first time, or the second, but gently having a go every day or so (after 36 weeks) and trying in the bath will usually produce the few drops she needs to show her body is working*

*Some women can hand express just because, but many need a reason to learn the skill.*

Your comments: **1.3 In order to hand express, a mother needs to be able to find emotional/ psychological support as well as practical instructions.**

Not important Very important No view  
 1 2 3 4 5  
 [M]

*Perhaps some need psychological support but not unequivocal*

*The emotional/psychological support that a mother needs is a teacher who knows what she is doing and knows how to teach. That's it! I have seen people attempting to teach HE who don't know what they are doing or how to teach and then the mothers don't feel emotionally/psychologically supported.*

*This becomes important if she is seeking to express quantities of milk over a period of time, in order to establish or maintain her lactation. It is much less important in terms of her acquiring the technique.*

*Usually very helpful*

*Practical instructions & encouragement are all that is needed*

*I feel this isn't as important as the 'permission' to touch her breasts and have a go.*

*I have rated this highly for the preterm population since long term expression is incredibly time consuming. But for the occasional expression I don't think it rates very highly.*

Your comments:

**1.4 In order to hand express, a mother needs to know other mothers who have hand expressed**

Not important Very important No view  
 1 2 3 4 5  
 M

*Not necessary but may be helpful x2*

*May depend on mother's culture setting/background but not a priority for most mothers*

*Can be a great source of support, but not absolutely essential*

*support from these women can be helpful but I don't feel it essential*

*Most mothers I've worked with have never seen another mother HE.*

*Hand expression is a learnt skill. Mothers therefore need to be taught it, either formally (e.g. by a midwife) or informally, through observing other women doing it. Mothers in stressful situations, or who are expressing long-term may find this contact valuable in the emotional sense but it is not a prerequisite for acquiring the technique provided a 'teacher' is available.*

*Hand expressing in pregnancy needs to be talked about. So other mothers who talk about doing it are more important than those who have actually done it. It isn't supposed to be a competition and it is about technique rather than amount.*

*Obviously peer support etc helps but it is not essential for the technique to work.*

Your comments

**Section 2: Information****2.1 In order to hand express, a mother needs to know the advantages of expressing by hand.**

Not important Very important No view  
 1 2 3 4 5  
 M

Your comments

**2.2 In order to hand express, a mother needs to know when to start expressing after the baby is born.**

Not important Very important No view  
 1 2 3 4 5  
 M

Your comments

**2.3 In order to hand express, a mother needs to know how frequently to express.**

Not important Very important No view  
 1 2 3 4 5  
 M

*May only need to know how frequently to express if she is needing to express for volume to keep up with baby feeding needs*

*Why?*

*Very important for early days to establish supply or is using HE in place of feedings, less so for older baby, eg if only expressing to relieve engorgement and achieve a good latch x 2*

*Assuming she is doing it to initiate lactation*

*Yessss! But she probably needs to know the minimum and if she starts with 8 times in 24 hours and she gets uncomfortable she may need to increase.*

*depends what the milk is needed for, or if it is to clear blocked ducts*

*not a prerequisite for acquiring/mastering the technique. However, the answer is 5 if her baby is unable to breastfeed and she is seeking to establish and maximise her lactation through hand expression.*

*In order to get enough milk, not to hand express*

*not important to learn the skills, but very important to stimulate or maintain milk production*

*Yes, before birth as above. Afterwards she needs to know why she is doing it because that will determine how much. To ease engorgement so the baby can latch on will only require occasional expressing.*

*Producing milk when baby is ill or separated means she needs to do it little and often, and the few drops she gets should be praised. For a mum not breastfeeding, only to ease her breasts, so as needed.*



*Absolutely essential for early days expressing or the mum's confidence is flattened by unrealistic expectations*

Your comments

**2.7 In order to hand express, a mother needs to know that expressed milk will sometimes come in drops, or spurt/spray**

Not important Very important No view  
 1 2 3 4 5  
 [ M ]

*relevant but not very important*

*She will see that, won't she? I suppose some warning might help. Colostrum does not usually spray.....*

*It's nice to know, but not necessary.*

*Not a prerequisite for acquiring/mastering the technique, but useful to know so that she is not surprised or alarmed by what happens.*

*I would say that in order to be successful at establishing a milk supply by any form of expression a mother needs to know what to expect and how to know when the breasts are sufficiently "empty" to trigger further milk production.*

Your comments

**2.8 In order to hand express, a mother needs to know that expressing should not hurt and to seek help if it is uncomfortable.**

Not important Very important No view  
 1 2 3 4 5  
 [ M ]

Your comments:

**2.9 In order to hand express, a mother needs to know what a let-down is and ways to stimulate a let-down reflex.**

Not important Very important No view  
 1 2 3 4 5  
 [ M ]

*Maybe, maybe not depending on purpose.*

*assumes that this is not just at the beginning of the lactation process, but expressing once the milk is in Whether she needs to know the terminology and the physiology is open to question. She certainly will find it useful to know ways to get the flow started and increase flow*

*Please, get rid of the term "let-down." It's out of date and physiologically incorrect. It's important for the mother to know that she isn't likely to get as efficient a MER with HE as with the baby.*

*This is not a prerequisite for acquiring/mastering the technique of hand expression per se but is useful as part of explaining how her body works and how she can help it to do so in less-than-ideal circumstances. However, over-emphasis on the importance of the let-down reflex can, of itself, prevent it from occurring easily.*

*More so in mums with established milk supply*

*I'd say this may be useful information but it may also get in the way. It is important if mum needs to express large quantities but not for easing the breast for comfort.*

*Another issue that matters significantly. However, it is equally important for her to understand that she may not feel the let-down as such.*

Your comments

**2.10 In order to hand express, a mother needs to know what prolactin and oxytocin do.**

Not important Very important No view  
 1 2 3 4 5  
 [ M ] -

*Needs an understanding of the action & how they affect let-down but not a science lecture*

*Hand expressing will work without this knowledge, if she does the right things – how much she needs to know depends on why she is doing it*

*Why?? If she is interested fine but it isn't going to stop her hand expressing if she doesn't know!!*

*Not essential, although it may be helpful. Lots of people can express very successfully knowing nothing about hormones.*

*They need to know in a way but discussing technicalities such as specific hormones when especially talking to a mum whose baby is maybe sick and she is under a lot of stress, may scare her off!!!*

*'Hormones' should be sufficient.*

*A basic understanding of how their breasts work is useful for all women, though this need not include technical nomenclature. However, it is not a prerequisite for acquiring/mastering the technique of hand expression. Plenty of women worldwide can hand express very effectively without ever having heard the terms prolactin and oxytocin!*

*some information just make things more complicated...*

*Information helps preterm mothers*

*I am thinking of ALL mums and talking hormones sometimes turns them off.*

*In simple terms, that she can comprehend.*

*For most mothers I find it most helpful to give them a basic understanding of what they are doing and why. It is reinforcing to recognize signs and symptoms of hormone release and know how they act together.*

Your comments:

### **2.11 In order to hand express, a mother needs to know basics of breast anatomy.**

Not important				Very important	No view
1	2	3	4	5	—

*She will need to know why it works when she does some things, and not when she does others*

*Useful..... but depends upon what basics are meant.*

*This can be helpful but since we teach mothers incorrect anatomy it can be misleading. Peter Hartmann and Donna Ramsay have shown that there are no lactiferous sinuses.*

*Needs to be basic (or very basic) x 4*

*In simple terms, that she can comprehend.*

*she just need to know where to place her fingers as described in detail in section 3*

*She certainly needs to know that her breast isn't an empty sac, so an idea of the workings may be helpful, but showing her bunches of grapes or half a cauliflower will be an effective illustration.*

*Your comments: especially for finding milk reservoirs through touch and use soft pressure, no harsh massage*

*I find this helpful to some mothers, but not necessary.*

Your comments

### **2. 12 In order to hand express, a mother needs to be able to choose a suitable container for the milk.**

Not important				Very important	No view
1	2	3	4	5	□

*If planning to collect and store and feed to baby or other*

*Well she's got to collect it in something!*

*Use whatever she may have at home, plastic is preferable.*

*Something sterile and preferably wide-necked*

*Has no real impact on 'hand expression'. May be useful as far as collecting a usable sample of breastmilk is concerned.*

*It doesn't help if the milk gets contaminated. Clean is good! (Really essential)*

*This is not a prerequisite for acquiring/mastering the technique of hand expression. If, however, the aim is to collect the milk to give to a baby, then knowing that a wide-mouthed container will catch the maximum amount of milk is useful. An understanding in advance of whether or not the container needs to*

*be sterile (depending on the age/vulnerability of the baby) will prevent disappointment over whether the milk can, in fact, be used.*

*any container will do*

*depending... on whether the baby is going to have the expressed milk*

*Only if she is going to 'contain' it. For easing the breasts she doesn't need to collect and contain her milk.*

*Only if you mean a suitable container into which she can express so she is not focusing on aim, but on technique. And, actually this is not at all important for the skill of hand expression per se – many women hand express in the shower just to relieve fullness.*

*Must be sterile.*

Your comments

### Section 3: Practical

#### 3.1 In order to hand express, a mother needs to be able to wash her hands well before expressing.

Not important Very important  
 1 2 3 4 5 No view  
 [ M ]

*Good hygiene but act of expressing not dependent on hand washing.*

*Good idea.... Helps prevent infection etc. BUT if she cannot she can still express if she is uncomfortable just much more risky. Depends upon whether you mean hand expression can only be done if she is able to wash her hands or no.*

*Clean is good! (Really essential)*

*I've got to remember that the gut needs to be colonised to, but yes if it's for a premie*

*This information is situational. It applies only in the situation where the milk is to be collected and given to a vulnerable baby. It is not relevant to the technique itself.*

*In order to avoid contamination*

*Although I do think this is important it is possible to hand express without touching the stream of milk. depending...*

*Again, for large quantities it will be important but for easing her breasts probably not.*

*This is good for hygiene, but does not influence the skill of hand expression*

Your comments

#### 3.2 In order to hand express, a mother needs to have a warm, private, comfortable environment

Not important Very important  
 1 2 3 4 5 No view  
 [ M ]

Your comments

#### 3.3 In order to hand express, a mother needs to be near her baby, have a picture of her baby or an item of the baby's clothes.

Not important Very important  
 1 2 3 4 5 No view  
 [ M ]

*Helpful but not totally necessary x4*

*If expressing to feed a baby from whom she is separated – preterm, sick or being “minded”.*

*Helpful for some mothers, but definitely not necessary – and with hand expression a women is focusing more on what she is doing than with pumping, so it may be in the way.*

*Works well for many women. Not essential for all. Depends upon conditioned response*

*Nice, but not necessary. This is subjective and situational. It is not related to the technique itself but to facilitating the let-down reflex in order to maximise yield. It may be very important for one woman and not so for another.*

*especially so during the learning period, afterwards she will not be bothered so much by a less positive environment*

*If separated this can help, if a skilled, experienced expresser then no.*

*this really relates to preterm mothers. However, since milk removal is a conditioned reflex it may not as important once a milk expression technique is established.*

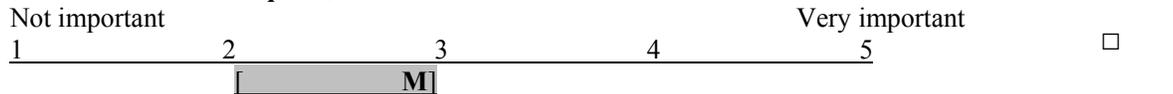
Your comments

**3.4 In order to hand express, a mother needs to be able to judge how long to continue expressing for at a time.**



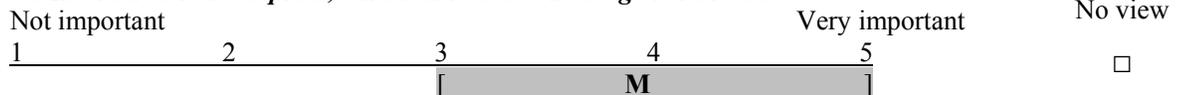
Your comments

**3.5 In order to hand express, a mother needs to warm her breast.**



Your comments

**3.6 In order to hand express, a mother needs to massage her breast.**



*Perhaps sometimes if doing long term expressing for working mum or for preemie babe*

*Generally good principle to start*

*Can help a lot.*

*highly individualized.*

*This has been demonstrated to be helpful in the context of a trial on expressing with a breastpump, presumably because it triggers oxytocin release. It is logical to assume that it might be helpful prior to hand expressing, provided it is done gently.*

*She can express without massage. BUT this will enhance her success*

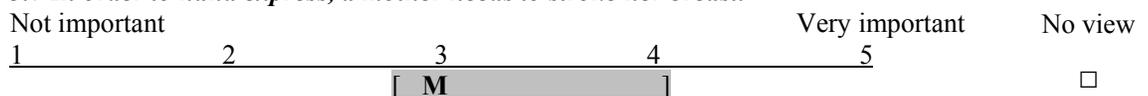
*Depends on the situation. For most mothers, used correctly, it's extremely helpful.*

*This is subjective and individual. Its purpose is to stimulate the let-down reflex; it is not part of the mechanical technique of compression which actively removes milk. I consider that over-emphasis on breast massage is the cause of much confusion amongst both clinicians and mothers about how milk is actually removed. It also has the potential to cause tissue damage. I am therefore very wary of describing it as important. It may, however, be appropriate in certain situations, such as blocked duct. this item is actually covered in 2.9, which is the principle - the different ways of stimulating the flow should be the choice of the mother, but of course some ways work more efficient for most mothers than other ways.*

*May help for larger amounts but not for ease*

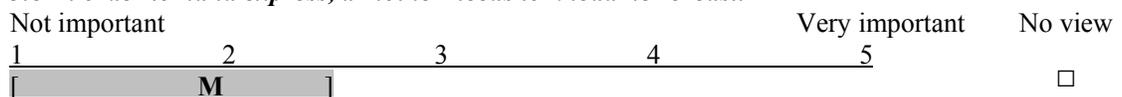
Your comments

**3.7 In order to hand express, a mother needs to stroke her breast.**



Your comments

**3.8 In order to hand express, a mother needs to knead her breast.**



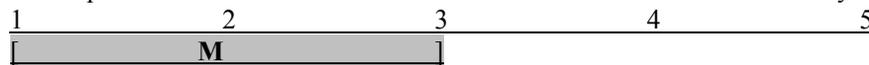
Your comments

**3.9 In order to hand express, a mother needs to stroke, massage and shake her breast.**

Not important

Very important

No view

*I find most mothers don't shake breasts as they don't find it of value.**These are variations on 3.6 .I am not sure that there is evidence to support being so prescriptive**Good sequence of above needed**may help milk letdown/production but not essential x 3**Personal experimentation is the key.**Not in early days, nor with engorged breasts**These are all techniques which may or may not work for any individual mother. BUT none of them are absolutely essential. She should do whatever is right for her**There is no question that the M/S/S in conjunction with Hand Expression gets the best results for the majority of mothers. Nothing works for everyone.**Why shake?**Not only is all this unnecessary in the majority of situations, it makes the whole business far more complicated than it need be. This technique may help some women to maximise their yield or to overcome specific problems but it should not presented as an essential part of the basic technique.**this item is actually covered in 2.9, which is the principle - the different ways of stimulating the flow should be the choice of the mother, but of course some ways work more efficient for most mothers than other ways.*

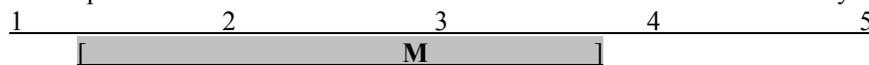
Your comments

**3.10 In order to hand express, a mother needs to stimulate her nipple.**

Not important

Very important

No view

*Important to stimulate the hormone response**are variations on 3.6 . I am not sure that there is evidence to support being so prescriptive**A useful technique and mothers may find it a useful thing to know**But, it wouldn't hurt!**This is helpful for many women but not necessary for all women by any means.**This may be useful to maximise overall milk production through the release of prolactin. It is, however, separate from the expression of milk on any one occasion.**this item is actually covered in 2.9, which is the principle - the different ways of stimulating the flow should be the choice of the mother, but of course some ways work more efficient for most mothers than other ways.**This can help but isn't essential.**Of no relevance**Personal experimentation is the key.**imitate baby's mouth touching the nipple, thus een soft approach.*

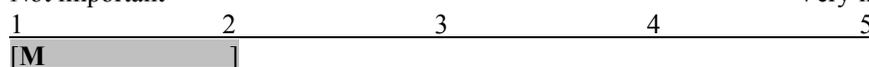
Your comments

**3.11 In order to hand express, a mother needs to shake her breast.**

Not important

Very important

No view



Your comments

**3.12 In order to hand express, a mother needs to alternate breasts.**

Not important

Very important

No view



M
---

*Relevant to increasing production*

*would be covered by the advice to the mother to express her breast for as long as milk flowed, and change to the other when the flow slowed. When the flow from the second one slowed, to go back to the first, and finally finish off on the second. It is not possible, or in my view helpful, to give a prescriptive time in minutes.*

*This can be helpful but I don't think it is a must.*

*it works best for the greatest majority.*

*Why? You can hand express both breast simultaneously with a bit of practice.*

*this is helpful*

*Not a prerequisite for acquiring/mastering the technique. However, the answer is 5 if her baby is unable to breastfeed and she is seeking to establish and maximise her lactation through hand expression.*

*this item is actually covered in 2.9, which is the principle - the different ways of stimulating the flow should be the choice of the mother, but of course some ways work more efficient for most mothers than other ways.*

*To keep up a supply it is a good idea to alternate – and for cosmetic reasons.*

*Depends on reason to express.*

*Not necessarily, she may only be relieving engorgement or a blocked duct on one side*

Your comments

### **3.13 In order to hand express, a mother needs to have a (non-alcoholic) drink.**

Not important

Very important

No view

1	2	3	4	5
---	---	---	---	---

M
---

*Helpful but not necessary – varies from mother to mother*

*If the mother is thirsty or hungry, she's probably not going to HE as effectively.*

*Oxytocin release seems to make women feel thirsty, so it*

*would make sense to have a drink to hand before she starts expressing – but the word “need” implies that expressing won't be effective if she does not have a drink....*

*Good time to have a drink. She is likely to feel thirst because of release of vaso pressin BUT probably not absolutely essential*

*Not necessary but may enhance her comfort*

*Not a prerequisite for acquiring/mastering the technique and obtaining milk.*

*this item is actually covered in 2.9, which is the principle - the different ways of stimulating the flow should be the choice of the mother, but of course some ways work more efficient for most mothers than other ways.*

*as part of relaxation: something she likes, taking a sip during a pause.*

*For some women this may be a trigger for letdown but for most it is only a “nice to have.”*

Your comments

### **3.14 In order to hand express, a mother needs to have her back/neck/shoulders massaged.**

Not important

Very important

No view

1	2	3	4	5
---	---	---	---	---

M
---

Your comments

### **3.15 In order to hand express, a mother needs to know where to position her thumb and forefinger on her breast.**

Not important

Very important

No view

□

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5  
 M

Your comments

**3.16 In order to hand express, a mother needs to know to position her thumb and fingers opposite each other.**

Not important \_\_\_\_\_ Very important \_\_\_\_\_ No view  
 1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5  
 □  
 M

Your comments

**3.17 In order to hand express, a mother needs to position her thumb exactly at 12 o'clock and her finger at six o'clock on the breast.**

Not important \_\_\_\_\_ Very important \_\_\_\_\_ No view  
 1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5  
 □  
 M

Your comments

**3.18 In order to hand express, a mother needs to position her fingers where baby has his upper and lower lip when feeding.**

Not important \_\_\_\_\_ Very important \_\_\_\_\_ No view  
 1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5  
 □  
 M

Your comments

*Not something a mother will remember*

*And if he has never fed? Not helpful for guidance – babies do not compress the breast with their lips*

*Only if expressing to relieve engorgement and get baby attached properly, in which case this is exactly what mum needs to do*

*Most mothers can't see where the lower lip is.*

*I find most women move their hand around the breast to several different positions to empty all areas of the breast.*

*Yes and no! depends if attachment is good. If poor this may not result in expression of much milk. If attachment good then probably very useful guide.*

*As near to as possible and this also suggests rotating as the mother may hold her baby in different positions during a feed*

*Assuming the baby is latched on correctly.*

*wrong!!! it may actually be important to position the fingers in a different position to clear ducts which the baby does not reach*

*This is a useful guide to give a mother (and explains to her why massage alone will not be effective) but it is not accurate, since it is the action of the baby's tongue against his palate which express the milk. His lips will tend to be off-centre, whereas her fingers should be at more or less the same distance from the nipple.*

*This may be right for some mums but again individual care suggests this type of rule is unhelpful.*

*She will rotate around the breast. Babies drink in different positions anyway.*

Your comments

**3.19 In order to hand express, a mother needs to position her fingers at the edge of the areola.**

Not important \_\_\_\_\_ Very important \_\_\_\_\_ No view  
 1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5  
 □  
 M

Your comments

*Not always a good principle, areola sizes vary x 6*

*Not all mothers ducts are situated exactly at the edge of the areola, may alter with breast or areola size*

*Depends on the size of her areola. The areola works well for the majority of women, since the reference areola is about 1 inch in radius. Even more than her areola, it depends on the physiology of the woman's*

breasts. For most, 1 inch is what works best.

Over the ducts

This information is individual and a blanket 'rule' can be very misleading. Areola size varies enormously, whereas the position of the lactiferous sinuses is fairly constant (given that newborn babies' mouths are similar sizes).

not always right - the sinuses may not be exactly underneath the edge of the areola

This may be right for some mums but again individual care suggests this type of rule is unhelpful.

That depends solely on how well the outer decoration matches the inner anatomy.

This is old info & not helpful.

Your comments

**3.20 In order to hand express, a mother needs to know how to find the lactiferous sinuses/ducts/area where the underlying breast tissue is different.**

Not important				Very important	No view
1	2	3	4	5	
[ M ]					-

Difficult to find and confuses mothers

There are not lactiferous sinus see research by Peter Hartman and Donna Ramsay

Useful if she can feel this – but not all mothers can.

Again, this is one of the few critical points in my view.

I don't think we understand the physiology yet. So experimentation is the key.

Can be really useful if the mother can locate the swellings before expression

Good idea, but not always easy to feel, especially if milk supply is not yet established

According to Hartmann/Ramsay's research, lactiferous sinuses are non-existent. Nevertheless, one inch of tissue dorsal to the base of the nipple is what works best for most mothers

If they exist!

Some women do not like palpating their breasts. What about Hartmann's work on this? Do we know if saying this is still valid?

She needs to know where pressure must be applied in order to obtain milk effectively. However, she does not need necessarily to be told this in advance, provided she feels able to experiment and find the right place. On the other hand, assisting a mother to find the right 'spot' will enable her to obtain milk quickly.

This may be right for some mums but again individual care suggests this type of rule is unhelpful.

Your comments

**3.21 In order to hand express, a mother needs to rotate her thumb and finger position positions around the breast.**

Not important				Very important	No view
1	2	3	4	5	
[ M ]					□

Your comments

**3.22 In order to hand express, a mother needs to support her breast while expressing.**

Not important				Very important	No view
1	2	3	4	5	
[ M ]					□

Your comments

**3.23 In order to hand express, a mother needs to use both breasts.**

Not important				Very important	No view
1	2	3	4	5	
[ M ]					□

Depends on the reason for expressing, like feeding, both breasts are offered but not always taken

Not if the mother is only breastfeeding from one breast. However, if she is a two breasted lactating mom,

*it's a good idea!*

*Not necessarily, might be relieving blocked duct on one side only*

*Not a prerequisite for acquiring/mastering the technique. However, the answer is 5 if her baby is unable to breastfeed and she is seeking to establish and maximise her lactation through hand expression.*

*not important to learn the skills, but very important to stimulate or maintain milk production ... and some mothers may feed from one breast and express from the other*

*Depends entirely on why she is expressing x2*

*Unless she only has one i.e. mastectomy!*

Your comments

**3.24 In order to hand express, a mother needs to be able to judge when to change breasts.**

Not important					Very important	No view
1	2	3	4	5		
[ M ]						

Your comments

**3.25 In order to hand express, a mother needs to use rhythmic movements.**

Not important					Very important	No view
1	2	3	4	5		
[ M ]						

*Where is she dancing?*

*Helpful but not imperative.*

*Generally improves technique*

*Her own rhythm, she will find it!*

*If she wants to be successful over an extended period of time she needs to use rhythmic movements.*

*However, one squirt of breastmilk into a baby's infected eye doesn't require rhythm!*

*Finding the right rhythm for her will maximise her effectiveness.*

Your comments

**3.26 In order to hand express, a mother needs to compress and release the finger pressure on the breast.**

Not important					Very important	No view
1	2	3	4	5		
[ M ]						

Your comments

**3.27 In order to hand express, a mother needs to squeeze her fingers together, hold for a few seconds and then release pressure.**

Not important					Very important	No view
1	2	3	4	5		
[ M ]						

*Squeezing may not be appropriate choice of words*

*Squeeze her finger and thumb together*

*There is no squeezing in Marmet Technique!*

*To begin with this may be helpful but it is bordering on prescriptive.*

*This is part of the rhythm required. However, I would dispute "a few seconds" – it may not need to be this long.*

*If you mean finger and thumb, I find that most women as they become proficient do compress and hold slightly.*

*I prefer "press" from "squeeze" and don't like to decide the length of the pressure which means that a combination of the two information might be the best option*

*Each mother will find her own technique.*

Your comments

**3.28 In order to hand express, a mother needs to press back towards the chest wall and press her fingers together.**

Not important				Very important	No view
1	2	3	4	5	
			[ M ]		-
Your comments					

**3.29 In order to hand express, a mother needs to use a rolling technique.**

Not important				Very important	No view
1	2	3	4	5	
		[ M ]			□
Your comments					

**3.30 In order to hand express, a mother needs to find her own method of hand expression in the best way that it works for her.**

Not important				Very important	No view
1	2	3	4	5	
			[ M ]		-
Your comments					

**3.31 In order to hand express, a mother needs picture of where to place her fingers.**

Not important				Very important	No view
1	2	3	4	5	
		[ M ]			□

*Can be helpful-demo if not a culturally acceptable practice*

*It might be helpful*

*Drawing, photo, verbal description or demonstration – whatever picture is available.*

*Can be a useful guide but again all breast are different and individual position may alter*

*That picture can be an in-person demonstration or on a page of paper. As with any other manual skill, it needs to be seen to be taught/learned.*

*It is much better for a mother to find the right place for her than to attempt to copy a picture which may not be relevant. In particular, a picture is likely to show the fingers in relation to the areola, which can be misleading. It may, however, help the mother to have seen a diagram of the internal structure of the breast, so that she can form a mental picture for herself of the lactiferous sinuses.*

*The best information is given verbally so while a picture may help it is not essential and should never replace one to one help.*

*could, but personal explanation seems more effective*

*Essential if she is not being shown personally by someone experienced. Can be a useful reminder later too.*

Your comments

**3.32 In order to hand express, a mother needs a practical demonstration ( ie assistance/ verbal feedback) with the mother trying on herself.**

Not important				Very important	No view
1	2	3	4	5	
			[ M ]		-
Your comments					

**3.33 In order to hand express, a mother needs to see another mother doing this who can demonstrate the techniques.**

Not important

Very important

1 2 3 4 5

*Not necessary and seldom a possibility*

*Could help immensely*

*This is one useful learning tool, but I find that often individualized hands-on teaching where the women can focus on her own body works better.*

*It might be helpful, but not essential x2*

*not unless another mother is happy to demonstrate!!*

*The key is to be correctly taught on her own body. The written word is third best. Seeing another mother correctly hand express is second best, but feeling it on her own body is best of all, in terms of the mother's learning curve.*

*This may lead to 'competition', or even make the mum lose confidence if she doesn't get it first time. breast models work fine*

*This is not essential but may be very helpful, from both a practical and psychological point of view.*

*Could be really helpful, but could be achieved by watching a video of technique*

*Can be helpful. (Depending on the mother demonstrating the technique)!*

Your comments

**C4. Source A results of Delphi Round 2 and Round 3**

B (number) = statement number in Round 2      C (number) = statement number in Round 3  
 nr = no rating marked      nrc = no rating marked but commented      nv = marked "no view"      nvc = marked "no view" and commented

Respondent	B1.01	C1.01	B1.02	C1.02	B1.03	C1.03	B1.04	C1.04	B2.01	C2.01	B2.02	C2.02	B2.03	C2.03	B2.04	C2.04
1	5.00	4.00	3.00	3.00	3.00	3.00	1.00	1.00	4.00	4.00	4.00	4.0	4.00	4.00	4.00	4.00
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5	4.00	4.00	3.00	3.00	nv	3.00	nv	2.00	3.00	3.00	5.00	4.0	5.00	4.00	nrc	4.00
6	1.00	3.00	3.00	3.00	5.00	5.00	2.00	1.00	3.00	3.00	nvc	nvc	nvc	nvc	nvc	5.00
7	4.00	4.00	5.00	3.00	4.00	3.00	2.00	2.00	1.00	2.00	2.00	2.0	5.00	2.00	2.00	2.00
8	5.00	5.00	5.00	5.00	5.00	5.00	3.00	2.50	5.00	3.50	5.00	3.5	5.00	5.00	5.00	5.00
9	5.00	5.00	4.00	5.00	5.00	5.00	3.00	2.00	4.00	5.00	5.00	5.0	5.00	5.00	5.00	5.00
10	nrc	3.00	4.00	4.00	4.00	4.00	1.00	1.00	3.00	3.00	3.00	3.0	5.00	5.00	5.00	5.00
11	4.00	4.00	5.00	4.00	3.00	4.00	5.00	2.00	4.00	3.00	5.00	4.0	3.00	5.00	3.00	3.00
12	1.00	1.00	3.00	3.00	2.00	3.00	3.00	2.00	1.00	1.00	1.00	1.0	1.00	1.00	1.00	1.00
13	4.00	5.00	4.00	5.00	4.00	4.00	2.00	nrc	2.00	3.00	4.00	5.0	3.00	4.00	2.00	2.00
14	5.00	4.00	5.00	4.00	5.00	4.00	3.00	2.00	3.00	3.00	nrc	nrc	nrc	nrc	nrc	nrc
15	5.00	4.00	3.00	5.00	3.00	3.00	3.00	2.00	5.00	3.00	3.00	2.0	5.00	3.00	3.00	3.00
16	5.00	1.00	5.00	5.00	4.00	4.00	3.00	1.00	3.00	3.00	4.00	4.0	4.00	4.00	5.00	5.00
17	4.00	4.00	4.00	3.00	5.00	nrc	2.00	nv-	4.00	3.00	3.00	4.0	4.00	5.00	5.00	nv-
18	4.00	4.00	3.00	3.00	3.00	3.00	1.00	1.00	2.00	2.00	nrc	nrc	nrc	nrc	nrc	nrc
19	4.00	4.50	3.00	4.00	4.00	4.00	3.00	2.00	4.00	4.00	5.00	4.0	5.00	4.50	5.00	3.50
21	2.00	1.00	2.00	3.00	1.00	2.00	1.00	1.00	1.00	2.00	2.00	1.0	1.00	1.00	1.00	2.00
22	4.00	5.00	1.00	1.00	1.00	3.00	1.00	1.00	3.00	3.00	3.00	4.0	3.00	3.00	4.00	2.00
23	4.00	5.00	4.00	4.00	4.00	4.00	3.00	2.00	4.00	4.00	3.00	4.0	5.00	4.00	3.00	3.00
median	4.00	4.00	4.00	4.00	4.00	4.00	2.50	2.00	3.00	3.00	4.00	4.00	4.50	4.00	4.00	3.25
IQR	1.00	1.00	2.00	2.00	2.00	1.00	1.25	1.00	1.00	1.00	1.75	0.88	2.00	1.75	3.00	2.50
median diff		0.00		0.00		0.00		0.50		0.00		0.00		0.50		0.75
IQR diff		0.00		0.00		1.00		0.25		0.00		0.88		0.25		0.50

**Source A results of Delphi Round 2 and Round 3 (continued)**

B (number) = statement number in Round 2      C (number) = statement number in Round 3 nr = no rating marked      nrc = no rating marked but commented      nv = marked "no view"      nvc = marked "no view" and commented																
Respondent	B2.05	C2.05	B2.06	C2.06	B2.07	C2.07	B2.08	C2.08	B2.09	C2.09	B2.10	C2.10	B2.11	C2.11	B2.12	C2.12
1	5.00	5.00	5.00	5.00	3.00	4.00	5.00	5.00	5.00	4.00	2.00	2.00	3.00	3.00	3.00	3.00
2	5.00	5.00	5.00	2.00	5.00	4.00	4.00	5.00	3.00	4.00	4.00	2.00	4.00	3.00	4.00	1.00
3	5.00	4.00	5.00	4.00	4.00	4.00	5.00	5.00	5.00	4.00	3.00	2.00	5.00	4.00	5.00	4.00
5	4.00	5.00	4.00	4.00	nvc	4.00	5.00	5.00	4.00	3.00	3.00	2.00	3.00	3.00	3.00	3.00
6	nvc	5.00	nvc	nvc	nvc	3.00	5.00	5.00	5.00	5.00	5.00	2.00	3.00	3.00	5.00	3.00
7	4.00	3.00	1.00	2.00	4.00	3.00	4.00	5.00	4.00	3.00	2.00	2.00	3.00	2.00	1.00	2.00
8	5.00	5.00	5.00	4.00	5.00	4.00	5.00	5.00	5.00	5.00	4.00	1.00	5.00	5.00	3.00	3.00
9	4.00	5.00	4.00	4.00	4.00	4.00	4.00	5.00	4.00	5.00	3.00	3.00	5.00	5.00	4.00	4.00
10	4.00	5.00	1.00	1.00	1.00	1.00	5.00	5.00	5.00	5.00	1.00	1.00	5.00	5.00	5.00	5.00
11	4.00	5.00	2.00	4.00	3.00	5.00	5.00	5.00	4.00	4.00	2.00	2.00	4.00	4.00	3.00	5.00
12	3.00	3.00	3.00	3.00	2.00	2.00	5.00	5.00	3.00	3.00	1.00	1.00	5.00	5.00	1.00	1.00
13	5.00	5.00	3.00	4.00	3.00	4.00	5.00	5.00	4.00	5.00	2.00	2.00	nr-	4.00	2.00	2.00
14	5.00	5.00	nrc	nvc	5.00	4.00	5.00	5.00	5.00	5.00	1.00	1.00	1.00	3.00	nrc	nrc
15	5.00	5.00	5.00	5.00	5.00	3.00	5.00	5.00	3.00	3.00	3.00	1.00	5.00	4.00	3.00	2.00
16	5.00	5.00	4.00	4.00	4.00	4.00	5.00	5.00	5.00	5.00	3.00	3.00	3.00	3.00	4.00	4.00
17	5.00	5.00	5.00	3.00	4.00	4.00	5.00	nr-	5.00	4.00	1.00	2.00	3.00	3.00	4.00	2.00
18	4.00	4.00	5.00	4.00	4.00	4.00	5.00	5.00	4.00	4.00	1.00	1.00	4.00	3.00	3.00	3.00
19	5.00	5.00	4.00	4.50	5.00	4.00	5.00	5.00	5.00	4.50	3.00	1.50	4.00	4.00	4.00	2.00
21	3.00	3.00	1.00	1.00	3.00	2.00	5.00	5.00	5.00	3.00	4.00	1.00	3.00	3.00	2.00	1.00
22	5.00	5.00	5.00	1.00	5.00	1.00	5.00	5.00	2.00	4.00	1.00	1.00	1.00	3.00	2.00	2.00
23	5.00	5.00	5.00	5.00	4.00	4.00	4.00	5.00	3.00	4.00	2.00	1.50	3.00	4.00	4.00	3.00
median	5.00	5.00	4.00	4.00	4.00	4.00	5.00	5.00	4.00	4.00	2.00	2.00	3.50	3.00	3.00	3.00
IQR	1.00	0.00	2.00	1.50	2.00	1.00	0.00	0.00	1.00	1.00	2.00	1.00	2.00	1.00	1.25	1.25
median diff		0.00		0.00		0.00		0.00		0.00		0.00		0.50		0.00
IQR diff		1.00		0.50		1.00		0.00		0.00		1.00		1.00		0.00

## Source A results of Delphi Round 2 and Round 3 (continued)

B (number) = statement number in Round 2      C (number) = statement number in Round 3 nr = no rating marked      nrc = no rating marked but commented      nv = marked "no view"      nvc = marked "no view" and commented														
Respondent	B3.01	C3.01	B3.02	C3.02	B3.03	C3.03	B3.04	C3.04	B3.05	C3.05	B3.06	C3.06	B3.07	C3.07
1	5.00	3.00	5.00	3.00	5.00	3.00	4.00	4.00	4.00	3.00	4.00	3.00	4.00	3.00
2	2.00	2.00	1.00	3.00	1.00	2.00	2.00	5.00	3.00	3.00	3.00	3.00	3.00	3.00
3	5.00	5.00	4.00	4.00	4.00	3.00	5.00	4.00	4.00	3.00	5.00	4.00	4.00	3.00
5	5.00	4.00	4.00	3.00	4.00	3.00	nrc	4.00	3.00	3.00	4.00	3.00	nvc	3.00
6	5.00	4.00	3.00	3.00	5.00	3.00	nvc	nvc	5.00	3.00	4.00	5.00	nrc	nv-
7	4.00	3.00	2.00	3.00	3.00	2.00	1.00	3.00	2.00	2.00	3.00	3.00	3.00	2.00
8	5.00	4.00	4.00	3.00	5.00	3.00	5.00	5.00	3.00	1.00	5.00	3.50	5.00	3.00
9	4.00	5.00	4.00	4.00	4.00	4.00	4.00	4.00	3.00	2.00	4.00	4.00	4.00	2.00
10	5.00	5.00	3.00	3.00	1.00	1.00	5.00	5.00	nrc	1.00	5.00	5.00	5.00	5.00
11	3.00	5.00	5.00	4.00	3.00	3.00	3.00	4.00	3.00	3.00	3.00	4.00	3.00	4.00
12	1.00	1.00	nvc	nrc	nvc	3.00	3.00	3.00	1.00	1.00	1.00	1.00	1.00	1.00
13	1.00	3.00	1.00	3.00	2.00	2.00	nrc	3.00	1.00	2.00	5.00	4.00	1.00	3.00
14	3.00	nrc	3.00	3.00	3.00	nvc	5.00	5.00	3.00	nvc	5.00	4.00	5.00	4.00
15	3.00	3.00	3.00	3.00	3.00	3.00	5.00	4.00	3.00	1.00	3.00	3.00	3.00	3.00
16	4.00	4.00	4.00	4.00	3.00	3.00	4.00	4.00	1.00	2.00	4.00	4.00	3.00	3.00
17	5.00	3.00	4.00	3.00	5.00	3.00	4.00	4.00	3.00	3.00	4.00	5.00	4.00	3.00
18	3.00	3.00	3.00	3.00	nrc	3.00	4.00	4.00	1.00	1.00	3.00	3.00	3.00	3.00
19	4.00	3.00	3.00	3.00	3.00	2.00	5.00	4.00	4.00	2.50	4.00	5.00	4.00	3.50
21	1.00	1.00	3.00	2.00	2.00	2.00	5.00	3.00	2.00	1.00	2.00	2.00	2.00	1.00
22	5.00	3.00	1.00	2.00	2.00	2.00	4.00	4.00	2.00	1.00	2.00	nrc	2.00	1.00
23	4.00	4.00	5.00	4.00	4.00	3.00	4.00	4.00	4.00	3.00	3.00	4.00	3.00	3.00
median	4.00	3.00	3.00	3.00	3.00	3.00	4.00	4.00	3.00	2.00	4.00	4.00	3.00	3.00
IQR	2.00	1.00	1.00	0.25	1.50	1.00	1.00	0.00	1.25	2.00	1.00	1.00	1.00	0.25
median diff		1.00		0.00		0.00		0.00		1.00		0.00		0.00
IQR diff		1.00		0.75		0.50		1.00		-0.75		0.00		0.75

**Source A results of Delphi Round 2 and Round 3 (continued)**

B (number) = statement number in Round 2      C (number) = statement number in Round 3 nr = no rating marked      nrc = no rating marked but commented      nv = marked "no view"      nvc = marked "no view" and commented																
Respondent	B3.08	C3.08	B3.09	C3.09	B3.10	C3.10	B3.11	C3.11	B3.12	C3.12	B3.13	C3.13	B3.14	C3.14	B3.15	C3.15
1	3.00	3.00	3.00	2.00		3.00		1.00	5.00	3.00	2.00	1.00	2.00	1.00	5.00	5.00
2	2.00	1.00	2.00	2.00	2.00	2.00	1.00	1.00	nr	4.00	2.00	2.00	1.00	1.00	5.00	5.00
3	4.00	2.00	4.00	2.00	5.00	3.00	1.00	2.00	5.00	4.00	3.00	2.00	2.00	2.00	4.00	5.00
5	nvc	1.00	nvc	1.00	nvc	2.00	nvc	1.00	5.00	3.00	3.00	1.00	nvc	1.00	5.00	5.00
6	nrc	nv-	nrc	nv-	nrc	3.00	nrc	nv-	nrc	4.00	nrc	nv-	nvc	1.00	4.00	5.00
7	2.00	1.00	3.00	1.00	3.00	2.00	1.00	1.00	5.00	3.00	4.00	2.00	2.00	2.00	5.00	5.00
8	3.00	2.00	3.00	1.00	3.00	1.50	2.00	1.00	5.00	4.00	5.00	2.00	3.00	1.00	5.00	5.00
9	1.00	2.00	1.00	2.00	1.00	1.00	1.00	1.00	5.00	5.00	3.00	2.00	3.00	4.00	5.00	5.00
10	nrc	1.00	5.00	5.00	nrc	1.00	5.00	5.00	5.00	5.00	nrc	1.00	nrc	1.00	5.00	5.00
11	2.00	2.00	2.00	2.00	4.00	4.00	1.00	2.00	3.00	4.00	3.00	2.00	1.00	1.00	5.00	5.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	5.00	5.00
13	1.00	2.00	1.00	2.00	5.00	5.00	1.00	1.00	4.00	4.00	2.00	2.00	2.00	2.00	5.00	5.00
14	1.00	1.00	1.00	nvc	1.00	nvc	1.00	nvc	nrc	nrc	1.00	2.00	1.00	1.00	5.00	5.00
15	1.00	1.00	2.00	1.00	3.00	3.00	1.00	1.00	3.00	3.00	1.00	1.00	2.00	1.00	4.00	4.00
16	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	3.00	3.00	1.00	1.00	1.00	1.00	4.00	nr-
17	1.00	1.00	3.00	2.00	5.00	3.00	2.00	1.00	4.00	4.00	4.00	nv-	3.00	1.00	5.00	5.00
18	3.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00	4.00	4.00	1.00	1.00	1.00	1.00	5.00	5.00
19	3.00	1.00	4.00	2.00	4.00	2.50	4.00	1.50	3.00	4.00	4.00	3.00	3.00	1.00	5.00	5.00
21	1.00	1.00	1.00	1.00	3.00	2.00	1.00	1.00	3.00	1.00	2.00	1.00	1.00	1.00	5.00	5.00
22	2.00	1.00	2.00	nrc	2.00	1.00	2.00	1.00	4.00	3.00	2.00	1.00	1.00	1.00	4.00	5.00
23	1.00	1.00	2.00	1.50	3.00	3.00	1.00	1.00	2.00	4.00	2.00	2.00	1.00	1.00	5.00	5.00
median	2.00	1.00	2.00	2.00	3.00	2.00	1.00	1.00	4.00	4.00	2.00	2.00	1.50	1.00	5.00	5.00
IQR	1.75	1.00	2.00	1.00	2.00	1.63	1.00	0.00	2.00	1.00	1.50	1.00	1.00	0.00	0.00	0.00
median diff		1.00		0.00		1.00		0.00		0.00		0.00		0.50		0.00
IQR diff		0.75		1.00		0.38		1.00		1.00		0.50		1.00		0.00

## Source A results of Delphi Round 2 and Round 3 (continued)

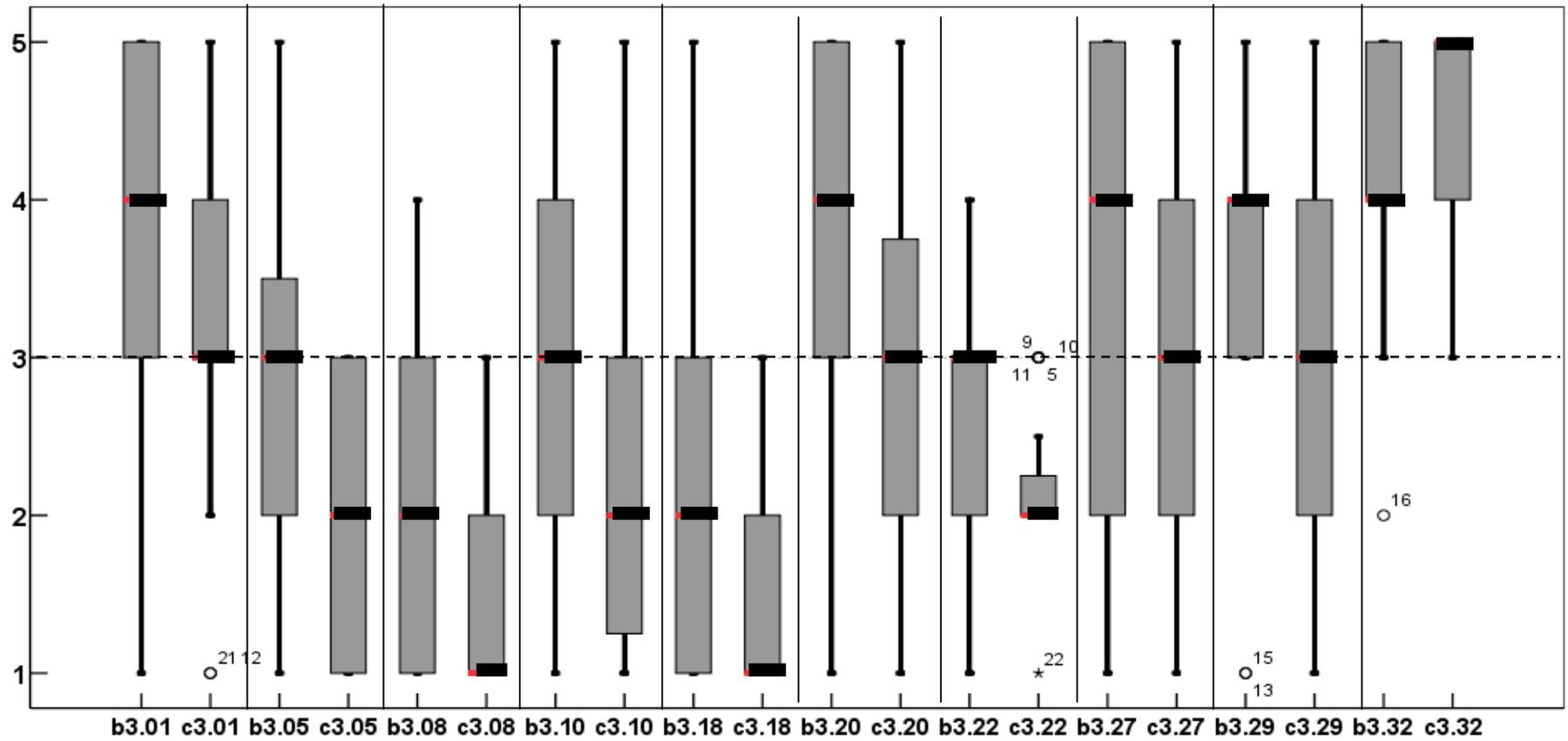
B (number) = statement number in Round 2      C (number) = statement number in Round 3																		
nr = no rating marked      nrc = no rating marked but commented      nv = marked "no view"      nvc = marked "no view" and commented																		
Respondent	B3.16	C3.16	B3.17	C3.17	B3.18	C3.18	B3.19	C3.19	B3.20	C3.20	B3.21	C3.21	B3.22	C3.22	B3.23	C3.23	B3.24	C3.24
1	5.00	5.00	1.00	1.00	1.00	1.00	5.00	2.00	1.00	2.00	5.00	5.00	1.00	2.00	4.00	3.00	5.00	5.00
2	4.00	5.00	1.00	1.00	5.00	1.00	3.00	2.00	1.00	2.00	5.00	5.00	2.00	2.00	2.00	2.00	4.00	4.00
3	5.00	5.00	1.00	2.00	2.00	2.00	2.00	3.00	5.00	3.00	5.00	4.00	3.00	2.00	3.00	3.00	3.00	4.00
5	5.00	5.00	nvc	1.00	nvc	1.00	nvc	2.00	4.00	3.00	4.00	4.00	4.00	3.00	5.00	3.00	nrc	4.00
6	4.00	5.00	4.00	2.00	nv-	2.00	nv-	2.00	3.00	nv-	5.00	5.00	3.00	2.00	nrc	3.00	nrc	4.00
7	4.00	nr-	2.00	2.00	4.00	3.00	1.00	1.00	3.00	2.00	nr	4.00	nr	2.00	nr	2.00	nr	4.00
8	5.00	5.00	1.00	1.00	1.00	1.00	3.00	1.00	4.00	3.00	5.00	5.00	2.00	2.00	3.00	2.00	5.00	4.00
9	4.00	5.00	1.00	1.00	3.00	3.00	1.00	2.00	5.00	5.00	4.00	5.00	3.00	3.00	4.00	4.00	4.00	4.00
10	5.00	5.00	1.00	1.00	5.00	1.00	nrc	1.00	1.00	1.00	5.00	5.00	3.00	3.00	1.00	1.00	5.00	5.00
11	5.00	5.00	1.00	1.00	1.00	1.00	1.00	2.00	5.00	5.00	5.00	5.00	3.00	3.00	3.00	3.00	4.00	5.00
12	5.00	5.00	1.00	1.00	2.00	1.00	nvc	nrc	5.00	3.00	3.00	3.00	nvc	nrc	1.00	1.00	1.00	1.00
13	5.00	5.00	3.00	2.00	5.00	3.00	5.00	4.00	3.00	4.00	3.00	4.00	2.00	2.00	4.00	2.00	4.00	4.00
14	5.00	5.00	1.00	1.00	1.00	1.00	1.00	1.00	5.00	3.00	5.00	5.00	3.00	nvc	nrc	nvc	5.00	5.00
15	4.00	4.00	1.00	1.00	1.00	1.00	2.00	3.00	2.00	3.00	1.00	4.00	1.00	2.00	1.00	nr-	4.00	4.00
16	4.00	4.00	1.00	1.00	1.00	1.00	3.00	3.00	4.00	4.00	5.00	5.00	2.00	2.00	1.00	1.00	4.00	4.00
17	5.00	5.00	1.00	1.00	2.00	1.00	4.00	2.00	4.00	4.00	5.00	5.00	3.00	2.00	5.00	3.00	4.00	4.00
18	5.00	5.00	2.00	2.00	3.00	2.00	nrc	2.00	3.00	3.00	5.00	5.00	3.00	2.00	4.00	3.00	4.00	4.00
19	5.00	5.00	1.00	1.00	3.00	1.00	1.00	1.00	5.00	3.50	4.00	5.00	3.00	2.50	3.00	2.50	4.00	4.00
21	5.00	5.00	1.00	1.00	1.00	1.00	1.00	1.00	5.00	2.00	nrc	4.00	1.00	2.00	1.00	1.00	5.00	1.00
22	4.00	5.00	1.00	1.00	1.00	1.00	4.00	2.00	1.00	1.00	4.00	4.00	1.00	1.00	4.00	2.00	4.00	4.00
23	5.00	5.00	2.00	1.00	3.00	2.00	2.00	2.00	3.00	3.00	4.00	5.00	2.00	2.00	2.00	3.00	3.00	4.00
median	5.00	5.00	1.00	1.00	2.00	1.00	2.00	2.00	4.00	3.00	5.00	5.00	3.00	2.00	3.00	2.50	4.00	4.00
IQR	1.00	0.00	0.25	0.00	2.00	1.00	2.25	1.00	2.00	1.63	1.00	1.00	1.00	0.25	2.75	1.00	0.75	0.00
median diff		0.00		0.00		1.00		0.00		1.00		0.00		1.00		0.50		0.00
IQR diff		1.00		0.25		1.00		1.25		0.38		0.00		0.75		1.75		0.75

## Source A results of Delphi Round 2 and Round 3 (continued)

B (number) = statement number in Round 2      C (number) = statement number in Round 3 nr = no rating marked      nrc = no rating marked but commented      nv = marked "no view"      nvc = marked "no view" and commented																		
Respondent	B3.25	C3.25	B3.26	C3.26	B3.27	C3.27	B3.28	C3.28	B3.29	C3.29	B3.30	C3.30	B3.31	C3.31	B3.32	C3.32	B3.33	C3.33
1	1.00	3.00	1.00	1.00	5.00	1.00	5.00	5.00	4.00	4.00	1.00	4.00	3.00	2.00	5.00	5.00	1.00	1.00
2	5.00	5.00	5.00	5.00	5.00	4.00	5.00	5.00	4.00	3.00	5.00	5.00	3.00	3.00	4.00	4.00	5.00	2.00
3	4.00	3.00	5.00	4.00	3.00	4.00	4.00	5.00	4.00	4.00	5.00	5.00	4.00	3.00	4.00	4.00	3.00	2.00
5	4.00	4.00	5.00	5.00	5.00	4.00	4.00	4.00	4.00	3.00	5.00	5.00	3.00	3.00	4.00	5.00	3.00	2.00
6	5.00	5.00	5.00	5.00	nvc	3.00	nv-	4.00	nv-	3.00	5.00	5.00	nv-	3.00	4.00	4.00	3.00	3.00
7	nr	4.00	nr	4.00	nr	2.00	nr	2.00	nr	2.00	nr	5.00	nr	2.00	nr	3.00	nr	2.00
8	5.00	4.00	5.00	5.00	5.00	2.00	5.00	5.00	5.00	4.50	5.00	5.00	2.00	3.00	5.00	5.00	1.00	1.00
9	4.00	4.00	4.00	5.00	4.00	5.00	5.00	5.00	5.00	4.00	4.00	5.00	3.00	4.00	5.00	5.00	2.00	2.00
10	5.00	5.00	5.00	5.00	1.00	1.00	5.00	5.00	5.00	5.00	1.00	1.00	5.00	5.00	5.00	5.00	3.00	3.00
11	4.00	4.00	3.00	5.00	2.00	3.00	2.00	4.00	4.00	4.00	4.00	5.00	3.00	3.00	3.00	5.00	3.00	1.00
12	4.00	2.00	5.00	5.00	2.00	2.00	nvc	3.00	nvc	1.00	4.00	5.00	1.00	3.00	4.00	4.00	2.00	1.00
13	5.00	4.00	4.00	4.00	1.00	2.00	2.00	3.00	1.00	2.00	5.00	5.00	2.00	2.00	5.00	5.00	3.00	3.00
14	3.00	3.00	5.00	5.00	1.00	1.00	5.00	5.00	nvc	nvc	5.00	5.00	3.00	3.00	3.00	5.00	3.00	1.00
15	2.00	3.00	4.00	4.00	3.00	3.00	3.00	4.00	1.00	2.00	5.00	5.00	3.00	2.00	5.00	5.00	1.00	1.00
16	3.00	3.00	5.00	nrc	nr-	5.00	4.00	4.00	3.00	3.00	5.00	5.00	2.00	2.00	2.00	3.00	1.00	1.00
17	5.00	4.00	4.00	4.00	2.00	nv-	3.00	4.00	4.00	3.00	5.00	5.00	2.00	2.00	4.00	4.00	3.00	2.00
18	4.00	3.00	4.00	5.00	4.00	4.00	4.00	4.00	4.00	3.00	5.00	5.00	nr-	2.00	3.00	3.00	1.00	1.00
19	4.00	4.00	5.00	5.00	5.00	4.00	1.00	1.00	3.00	1.00	1.00	4.50	4.00	3.00	5.00	5.00	1.00	1.00
21	1.00	1.00	1.00	4.00	4.00	3.00	4.00	3.00	4.00	2.00	5.00	5.00	5.00	2.00	4.00	nrc	2.00	2.00
22	3.00	3.00	4.00	5.00	4.00	3.00	4.00	5.00	4.00	4.00	4.00	5.00	4.00	3.00	4.00	5.00	4.00	1.00
23	4.00	4.00	5.00	5.00	5.00	4.00	5.00	4.50	3.00	4.00	5.00	5.00	4.00	3.00	4.00	5.00	2.00	3.00
median	4.00	4.00	5.00	5.00	4.00	3.00	4.00	4.00	4.00	3.00	5.00	5.00	3.00	3.00	4.00	5.00	2.50	2.00
IQR	2.00	1.00	1.00	1.00	3.00	2.00	1.75	1.00	1.00	2.00	1.00	0.00	1.75	1.00	1.00	1.00	2.00	1.00
median diff		0.00		0.00		1.00		0.00		1.00		0.00		0.00		-1.00		0.50
IQR diff		1.00		0.00		1.00		0.75		-1.00		1.00		0.75		0.00		1.00

**C5. Changes between Delphi Round 2 and 3**

Statements with median movement  $\geq 1$  rating. Median, Interquartile Range and spread are shown for Round 2 (b) and Round 3 (c).



**C6. Source B Observation Tool**

Mentioned	√	Not mentioned	X
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## Section 1: Psychological

Item						
Materials show or state						
1.01 that breast milk is important.						
1.02 that hand expression will work.						
1.03 the need to find emotional/psychological support as well as practical instructions.						
1.04 helps to know other mothers who have hand expressed.						
Situation of video (home, postnatal ward, neo, etc)						

## Section 2: Information

2.01 the advantages of expressing by hand.						
2.02 when to start expressing after the baby is born.						
2.03 how frequently to express.						
2.04 how long to express for each time.						
2.05 that expressing milk usually only produces small amounts to begin with and that there is a learning period before larger quantities are achieved.						
2.06 what is a realistic amount to aim to express.						
2.07 that expressed milk will sometimes come in drops, or spurt/spray.						
2.08 that expressing should not hurt and to seek help if it is uncomfortable.						
2.09 what a let-down is and ways to stimulate a let-down reflex.						
2.10 what prolactin and oxytocin do.						
2.11 basics of breast anatomy.						
2.12 need to choose a suitable container for the milk.						

## Section 3: Practical

3.01	to wash her hands well before expressing.						
3.02	to have a warm, private, comfortable environment.						
3.03	to be near her baby, have a picture of her baby or an item of the baby's clothes.						
3.04	to judge how long to continue expressing for at a time.						
3.05	to warm her breast.						
3.06	to massage her breast.						
3.07	to stroke her breast.						
3.08	to knead her breast.						
3.09	to stroke massage and shake her breast.						
3.10	to stimulate her nipple.						
3.11	to shake her breast.						
3.12	to alternate breasts.						
3.13	to have a (non-alcoholic) drink.						
3.14	to have her back/neck/shoulders massaged.						
3.15	where to position her thumb and forefinger on her breast.						
3.16	to position her thumb and fingers opposite each other.						
3.17	to position her thumb exactly at 12 o'clock and her finger at six o'clock on the breast.						
3.18	to position her fingers where baby has his upper and lower lip when feeding.						
3.19	to position her fingers at the edge of the areola.						
3.20	to find the lactiferous sinuses/ducts/area where the underlying breast tissue is different						
3.21	to rotate her thumb and finger position positions around the breast.						

3.22	to support her breast while expressing.						
3.23	to use both breasts.						
3.24	to judge when to change breasts.						
3.25	to use rhythmic movements.						
3.26	to compress and release the finger pressure on the breast.						
3.27	to squeeze her fingers together, hold for a few seconds and then release pressure.						
3.28	to press back towards the chest wall and press her fingers together.						
3.29	to use a rolling technique.						
3.30	to find her own method of hand expression in the best way that it works for her.						
3.31	shows where to place her fingers.						
3.32	shows a practical demonstration ( ie assistance/ verbal feedback) with the mother trying on herself .						
3.33	shows a mother demonstrating a hand expression session.						
Target audience / secondary audience (if stated) (HW/mother)							
Length of section on hand expression							
Midwife handles mother's breast (tick)							
Pumping shown as equal or better than expressing							
Suitable container shown							
Technique shown matches voice							
Written materials accompany							

**C7. Source B materials reviewed**

D(n) = Source A Delphi respondent (n) who suggested material was a useful resource      M- colour = Source C mother who suggested material

Material	Author	Accessibility	Length on hand expression	Suggested by	
				for HW	for Mum
Breastfeeding Techniques that Work, Hand Expression <i>video</i> 1988	Geddes Productions, Kittie Frantz	USA company web site and Irish distributor	25 mins (half on storage)	D4, D1, D3, D11	D1 M-turquoise
How to milk by hand / How to feed from a cup <i>video</i> , 2002	National Breastfeeding Committee Denmark	Not widely accessible outside Denmark	3 minutes of 7 min	D14	D14
Becoming Baby Friendly <i>video</i> 1999	Mark-It TV/UNICEF UK Baby Friendly Initiative	UK organisation web site and Irish distributor	2 mins of 20 mins	D9	D9
Hand Expressing & Cup Feeding, <i>video</i> 1994	Australian Breastfeeding Association, Wendy Nicholson	Australian organisation web site	20 mins of 30 mins		D22
Expressing Breast Milk by hand, <i>video</i> undated	NHS Royal Cornwall Hospitals	Local hospital area only UK	15 mins	D23	D23
Breastfeeding Promotion and Support, materials for health professionals, <i>video</i> 1997	Centre for Health Promotion, University College, Galway	Distributed to Irish maternity services	3 mins in 60 mins		D3
Breastfeeding Promotion and Support, materials for health professionals, <i>open learning text</i> 1997	Centre for Health Promotion, University College, Galway	Distributed to Irish maternity services	4 pages on hand expression in 50 page learning unit (one of 12 units)		D3

Breastfeeding Special Care Babies, <i>book</i> 2002	Sandra Lang	Major publisher	40 pages on expressing including pumps in 225 pages	D15	
Successful Breastfeeding, <i>book</i> 2002	Royal College of Midwives	Major publisher	1.5 pages in 145 pages	D6	
Marmet Technique of manual expression, <i>leaflet</i> 1978 and updated frequently, 2005 version downloaded	Chele Marmet, Lactation Institute	US author web site and reprinted in La Leche League materials and elsewhere	4 pages as LLL reprint	D1, D10, D22	D1, D10, D22
Breastfeeding Your Baby, <i>leaflet</i> , 2002	UNICEF UK Baby Friendly Initiative	available on web site and in many maternity services in Ireland/UK	4 pages of 14	D12, D15	D12, D15
Expressing Milk for Your Preterm Baby, <i>booklet</i> , updated 1999, downloaded 2005, original date unknown	Wendy Nicholson	author web site and reprinted by Australian Breastfeeding Association	12 pages including use of pumps and storage	D2	D2

**C8. Source C Observation Tool**

Seen	√	Colour Code						
Not seen	X							
2.07	expressed milk will sometimes come in drops, or spurt/spray.							
2.12	choose a suitable container for the milk.							
3.01	wash her hands well before expressing.							
3.02	have a warm, private, comfortable environment.							
3.03	be near her baby, have a picture of her baby or an item of the baby's clothes.							
3.05	warm her breast.							
3.06	massage her breast.							
3.07	stroke her breast.							
3.08	knead her breast.							
3.09	stroke, massage and shake her breast.							
3.10	stimulate her nipple.							
3.11	shake her breast.							
3.12	alternate breasts.							
3.13	have a (non-alcoholic) drink.							
3.14	have her back/neck/shoulders massaged.							
3.16	position her thumb and fingers opposite each other.							
3.17	position her thumb exactly at 12 o'clock and her finger at six o'clock on the breast.							
3.19	position her fingers at the edge of the areola.							
3.20	find the lactiferous sinuses/ducts/area where the underlying							

breast tissue is different						
3.21 rotate her thumb and finger position positions around the breast.						
3.22 support her breast while expressing.						
3.23 use both breasts.						
3.24 judge when to change breasts.						
3.25 use rhythmic movements.						
3.26 compress and release the finger pressure on the breast.						
3.27 squeeze her fingers together, hold for a few seconds and then release pressure.						
3.28 press back towards the chest wall and press her fingers together.						
3.29 use a rolling technique.						
3.30 find her own method of hand expression in the best way that it works for her.						

## **C9. Source C Information and Consent Forms**

### HAND EXPRESSION RESEARCH PROJECT

Thank you for agreeing to assist with this research project. I am exploring how mothers who are confident at hand expressing learnt this skill and what they actually do with their hands/breasts to express. This information would then be used to assist new mothers to learn this skill.

Your involvement would be:

- Completing a questionnaire (8 questions) about your thoughts and experiences of expressing breast milk. Your answers will be confidential and your name will not be linked with any replies that you make.
- Demonstrating how you express your milk. This will be video taped. Your face will not be intentionally filmed. If your face does appear by accident, it will be removed during the editing process. You may see the video after filming to check if you wish. At any time you may request the filming to pause or to stop completely.

The filming will take place at a pre-arranged time and place of your choice. This may be at your home or elsewhere. You may have a family member or friend in the room during filming if you wish. However, we would prefer if there were no children in the room except for young non-mobile babies.

You will be asked to express milk in your usual manner. I am not looking for a 'right' way, just what ever you normally do. If possible, I would prefer if you could collect the milk in a see-through container. I will not touch your milk and you may store it in your usual way.

I am an International Board Certified Lactation Consultant who has worked with breastfeeding mothers for 25 years, both as a volunteer breastfeeding counsellor and in an education/ research capacity. This project forms part of my work towards a PhD.

If you have any questions or would like more information, please contact me:

Genevieve Becker  
 2 Kylemore Park  
 Taylor's Hill, Galway  
 Tel: 091-527511 or 087-2318775 or [becker@iol.ie](mailto:becker@iol.ie)

Research supervisor:  
 Dr Mike Woolridge  
 Senior Lecturer in Infant Feeding  
 Mother & Infant Research Unit  
 22 Hyde Terrace  
 University of Leeds LS2 9LN  
 Tel: 0113-343-6894  
 Fax: 0113-244-9730  
 Email: [m.w.woolridge@leeds.ac.uk](mailto:m.w.woolridge@leeds.ac.uk)

Please retain this for your later reference if needed.

**Source C**

HAND EXPRESSION RESEARCH PROJECT  
CONSENT TO PARTICIPATE

I agree to participate in this research project. I have read an explanation of my involvement and any questions I had have been answered.

I understand that I am agreeing to complete a confidential questionnaire and to be videoed while I hand express breast milk.

I understand that this video will not include my face or any distinguishing feature and that I may review the video if I wish to check this.

I agree that information in the questionnaire and on the video may be used for educational purposes and that this information belongs to the researcher.

I understand that no clinical assistance with breastfeeding or expressing will be provided as part of this project.

I understand that I may have a person of my choice present during the video filming.  
(Person present            yes \_\_\_ no \_\_\_)

Participant's signature: \_\_\_\_\_

Name printed: \_\_\_\_\_

Date: \_\_\_\_\_

Your answers will be confidential and your name will not be linked with any replies that you make.

**Source C**

HAND EXPRESSION RESEARCH PROJECT

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Telephone: \_\_\_\_\_

Email: \_\_\_\_\_

Date of visit: \_\_\_\_\_

Time of visit start: \_\_\_\_\_ finish: \_\_\_\_\_

Age of baby: \_\_\_\_\_

When did baby last breastfeed? \_\_\_\_\_

Venue: \_\_\_\_\_

Other people present:

Consent explained and signed \_\_\_\_\_

Wants to see video? \_\_\_\_\_

Willing to be more involved? \_\_\_\_\_

Any questions raised by mother

**Source C**

Code Colour: \_\_\_\_\_

## C10. Source C Questionnaire

### Questionnaire for mothers who are expressing

Thank you for agreeing to assist with this research. This questionnaire is about your thoughts and experiences of expressing breast milk. Your answers will be confidential and your name will not be linked with any replies that you make.

1. For each of your children,:

	Current baby	1 <sup>st</sup> child	2 <sup>nd</sup> child	3 <sup>rd</sup> child	4 <sup>th</sup> child
did you breastfeed					
did you express milk by hand					
did you use a breast pump					
was there any time when they received expressed milk and they did not feed at the breast (for a period of 3 days or more)					

2. Current frequency of expression:

	Hand expression	Pumping
Once or more times each day		
A few times a week		
Once a week		
Less often		

3. What were the main reasons that you expressed milk – by any method and at any time?

(Tick all that apply)

- Baby not able to latch on to the breast
- Baby ill or very preterm and unable to suck
- Engorgement/mastitis
- To rest a sore nipple
- For social outings without the baby
- Return to employment
- To increase milk supply
- To donate milk
- When taking a medication incompatible with breastfeeding
- Other: (please explain) \_\_\_\_\_

4. Who assisted you to learn how to hand express? Mark all those that assisted. Also mark the one person most useful and the one person least useful of those who assisted you.

	Assisted	Most useful	Least useful
Midwife/nurse in hospital			
Public health nurse			
Specialist hospital midwife/nurse for breastfeeding			
Lactation consultant in private practice			
Voluntary breastfeeding counsellor			
Other breastfeeding mother(s)			
Family member			
Friends			
Other (specify)			

5. What materials assisted you to learn how to hand express? Mark all those that assisted. Also mark the one item that you found most useful and the one item least useful.

	Assisted	Most useful	Least useful
Video(s)			
Leaflet(s) produced by hospital			
Leaflet(s) produced by breastfeeding support groups			
Leaflet(s) by others			
Book(s) you got yourself			
Book(s) you were given by hospital			
Other (specify)			

6. When you were learning to hand express, did a midwife or other person sit with you to assist and observe or where you left alone to learn yourself?

Assisted \_\_\_\_ Left alone \_\_\_\_

7. What are some key points that you would share with another mother learning to hand express?

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8. Please circle one number for each statement.

Overall, I find hand expressing ...

unpleasant	1	2	3	4	5	pleasant
inconvenient	1	2	3	4	5	convenient
unnatural	1	2	3	4	5	natural
embarrassing	1	2	3	4	5	not embarrassing
stressful	1	2	3	4	5	satisfying
time consuming	1	2	3	4	5	quick
worse than using a pump	1	2	3	4	5	better than using a pump
painful	1	2	3	4	5	comfortable
difficult to do	1	2	3	4	5	easy to do
difficult to learn	1	2	3	4	5	easy to learn
long time to develop skill	1	2	3	4	5	quick to develop skill
hard to do away from home	1	2	3	4	5	easy to do away from home
unusual	1	2	3	4	5	ordinary
repressing	1	2	3	4	5	empowering
cow-like	1	2	3	4	5	womanly
hinders continuing breastfeeding	1	2	3	4	5	helps continue breastfeeding

9. (After video) With regard to this hand expression, it was:

similar to usual \_\_\_\_ more difficult than usual \_\_\_\_ easier than usual \_\_\_\_

If more difficult, why?

Code Colour: \_\_\_\_\_

**C11. Combined data comparison Sources A, B and C**

In order to hand express, a mother needs to	Group opinion across rounds: median Round 2 → Round 3	Inter-quartile range Round 3	Quartile difference between rounds (Consensus) 0=no change minus=range narrower plus=range widened	Source A Delphi respondents rated on Round 3 n=21				Source B Materials INCLUDED n=12	Source C Mothers DID n=6
				1 to 2 (not important)	>2 <4	4 or 5 (important)	Not rated		
1.01 believe that breast milk is important.	4	1	0	3	2	16	0	10	
1.02 believe that hand expression will work.	4	2	0	1	8	12	0	12	
1.03 needs to be to find emotional/ psychological support as well as practical instructions.	4	1	-1	1	7	12	1	3	
1.04 know other mothers who have hand expressed.	2.50 → 2	1	-0.25	17	2	0	2	1	
2.01 know the advantages of expressing by hand.	3	1	0	4	11	6	0	11	
2.02 know when to start expressing after the baby is born.	4	0.88	-0.875	4	2	12	3	8	
2.03 know how frequently to express.	4.5 → 4	1.75	-0.25	3	2	13	3	5	
2.04 know how long to express for each time.	4 → 3.25	2.5	-0.5	5	5	8	3	8	
2.05 know that expressing milk usually only produces small amounts to begin with and that there is a learning period before larger quantities are achieved	5	0	-1	0	3	18	0	11	
2.06 know what is a realistic amount to aim to express	4	1.5	-0.5	5	2	12	2	5	
2.07 know that expressed milk will sometimes come in drops, or spurt/spray.	4	1	-1	4	3	14	0	10	5
2.08 know that expressing should not hurt and to seek help if it is uncomfortable.	5	0	0	0	0	20	1	6	
2.09 know what a let-down is and ways to stimulate a let-down reflex.	4	1	0	0	5	16	0	7	
2.10 know what prolactin and oxytocin do.	2	1	-1	19	2	0	0	3	
2.11 know basics of breast anatomy.	3.5 → 3	1	-1	1	10	10	0	10	
2.12 be able to choose a suitable container for the milk.	3	1.25	0	9	6	5	1	10	6

	Group opinion across rounds: median Round 2 → Round 3	Inter-quartile range Round 3	Quartile difference between rounds (Consensus) 0=no change minus=range narrower plus=range widened	Source A Delphi respondents rated 1 to 2 on final round (not important)	Source A Delphi respondents rated on Round 3			Source B Materials INCLUDED n=12	Source C Mothers DID n=6
					>2 <4	4 or 5 (important)	Not rated		
<b>In order to hand express, a mother needs to</b>									
3.01 be able to wash her hands well before expressing.	4 → 3	1	-1	3	8	9	1	7	
3.02 have a warm, private, comfortable environment.	3	0.25	-0.75	2	13	5	1	7	6
3.03 be near her baby, have a picture of her baby or an item of the baby's clothes.	3	1	-0.5	7	12	1	1	5	4
3.04 be able to judge how long to continue expressing for at a time.	4	0	-1	0	4	16	1	7	
3.05 warm her breast.	3 → 2	2	0.75+	11	9	0	1	6	0
3.06 massage her breast.	4	1	0	2	7	11	1	10	0
3.07 stroke her breast.	3	0.25	-0.75	5	12	3	1	7	2
3.08 knead her breast.	2 → 1	1	-0.75	19	1	0	1	4	0
3.09 stroke massage and shake her breast.	2	1	-1	17	0	1	3	2	0
3.10 stimulate her nipple.	3 → 2	1.63	-0.38	11	7	2	1	9	0
3.11 shake her breast.	1	0	-1	18	0	1	2	5	0
3.12 alternate breasts.	4	1	-1	2	6	12	1	10	2
3.13 have a (non-alcoholic) drink.	2	1	-0.5	18	1	0	2	4	0
3.14 have her back/neck/shoulders massaged.	1.5 → 1	0	-1	20	0	1	0	2	0
3.15 know where to position her thumb and forefinger on her breast.	5	0	0	0	0	20	1	11	
3.16 position her thumb and fingers opposite each other.	5	0	-1	0	0	20	1	11	6
3.17 position her thumb exactly at 12 o'clock and her finger at six o'clock on the breast.	1	0	-0.25	21	0	0	0	1	0
3.18 position her fingers where baby has his upper and lower lip when feeding.	2 → 1	1	-1	18	3	0	0	1	
3.19 position her fingers at the edge of the areola.	2	1	-1.25	16	3	1	1	9	3
3.20 know how to find the lactiferous sinuses/ducts/area where the underlying breast tissue is different	4 → 3	1.63	-0.38	6	9	5	1	9	2

In order to hand express, a mother needs to	Group opinion across rounds: median Round 2 → Round 3	Inter-quartile range Round 3	Quartile difference between rounds (Consensus) 0=no change minus=range narrower plus=range widened	Source A Delphi respondents rated 1 to 2 on final round (not important)	Source A Delphi respondents rated on Round 3 n=21			Source B Materials INCLUDED n=12	Source C Mothers DID n=6
					>2 <4	4 or 5 (important)	Not rated		
3.21 rotate her thumb and finger position positions around the breast.	5	1	0	0	1	20	0	11	5
3.22 support her breast while expressing.	3 → 2	0.25	-0.75	14	5	0	2	4	0
3.23 use both breasts.	3 → 2.5	1	-1.75	9	9	1	2	10	2
3.24 be able to judge when to change breasts.	4	0	-0.75	2	0	19	0	8	3
3.25 use rhythmic movements.	4	1	-1	2	7	12	0	11	5
3.26 compress and release the finger pressure on the breast.	5	1	0	1	0	19	1	11	5
3.27 squeeze her fingers together, hold for a few seconds and then release pressure.	4 → 3	2	-1	7	5	8	1	1	2
3.28 press back towards the chest wall and press her fingers together.	4	1	-0.75	2	3	16	0	10	0
3.29 use a rolling technique.(coders had difficulty agreeing on definitions)	4 → 3	2	1+	6	6	8	1	6	3
3.30 find her own method of hand expression in the best way that it works for her.	5	0	-1	1	0	20	0	9	6
3.31 see a picture of where to place her fingers. (shown in materials)	3	1	-0.75	8	11	2	0	11	
3.32 have a practical demonstration ( ie assistance/ verbal feedback) with the mother trying on herself .	4 → 5	1	0	0	3	17	1	5#	2*
3.33 see a mother demonstrating a hand expression session. (video shows)	2.5 → 2	1	-1	17	4	0	0	5#	

\* mother was assisted

# 5 out of the six videotape materials

not all items were visual to be seen in Source C

Source A Delphi respondents n=21

## Appendix D: Stakeholders' validation materials and results

### Example of materials for review

#### D1. Cover letter for Examiner Phase 1

Student letter was similar except phrased for self-assessment

##### Review of instrument for assessor

2 Kylemore Park  
Taylors Hill  
Galway, Ireland  
becker@iol.ie

December 11, 2007

Dear Colleague,

Will you help with a project to develop an observation instrument for assessing a student LCs performance in assisting a mother to learn to hand express? This project forms part of my PhD in the University of Leeds. This assessment process is designed to gather the views of the assessor/clinical instructor, of the student, and of the mother using three separate forms. You are asked to review just the assessor's forms. A student group and a mother group will review their forms.

I would like your expert opinion on:

- the content of the instrument – does it contain items that are relevant to assessing the student's performance, if further items are needed,
- the standard required for a 'pass' level performance by the student,
- if the instrument is clear and readable.

You are asked to just read through the instrument. You do not need to try using the instrument while observing a student at this time; that will be a later stage with a different group.

The assessor review package includes:

- A. Explanation of the assessment as would be given to an assessor/clinical instructor
- B. The assessment form
- C. A reviewers rating sheet for the content of the assessment form
- D. A reviewers rating sheet for the standard for a 'pass'
- E. A reviewers rating sheet for the readability/clarity of the assessment form and instructions

I would like if you could review the instrument and return the completed forms by **December 20th**. I realise time is in short supply for many people and if you think you are not able to complete the review please let me know. There are only a small number of reviewers at this stage so it is important to know if you are willing to assist. In due course the results of the development of the assessment forms and process will be shared.

Your name is requested on the review forms so that you can be contacted if any clarification of comments is needed. Your name will not be linked to any views expressed.

You can return the three rating sheets by  
email – becker@iol.ie (remember to save it first to your own computer and send the saved version)  
fax - +353 91 527511  
post - 2 Kylemore Park, Taylors Hill, Galway, Ireland

Thank you for your assistance. If you have any questions please contact me

Genevieve Becker

**The outcome measures (descriptors on the right hand side of the instrument) are based on the Clinical Competencies for IBCLC Practice and the Standards of Practice for International Board Certified Lactation Consultants, and a previous consultation process with LC experts and mothers.**

## D2. Information sheet for Examiner Phase 1

### Student information sheet was similar except phrased for self-assessment

#### **Workplace observation of practice information sheet (assessor)**

Purpose: to assess the performance of the student in assisting a mother to learn the skills of hand expression.

Prior knowledge and skills: previously, the student will have demonstrated their ability to:

- Describe the importance of breast milk;
- List the common reasons why a mother may want to hand express her milk;
- Describe the principles of hand expression;
- Demonstrate the use of effective support and communication skills (in general).

Expected outcome at this assessment: student will

1. Develop and carry out a plan, using evidence based practice and adult learning principles, to assist a mother to learn the skill of hand expression that includes:
  - Use appropriate support and counselling skills and identification of any communication barriers;
  - Assess learning needs of the mother including what does mother already know / able to do, and readiness to learn;
  - Explain why breast milk is important, why hand expression is a useful skill to know, and why hand expression is relevant to this individual mother at this time;
  - Describe how hand expression works (including demonstration, modelling, visual aids) in a way that the mother can understand;
  - Facilitate practise by the mother with supportive feedback and provision of further assistance as necessary;
  - Answer questions about using skill, check understanding and if mother feels capable of using the skills;
  - Provide appropriate education materials to the mother on hand expression and related matters such as milk storage, as relevant;
2. State the follow-up needed and key points to evaluate at follow-up;
3. Show appropriate documentation related to the mother learning and using this skill.

Scope: The student should be able to show acceptable performance on this topic in each of the situations:

- a new mother learning the skill of hand expression for breast care and to encourage infant latch on,
- a new mother whose infant is unable to feed at the breast (e.g. in a special care neonatal unit) and is therefore under extra stress, and
- the mother of an older infant seeking to learn this skill for regular or occasional separations such as employment, social events or other less stressful situations

Process: Before the assessment, mother will be asked by assessor for consent to the student assessment being carried out during her care. Mother will be given information and asked to complete a sheet for her views, though she is free to not do so. Fill in the date, time, and student's name or number before giving the assessment form to the mother. Mother's completed form will be put in envelope for return to clinical instructor.

Assessor will complete the form during and immediately after the interaction finishes. Assessor's form will be put in envelope with mother's form for return to clinical instructor.

Student will complete self-assessment immediately after the interaction finishes. It is the student's choice to give the form to the clinical instructor or not.

Instrument: The assessment instrument uses a visual analogue scale (VAS) with a description of performance at each end point.

The assessor puts a vertical mark where they judge the student's performance is in relation to the endpoints for each of the 9 items. In addition there is a global rating if the student is fit for practice.

#### Feedback:

Student will receive the summary of ratings of mother and assessor, and have an opportunity to discuss ratings with her/his clinical instructor. If needed, opportunities for additional student learning and practice will be provided by the clinical instructor.

**The outcome measures are based on the Clinical Competencies for IBCLC Practice and the Standards of Practice for International Board Certified Lactation Consultants. Assume that the target LC student is in the last weeks of their training and/or preparation to sit the IBLCE exam, i.e. that they are ready to carry a caseload and work on their own with a mother.**

*D R A F T*

**D3. Assessment tool for Examiner Phase 1**

Student tool was similar except phrased for self-assessment

*Assisting Milk Expression Assessment*

Student Name/No.: \_\_\_\_\_ Assessor Name: \_\_\_\_\_  
 Date of assessment: \_\_\_\_\_ Time: \_\_\_\_\_ Place: \_\_\_\_\_

*Instructions:* Mark a vertical line in the scale at the position of achievement.  
 If it was not appropriate (NA) to carry out an action mark the box at the side, for example, if the mother indicated that she had adequate educational materials before they were offered.  
 Additional notes may be written on the form to assist feedback.

**1. Use appropriate support and counselling skills and identification of any communication barriers** NA

communication is inappropriate, poor use of skills | \_\_\_\_\_ | Showed suitable body language, voice, attention to mother's comfort

**2. Assess learning needs of the mother including what does mother already know / able to do, and readiness to learn**

Asked no questions about prior knowledge or interest in learning | \_\_\_\_\_ | Asked open questions and built on responses

**3. Explain why human milk is important, why hand expression is a useful skill to know, and why hand expression is relevant to this individual mother at this time**

Did not give explanation | \_\_\_\_\_ | Explained why important, useful skill, and relevance to this mother

**4. Describe how hand expression works (including demonstration, modelling, visual aids) in a way that the mother can understand**

Gave no information or inaccurate information | \_\_\_\_\_ | Explained general principles clearly and accurately with appropriate aids

*D R A F T*

G Becker PhD study Instrument Review (1) *NOT FOR SHARING PLEASE*

**5. Facilitate practise by the mother with supportive feedback and provision of further assistance as necessary**

Did not suggest practise, or offer further assistance

Encouraged mother to find her own way of expressing, offered supportive feedback, and assistance

**6. Answer questions about using skill, check understanding and if mother feels capable of using the skills**

Did not offer opportunity to ask questions

Observed skill, asked checking questions and how mother felt

**7. Provide appropriate education materials to the mother on hand expression and related matters such as milk storage\*, as relevant**

Did not provide suitable educational materials

Provided adequate, suitable materials for this individual situation

**8. Offer follow-up, explaining what might be needed and key points to evaluate at follow-up**

Did not offer follow-up, or explaining when to seek help

Offered follow-up, explained to seek help if it hurt, or if little milk expressed\*

**9. Record (show to assessor) appropriate documentation related to the mother learning and using this skill.**

Did not record both that assistance was provided and mother's level of learning or on-going learning need

Recorded assistance provided, and mother level of learning or on-going learning need

\* if expressing a quantity of milk is the mother's reason for expressing.

Fit for independent practice as a lactation consultant on this topic? Yes  No

*D R A F T*

## D4. Standards comment forms for Examiner Phase 1

Student form was similar except phrased for self-assessment

### Rating sheet for the standard for a 'pass'

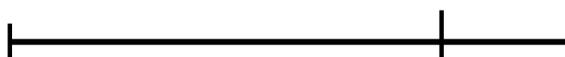
#### Instructions to Reviewers:

- Visualise a student LC at the end of their training.
- For each of the 9 items with a VAS scale, where on the scale you would put the cut-off point for a student to reach to be considered as fit for practice?
- Either mark the point on the scale by hand if you are returning the form by fax or post, or there is a vertical line beside each item that you can drag with your mouse to the required place if returning electronically.

*Example:*

**Describe how hand expression works (including demonstration, modelling, visual aids) in a way that the mother can understand**

Gave no information or inaccurate information



Explained general principles clearly and accurately with appropriate aids

*Example only:* Point on the scale considered as minimum passing level

#### Also answer these questions please:

1. Should there be a minimum passing level which must be reached to pass this assessment? (Choose one)
  - Student needs to reach a minimum level on all items
  - If the student reaches a minimum level on the majority of items that is sufficient for an overall pass
  - Student needs to reach a minimum level on some of the nine items. List which of the items that you consider should be required to pass.
2. Should there be compensation allowed, i.e. a low performance by the student on one or more items could be compensated for by a high standard on other items so the average score was a minimum?
 

Yes  No

If yes, what standard would be an acceptable average level of performance?
3. In this assessment there would be three views – mother, student and examiner/assessor. Should the scores be treated as equal from all three sources or one given more value than the others? For example, should the examiner's score be taken as the 'most accurate view' or the mothers?
  - all three views have equal value and should be added together for an average score
  - the view of the ..... should be given more value and this score would need to be at a 'pass' standard for the student to be considered fit for independent practice on this topic.
  - other way (explain further)

**D5. Content review forms for Examiner Phase 1**

Student form was similar

**Instructions to Reviewers:**

The content validity index process developed by (Lynn 1986) is used.

1. Rate each of the nine items for their relevance
2. Rate the content relevance of the entire assessment form
3. Note any area(s) that you think are needed and that are missing from the assessment form
4. Suggest areas of improvement that you think are needed

**Assume that the target LC student is in the last weeks of their training and/or preparation to sit the IBLCE exam, i.e. that they are ready to carry a caseload and work on their own with a mother.**

**Content Validity Review (1)***Please mark the appropriate box, eg. X*

1. Is the item relevant to determining the required level of performance of an LC student at the end of training?

Item number	1= not relevant	2 = unable to assess relevance without revision	3 = relevant but needs minor alteration	4= very relevant and succinct
1				
2				
3				
4				
5				
6				
7				
8				
9				

2. Is the entire assessment form relevant to determining the required level of performance of an LC student at the end of training?

Entire instrument	1= not relevant	2 = unable to assess relevance without revision	3 = relevant but needs minor alteration	4= very relevant and succinct

3. Do you think there was any area(s) omitted in the assessment form that are needed to assess the LC student's performance in assisting the mother to learn to hand express ?

4. Would this assessment form provide a means of identifying problematic student performance?

5. Are the instructions for use of the observation assessment form clear?

6. Any suggestions for improvement or needing revision to the assessment form or instruction?

Thank you

*Reviewer's Name:*

**D6. Readability forms for Examiner Phase 1**

Student form was similar

**Instructions to Reviewers:**

1. Comment on the readability and other aspects as listed.
2. Make any additional comments you think are needed

**Readability Review (1)***Please mark the appropriate box, eg. X*

1. 'On the face of it' or first impression, does the instrument appear to be measuring the student LC's performance of assessing a mother learn to hand express?

Entire instrument	does not appear to measure	unable to assess without revision	appears to measure but needs minor alteration	appears to measure very well

Comments:

2. Is the instrument readable and clear to a clinical facilitator/assessor (who would be an IBCLC)?

Entire instrument	is not readable and clear	unable to assess without revision	is readable and clear but needs minor alteration	is very readable and clear

Comments:

3. Is there possible bias in the instrument? For example, are there terms used that might mean different things in different areas, is there a class, gender or cultural bias?

Entire instrument	is biased	unable to assess without revision	is not biased but needs minor alteration	is not biased and needs no changes

Comments:

4. Is this instrument suitable for assessing the student LC's performance in different settings – postnatal, neonatal, community, and with mothers at different stages of lactation?

Entire instrument	is unsuitable	unable to assess without revision	is suitable but needs minor alteration	is very suitable

Comments:

Any other comments?

Thank you.

*Reviewer's Name:*

## D7. Cover letter for Student Phase 2

Assessor letter was similar except phrased for observation

### Review of instrument for student (2)

2 Kylemore Park  
Taylors Hill  
Galway, Ireland

January 14, 2008

Will you help with a project to develop an observation instrument for assessing a student LCs performance in assisting a mother to learn to hand express? This project forms part of my PhD in the University of Leeds. This assessment process is designed to gather the views of the assessor/clinical instructor, of the student, and of the mother using three separate forms. You are asked to comment as a student. This assessment can be used as evidence in a portfolio or to build towards final sign-off on clinical skills.

I would like your expert opinion on:

- the content of the instrument – does it contain items that are relevant to assessing the student's performance, if further items are needed, if the instrument is clear and readable, would you be likely to use this form – would it be feasible or what barriers are there?
- the standard required for a 'pass' level performance by the student

You are asked to just read through the instrument and visualize using it as a student LC near the end of training (or other health care provider developing their skills to an advanced level). You do not need to try using the instrument while assisting a mother at this time.

The student review package includes:

- A. Explanation of the assessment as would be given to a student – please check for clarity, missing items
- B. The assessment form – please check for clarity, missing items etc and also mark pass level on each of the 9 items
- C. A reviewers comment sheet – please answer the questions
- D. A page of guidelines for marking – please comment for clarity, missing items etc

I would like if you could review the instrument and return the completed forms by **January 25th**. I realise time is in short supply for many people and if you think you are not able to complete the review please let me know. There are only a small number of reviewers at this stage so it is important to know if you are willing to assist. In due course the results of the development of the assessment forms and process will be shared.

Your name is requested on the review forms so that you can be contacted if any clarification of comments is needed. Your name will not be linked to any views expressed.

You can return the three rating sheets by  
email – becker@iol.ie (remember to save it first to your own computer and send the saved version)  
fax - +353 91 528677  
post - 2 Kylemore Park, Taylors Hill, Galway, Ireland

Thank you for your assistance. If you have any questions please contact me

Genevieve Becker

**The outcome measures (descriptors on the right hand side of the instrument) are based on the Clinical Competencies for IBCLC Practice and the Standards of Practice for International Board Certified Lactation Consultants, and a previous consultation process with LC experts and mothers.**

## D8. Information sheet for Student Phase 2

Assessor letter was similar except phrased for observation

*D R A F T*

### Sheet A: Workplace observation of practice information sheet (student)

Purpose: to assess the performance of the student in assisting a mother to learn the skills of hand expression.

Prior knowledge and skills: in previous assessments the student will have demonstrated their ability to:

- Describe the importance of breast milk;
- List the common reasons why a mother may want to hand express her milk;
- Describe the principles of hand expression;
- Demonstrate the use of effective support and communication skills (in general).

Expected outcome at this assessment: student will

1. Develop and carry out a plan, using evidence based practice and adult learning principles, to assist a mother to learn the skill of hand expression that includes the student to:
  - Use appropriate support and communication skills and identify any communication barriers;
  - Assess learning needs of the mother including what does the mother already know / able to do, and readiness to learn;
  - Explain why breast milk is important, why hand expression is a useful skill to know, and why hand expression is relevant to this individual mother at this time;
  - Describe how hand expression works (including demonstration, modelling, visual aids) in a way that the mother can understand;
  - Facilitate practise by the mother with supportive feedback, information and provision of further assistance as necessary;
  - Answer questions about using skills, check understanding and if mother feels capable and comfortable hand expressing;
  - Provide appropriate education materials to the mother on hand expression and related matters such as milk storage, as relevant;
2. State the follow-up needed, when needed, and key points to evaluate at follow-up;
3. Show appropriate documentation related to this learning encounter, mother's skill and need for follow-up.

Scope: The student should be able to show acceptable performance on this topic in each of the situations:

- a mother learning the skill of hand expression for nipple and breast care and to encourage infant latch on,
- a new mother whose infant is unable to feed at the breast (e.g. in a special care or neonatal unit) and is therefore under extra stress, and
- the mother of an older infant seeking to learn this skill for regular or occasional separations such as employment, social events or other less stressful situations.

A separate observation and forms will be completed for each situation.

Process: Before the assessment, a mother will be asked by the assessor for verbal consent for the student assessment being carried out during her care. The mother will be given information and asked to complete a sheet for her views, though she is free to not do so. The assessor will fill in the date, time, and student's name or number before giving the assessment form to the mother. Mother's completed form will be put in envelope for return to clinical instructor. The assessor will complete the assessor form during and immediately after the interaction finishes. Assessor's form will be put in the envelope with mother's form for return to clinical instructor.

Student will complete self-assessment immediately after the interaction finishes and put their form in the envelope.

Instrument: The assessment instrument uses a visual analogue scale (VAS) with a description of performance/outcome measure at each end point. The student puts a vertical mark where they judge their performance is in relation to the endpoints for each of the 9 items. In addition there is a global rating if the student is ready for practice.

Feedback: Student will receive the summary of ratings of mother and assessor, and have an opportunity to discuss ratings with her/his clinical instructor/assessor. If needed, opportunities for additional student learning and practice will be provided by the clinical instructor.

**The outcome measures are based on the Clinical Competencies for IBCLC Practice and the Standards of Practice for International Board Certified Lactation Consultants. Assume that the target LC student is in the last weeks of their training, i.e. that they should be ready to carry a caseload and work on their own with a mother.**

**D9. Assessment tool for Student Phase 2**

Assessor form was similar except phrased for observation

Sheet B:		<i>Assisting Milk Expression Assessment</i>	
Student Name/No.: _____		Assessor Name: _____	
Date of assessment: _____		Time: _____	Place: _____
<p><i>Instructions:</i> Mark a vertical line in the scale at the position of achievement. [For this review there is a mark on the left that you can move with your mouse. This would not be on the final form].            If the student <u>exceeds</u> the expected outcome mark the box at the side.            If it was not appropriate (NA) to carry out an action mark the box at the side, for example, if the mother indicated that she had adequate educational materials before they were offered.            Additional notes may be written on the form to assist feedback.</p>			
<b>1. Uses appropriate support and communication skills and identifies any communication barriers</b>			NA <input type="checkbox"/>
Communication is inappropriate, poor use of skills		Showed suitable body language, tone of voice, attention to mother's comfort	E x c e e d s <input type="checkbox"/>
<b>2. Assesses learning needs of the mother including what does mother already know / able to do, and her readiness to learn</b>			NA <input type="checkbox"/>
Asked no questions about prior knowledge or interest in learning		Asked open questions to assess learning and built on responses	E x c e e d s <input type="checkbox"/>
<b>3. Explains to the mother why human milk is important, why hand expression is a useful skill to know, when it can be used, and why hand expression is relevant to this individual mother at this time</b>			NA <input type="checkbox"/>
Did not give explanation		Explained importance of breast milk, usefulness of skill, and relevance to this mother	E x c e e d s <input type="checkbox"/>
<b>4. Describes how hand expression works (including demonstration, modelling, visual aids if needed) in a way that the mother can understand</b>			NA <input type="checkbox"/>
Gave no information or inaccurate information		Explained general principles <sup>#</sup> clearly and accurately with appropriate aids <small># see attached sheet</small>	E x c e e d s <input type="checkbox"/>
<div style="border: 1px solid black; padding: 5px; display: inline-block; margin: 10px 0;">D R A F T</div>			
<small>G Becker PhD study Instrument Review (2) NOT FOR SHARING PLEASE</small>			

5. Facilitates practise by the mother with supportive information and feedback and provision of further assistance as necessary NA

Did not suggest practise, or offer further assistance

Encouraged mother to find a way to express that suits her, offered supportive feedback, and assistance E  
x  
c  
e  
l  
l  
e  
n  
t

6. Answers questions about using skill, checks understanding, and if mother feels capable of using the skills NA

Did not offer opportunity to ask questions

Observed skill, asked checking questions and how mother felt about expressing E  
x  
c  
e  
l  
l  
e  
n  
t

7. Provides appropriate education materials to the mother on hand expression and related matters as relevant. For example containers and storage information if milk is to be kept. NA

Did not provide suitable educational materials

Provided adequate, suitable materials for this individual situation and discussed them E  
x  
c  
e  
l  
l  
e  
n  
t

8. Offers follow-up, explaining when it might be needed, and key points to evaluate at follow-up NA

Did not offer follow-up, or explain when to seek help

Offered follow-up if any questions, explained to seek help if it hurts, or if little milk expressed\* E  
x  
c  
e  
l  
l  
e  
n  
t

\* if expressing a quantity of milk is the mother's reason for expressing.

9. Records appropriate documentation related to the mother's learning and use of this skill in mother's care notes. (show to assessor) NA

Did not record both that assistance was provided and mother's level of learning or on-going learning need

Recorded assistance provided, and mother level of learning or on-going learning need E  
x  
c  
e  
l  
l  
e  
n  
t

Is this student fit for independent practice on this topic?

Yes  Not yet

D R A F T

## D10. Reviewers' comment form for Student Phase 2

Assessor form was similar except phrased for observation

Sheet C: **Reviewers' Comment Form (Assessor)**

### Rating sheet for the standard for a 'pass'

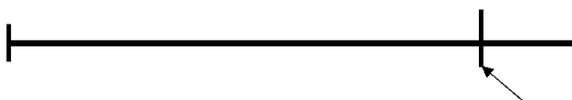
#### Instructions to Reviewers:

- Visualise a student LC at the end of their training.
- On the previous pages, for each of the 9 items with a VAS scale, where on the scale you would put the cut-off point for a student to reach to be considered as fit for practice?
- Either mark the point on the scale by hand if you are returning the form by fax or post, or there is a vertical line beside each item that you can drag with your mouse to the required place if returning electronically.

*Example:*

**Describe how hand expression works (including demonstration, modelling, visual aids)  
in a way that the mother can understand**

Gave no  
information or  
inaccurate  
information



Explained general  
principles clearly  
and accurately with  
appropriate aids

*Example only:* Point on the scale  
considered as minimum passing level

#### Also answer these questions please:

1. Should there be a minimum passing level which must be reached to pass this assessment? (Choose one)
  - Student needs to reach a minimum level on all items
  - It is sufficient for an overall pass if the student reaches a minimum level on the majority of items (i.e. 5 out of the 9 items)
  - Student needs to reach a minimum level on some of the nine items. List which of the items that you consider should be required to pass.
2. Should there be compensation allowed, i.e. a low performance by the student on one or more items could be compensated for by a high standard on other items so the average score was a minimum?
 

Yes  No

If yes, what standard would be an acceptable average level of performance?
3. In this assessment of the student there would be three views – mother, student and examiner/assessor/clinical facilitator. Should the scores be treated as equal from all three people or one person's views given more value than the others?
 

For example, should the score from the examiner be seen as the 'most accurate view' or the view of the mother? (Please mark one answer)

  - the views of all three people have equal value and should be added together for an average score
  - the student should only pass if the mother gives a passing score
  - the student should only pass if the examiner gives a passing score
  - the student should only pass if the student themselves feel that she/he has reached a passing score
  - other (explain):

4. There is a global question of fit or not yet fit for independent practice. Which of the following reflects your thoughts? (Please mark one answer)
- What the student is marked on each item is useful for feedback to the student but all that should count is the one global rating at the end of the form
- The examiner should not give a global rating of fit for practice unless all the items reach a minimum level
- The marks for each item and the global rating are different assessments and the educational provider, employee or other grading authority, should take all these indicators into account when deciding if the student passes or fails the assessment/course
- Other (explain):

General Comments:

1. Do you think there was any area(s) omitted in the assessment form that are needed to assess the LC student's performance in assisting the mother to learn to hand express ?
- No, it is fine  Yes, it needs .....
2. Are the instructions for use of the observation assessment form clear?
- Yes, it is fine  No, it needs ....
3. Is the sheet with general principles adequate and clear?
- Yes, it is fine  No, it needs ....
4. Would this assessment form provide a means of identifying problematic student performance?
- Yes, it is fine  No, it needs ....
5. Would it be feasible for you to use this form for assessing LC students and/or staff members?
- Yes, it is feasible  No, because .....
6. The Visual Analogue Scale (VAS) is easy to use and helps to show a continuum of practice / progress towards reaching the level of practice
- Yes, it is fine  No, it needs ....

Any further comments:

**Thank you.**

*Reviewer's Name:*

**D11. Cover letter for Mother Phase 2**

**Phase 2 letter took into account review comments regarding layout and readability but otherwise was similar to Phase 1 letter**

Review of instrument for mother

2 Kylemore Park  
Taylors Hill  
Galway

January 5, 2008

**Will you help to develop a form to gather the breastfeeding mother's view of help to learn to express her milk?**

This project is to help train health workers so that they can better help mothers to learn how to breastfeeding and to express their milk. It is part of my PhD in the University of Leeds.

You are asked to read through the form and the information sheet attached. Then to comment if the form and the information are easy to read, needs to be clearer and so on. Imagine that you are a mother being assisted by a student health worker to learn to hand express.

The review package includes:

- A. Explanation of the form as it would be given to a mother: review for understanding, spelling etc
- B. A mother reviewer rating sheet for the standard for a 'pass' (this sheet is only for the review, it would not be part of the form when in actual use): fill in please
- C. The form for the mother's view that would be used at a real assessment: fill in please
- D. A review sheet for your comments on the form (this sheet is only for the review, it would not be part of the form when in actual use): fill in please

*Please read all of the forms first before starting to mark them.*

I would like if you could review the form and return the completed review sheet by January 15<sup>th</sup> if at all possible. If you are not able to do the review please let me know.

You are asked for your name and a phone number on the review forms so that I can contact you if any comment is not clear to me. Your name will not be used for any other purpose or linked to any views that you express.

You can return the review sheet in the envelope provided or by  
email – becker@iol.ie or fax - 091 527511  
Remember to save the form to your computer before returning if sending by email.

Thank you for your assistance. If you have any questions please contact me.

Genevieve Becker  
Phone 091-527511

## D12. Information sheet for Mother Phase 2

Phase 2 information sheet took into account review comments regarding layout and readability but otherwise was similar to Phase 1 information sheet

Part 1: information sheet (mother)

### Give Your View

#### Did you get help with learning to express your milk?

##### What are you asked to do?

1. Will you fill in a form to help train students health workers to give good help to breastfeeding mothers?
2. Is it ok that a staff member (such as the student's teacher) watches the student help you?

##### Why are you asked to give your views?

People see things from different points of view. This study is to find out the views of the mother, the student, and of the staff member when they all give their view of the same thing: helping a mother to learn to express her milk.

It is not enough that health workers think that they help mothers to learn skills of breastfeeding. We want to know what the mothers think about the help they receive.

##### How do you give your views?

You will be asked by the staff person for training for your consent:

- to the student being observed while she/he helps you
- to fill in the form giving your views on the helping

You can say no. If you say no it will not make any difference to the care that you are given.

If you say yes:

The staff member is there and will make sure that you are cared for while the student is helping you.

The staff member will explain the form to you and answer any questions you have about marking it.

Your name is not on the form. After you mark it, you put it in the envelope and seal it.

Your form is not shown to the student. The forms from each mother helped by that student are put together. The teacher of the student uses the combined views to help that student to improve their skills when helping mothers.

Your form is seen also by the research person who wants to find out if asking mothers for their views works well.

If you say yes, you can change your mind and say no at any time.

*If you fill in the form and return it, this means that you consent to take part in this study.*

The student is expected to:

Be respectful to you

Give information that is specific to you, not just general information

Show you how to express milk using a model or pictures

Ask you to try yourself to express your milk and help you if needed

Ask if you have any questions, and try to answer them

Give you written information to help you remember what you learned about milk expression

Tell you where to get more help if you need it at a later time

**DRAFT**

**D13. Review comment forms for Mother Phase 1****Rating sheet for the standard for a 'pass'****Instructions to Reviewers:**

- Think of a student health worker at the end of their training.
- On the next page, for each of the 9 items with a line, the far right box states what the student is expected to be able to do when finished their training. In your view, how far along the line towards the far right do you think a student should reach to pass as fit to work on their own to help mothers learn to express their milk?
- Mark the point on each line on the next page. Either mark the point on the scale by hand if you are returning the form by fax or post, or there is a vertical line beside each item that you can drag with your mouse to the required place if returning by email.

*Example:*

I did not feel  
listened to,  
respected and  
cared for



I felt listened to,  
respected and cared  
for

*Example only:*  
Point along the line that you  
think is a passing level

**Also answer these questions please:**

1. Should the student need to reach a minimum level on all these items to get an overall pass?

Yes \_\_\_ No \_\_\_

If you said No, for which items should they need to reach a minimum level?

2. Should there be compensation allowed, i.e. a low mark for the student on one or more items could be made up for by a high mark on other items?

Yes \_\_\_ No \_\_\_

3. In this test of the student there would be three views – mother, student and staff member. Should the scores be treated as equal from all three people or one person's views given more value than the others?

For example, should the score from the staff member be seen as the 'most accurate view' or the view of the mother? (Please mark one answer)

\_\_\_ the views of all three people have equal value and should be added together for an average score

\_\_\_ the student should only pass if the mother gives a passing score

\_\_\_ the student should only pass if the staff member gives a passing score

\_\_\_ the student should only pass if the student themselves feel that she/he has reached a passing score

**Thank you.** Reviewer's Name:

Phone:

### Mother Review (1)

**Please mark the box with an X and make any additional comments that you think are needed**

- 1. When you first see the form “Giving Your View”, is it clear that the purpose of the form is for the mother to comment on the assistance or help that she got when she was learning to express her milk?**

Is not clear that this is the purpose	Needs a lot of changes for the purpose to be clear	Clear but needs minor changes	Very clear that this is the purpose

Comments or suggested changes:

- 2. Is the form easy to read and clear with suitable words used?**

It is not easy to read and clear	Needs a lot of changes to be clear	It is easy to read and clear but needs minor changes	It is very easy to read and clear

Comments or suggested changes:

- 3. Do you think that mothers would agree to fill in the form on how they were helped to learn to hand express?**

Not willing to fill in the form at all	Willing to fill in the form but not right after they were helped	Maybe willing to fill in the form right after they were helped	Very willing to fill in the form right after they were helped

Comments or suggested changes:

- 4. Are there any more items that a mother should be asked to comment on to rate the help she gets to learn to express her milk? (Please be specific to learning to express her milk not rating her care in general).**

**Any other comments on the form or about asking mothers to give their views?**

**Thank you.**     *Reviewer's Name:*

*Phone:*

**D14. Review comment form for Mother Phase 2**

Part 2: Your views

1. Is the information sheet (Part 1) easy to read and clear what the mother is asked to do?

Yes, it is fine     No, it needs ....

2. Do you think that mothers would agree to fill in the form on how they were helped to learn to hand express? (Mark which box is nearest to what you think)

Mothers would not be willing to fill in the form at all	Mothers would be willing to fill in the form but not right after they were helped	Might be willing to fill in the form right after they were helped	Mothers would be very willing to fill in the form right after they were helped

If you said "not willing" can you explain why you think mothers would not be willing to fill in the form?

Do you have any other comments about if mothers would be willing to help?

3. Do you think the mother would be willing for the teacher of the student to be present during the learning to hand express?

4. In this test of the student there would be three views – mother, student and staff member. Should the scores be treated as equal from all three people or one person's views given more value than the others?

For example, should the score from the staff member be seen as the 'most accurate view' or the view of the mother? (Please mark one answer)

the views of all three people have equal value and should be added together for an average score

the student should only pass if the mother gives a passing score

the student should only pass if the staff member gives a passing score

the student should only pass if the student themselves feel that she/he has reached a passing score

other: explain

Any other comments about asking mothers to give their views?

Thank you.

Name:

Phone:

**D15. Assessment tool for Mother Phase 2**

Phase 2 tool was similar to Phase 1 tool

Part 3: Items to mark

**Assisting Milk Expression Mother's Views**

**How good do you think a student lactation consultant needs to be to get a 'pass' mark on their skills of assisting mothers?**

Imagine a student was helping you to learn to hand express your milk and you were asked to rate how you felt after the help.

One end of each line is where the mother does not feel assisted or was not offered help and the other end of the line is where she was helped well.

For each item please put a mark through the line at the place that shows where you think is the lowest that the helping could be rated and still be a 'pass' for that item.

I did <u>not</u> feel listened to, respected and cared for	_____	I felt listened to, respected and cared for
Information was <u>not</u> specific to my needs	_____	I was given information that was relevant and specific to me at this time
I was <u>not</u> shown how to express	_____	I was clearly shown how to express milk
I was <u>not</u> asked to try expressing myself and not offered help	_____	I was asked to try expressing myself and given help if I needed it
I was <u>not</u> asked if I had any questions	_____	I was asked if I had any questions
I was <u>not</u> given useful written information	_____	I was given useful written information
I was <u>not</u> told where to get more help if needed	_____	I was told where to get more help if needed or if expressing hurt
I felt I was <u>not</u> helped to learn how to express my milk	_____	I felt I was helped to learn how to express my milk
I do <u>not</u> think I could express if I want to	_____	I think I could express if I want to

Thank you for helping to improve the care provided to mothers and babies.

**DRAFT**

## D16. Guidelines to assist assessors

Sheet D:

### *Guidelines to assist assessors*

#### **Principles and Techniques of hand expression**

This knowledge would be covered in learning sessions and assessed prior to the workplace practice and observation (for example in a classroom setting). The student is expected to use this knowledge in selecting what is appropriate for the individual mother but is not expected to include every point in discussions with the mother. This information is provided as guidance to the assessor. It is based on a literature review, structured observation of mothers who are hand expressing and expert views via a Delphi process.

Key principles of hand expression to include:

- Position thumb and finger opposing;
- Use rhythmic movements to compress and release the pressure of the fingers on the breast; it may help to press back towards the chest wall first and then compress the fingers;
- The mother develops her own method of hand expression in the best way that works for her and her situation.
- That expressing should not hurt and to seek help if it is uncomfortable.

Discuss individually with a mother depending on her situation:

- When to start expressing and how frequently to express;
- How to judge long to express for each time and when to change breasts,
- To rotate the fingers around the breast to help milk flow from all areas, if relevant;
- A realistic amount to aim to express;
- Stimulate let-down if needed, though aside from the general term massage, any one specific technique is not seen as more effective than others.

Specific knowledge related to hand expression to include and discuss, making it relevant to the individual mother:

- know that breast milk is important to her baby;
- know that hand expression works;
- know what let-down (milk ejection reflex) is;
- know that milk will sometimes come in drops or spurt/spray;
- know that there is a learning period before large quantities of milk are achieved;
- know that there are various reasons for expression – to get drops of milk to encourage the baby to latch-on or to lubricate the nipple area, to relieve fullness to help attachment or for comfort, to obtain colostrum at the end of pregnancy for a baby expected to be at high risk of hypoglycaemia, or to obtain milk for use at another time or for baby who cannot feed at the breast – and that large volumes of milk are not always the goal.

#### **General communication skills**

These include:

- attention to the mother's comfort, respect for her privacy
- permission and appropriateness of any touch,
- appropriate tone of voice and choice of words,
- facial expressions, body language and position,
- giving time without rushing,
- recognise and praise what is going well,
- cultural sensitivity,
- keeping the individual mother as the focus and respecting her decisions,
- any written materials are suitable literacy level and language

**General hygiene skills such as hand washing should also be observed**

DRAFT

**Stakeholders validation of assessment: additional data**

**D17 Views of individual panel members on cut-off / passing point - Examiners**

	Item >	1	2	3	4	5	6	7	8	9	Personal mean	Overall items mean	
Examiners Phase 1	1	85	85	85	85	80	82	82	81	84	83.22	79.69	
	2	88	74	74	77	73	86	74	75	77	77.56		
	3	93	93	97	97	89	95	91	98	98	94.56		
	4	75	75	76	99	99	99	80	80	81	84.89		
	5	98	98	98	99	97	99	99	99	99	98.44		
	6 *	50	60	50	70	70	50	50	60	70	58.89		
	7 *	60	60	60	60	60	60	60	60	60	60.00		
	8 *	80	80	80	80	80	80	80	80	80	80.00		
	9	commented but did not mark individual items											
mean for item		78.63	78.13	77.50	83.38	81.00	81.38	77.00	79.13	81.13			
Examiners Phase 2	1	commented but did not mark individual items										75.12	
	2 *	80	80	80	80	80	80	80	80	80	80		80.00
	3 *	60	60	60	60	60	60	60	60	60	60		60.00
	4 *	70	70	70	70	70	70	70	70	70	70		70.00
	5	66	52	59	68	71	68	68	68	68	64		64.89
	6	72	74	74	73	72	72	73	74	74	75		73.22
	7	73	73	68	94	90	94	86	80	72	72		81.11
	8	76	76	85	85	86	76	70	74	74	74		78.00
	9	74	75	85	85	85	76	86	75	75	75		79.56
	10	74	75	78	89	72	88	86	88	88	82		81.33
	11	65	65	49	80	78	71	51	76	51	51		65.11
	12	93	93	93	94	93	92	96	91	93	93		93.11
mean for item		73.00	72.09	72.82	79.82	77.91	77.00	75.09	76.00	72.36			

Overall  
Mean  
Examiners  
Phases

\* Stated a percentage mark, did not mark VAS.

**D18 Views of individual panel members on cut-off / passing point - Students**

Students Phase 1	Item >	1	2	3	4	5	6	7	8	9	Personal mean	Overall items mean
	<b>1</b>		77	76	76	77	78	78	76	75	77	76.67
<b>2</b>		86	87	88	95	93	94	94	94	89	91.11	
<b>3</b>		67	66	67	79	76	73	71	72	73	71.56	
<b>4</b>		73	69	62	60	68	69	69	69	75	68.22	
<b>5 *</b>		80	80	80	80	80	80	80	80	80	80.00	
<b>6</b>		commented but did not mark individual items										
<b>mean for item</b>		76.6	75.6	74.6	78.2	79	78.8	78	78	78.8		
Students Phase 2	<b>1</b>	91	95	93	89	93	96	92	94	91	92.67	82.70
	<b>2</b>	75	83	81	76	71	70	71	73	74	74.89	
	<b>3</b>	66	66	85	86	93	75	74	72	82	77.67	
	<b>4</b>	87	89	87	87	87	84	91	91	87	87.78	
	<b>5</b>	99	87	82	99	99	99	62	99	99	91.67	
	<b>6</b>	75	75	75	75	75	75	75	75	75	75.00	
	<b>7</b>	86	75	74	86	69	78	86	72	87	79.22	
<b>mean for item</b>		82.71	81.43	82.43	85.43	83.86	82.43	78.71	82.29	85.00		

Overall Mean Students Phases
---------------------------------------

\* Stated a percentage mark, did not mark VAS.

**D19 Views of individual panel members on cut-off / passing point – Mothers**

	Item >	1	2	3	4	5	6	7	8	9	was helped	think I could	Personal mean	Overall items mean	
<b>Mothers Phase 1</b>	<b>1</b>	87	not asked to mother panel	85	84	87	81	82	82	not asked to mother panel	82	83	83.25	78.20	
	<b>2</b>	95		95	95	95	95	95	95		95	95	95		95.00
	<b>3</b>	75		66	73	66	62	50	84		75	75	68.88		
	<b>4</b>	99		99	99	99	99	99	99		99	99	99.00		
	<b>5</b>	71		72	72	72	72	72	73		73	71	72.13		
	<b>6 *</b>	50		50	50	50	50	50	50		50	50	50.00		
<b>mean for item</b>	79.50	77.83		78.83	78.17	76.50	74.67	80.50	79.00		78.83				
<b>Mothers Phase 2</b>	<b>1</b>	69		70	81	78	82	77	89		79.00	68.00	78.00		78.34
	<b>2</b>	62		61	74	63	50	56	59		73.00	78.00	64.25		
	<b>3</b>	81		81	85	74	84	79	79		94.00	92.00	83.50		
	<b>4</b>	85		80	92	71	79	79	80		88.00	90.00	82.38		
	<b>5</b>	96	85	97	85	92	91	92	95.00	80.00	89.63				
	<b>6</b>	89	67	93	81	77	80	81	92.00	67.00	79.75				
	<b>7</b>	69	68	84	66	73	68	74	73.00	61.00	70.88				
	<b>8</b>		commented but did not mark individual items												
<b>mean for item</b>	78.71	73.14	86.57	74.00	76.71	75.71	79.14	84.86	76.57						

\* Stated a percentage mark, did not mark VAS.

Overall Mean Mothers Phases combined 78.30

Overall Mean All Panels & Phases combined 78.40

**D20 Frequency statistics compared between Phases and Panels**

Panel	Item >	1. Communication skills	2. Assesses learning needs	3. Explains relevance	4. Explains principles of expression	5. Facilitates practice	6. Checks understanding	7. Provides supporting materials	8. Offers follow-up	9. Records appropriate documentation	MA. Mother felt helped	MB. Mother thinks could express
<b>Examiner</b> Phase I	Valid	8	8	8	8	8	8	8	8	8		
	Missing	1	1	1	1	1	1	1	1	1		
	Mean	78.63	78.13	77.50	83.38	81.00	81.38	77.00	79.13	81.13		
	SD	16.44	13.89	16.65	14.41	13.48	18.02	15.81	14.66	13.10		
	Min	50	60	50	60	60	50	50	60	60		
	Max	98	98	98	99	99	99	99	99	99		not asked to examiner panel
Phase II	Valid	11	11	11	11	11	11	11	11	11		
	Missing	1	1	1	1	1	1	1	1	1		
	Mean	73.00	72.09	72.82	79.82	77.91	77.00	75.09	76.00	72.36		
	SD	8.67	10.68	13.18	11.03	9.97	10.61	13.16	8.75	11.31		
	Min	60	52	49	60	60	60	51	60	51		
	Max	93	93	93	94	93	94	96	91	93		
<b>Student</b> Phase I	Valid	5	5	5	5	5	5	5	5	5		
	Missing	1	1	1	1	1	1	1	1	1		
	Mean	76.60	75.60	74.60	78.20	79.00	78.80	78.00	78.00	78.80		
	SD	7.16	8.44	10.33	12.44	9.06	9.52	9.92	9.82	6.26		
	Min	67	66	62	60	68	69	69	69	73		
	Max	86	87	88	95	93	94	94	94	89		not asked to student panel
Phase II	Valid	7	7	7	7	7	7	7	7	7		
	Missing	0	0	0	0	0	0	0	0	0		
	Mean	82.71	81.43	82.43	85.43	83.86	82.43	78.71	82.29	85.00		
	SD	11.27	9.96	6.68	8.14	12.05	11.15	11.22	11.86	8.85		
	Min	66	66	74	75	69	70	62	72	74		
	Max	99	95	93	99	99	99	92	99	99		

Panel		1. Communication skills	2. Assesses learning needs	3. Explains relevance	4. Explains principles of expression	5. Facilitates practice	6. Checks understanding	7. Provides supporting materials	8. Offers follow-up	9. Records appropriate documentation	MA. Mother felt helped	MB. Mother thinks could express
<b>Mother</b>	Valid	6		6	6	6	6	6	6		6	6
Phase I	Missing	0		0	0	0	0	0	0		0	0
	Mean	79.50		77.83	78.83	78.17	76.50	74.67	80.50		79.00	78.83
	SD	18.11		18.67	17.93	18.84	18.98	21.37	17.63		17.65	17.85
	Min	50		50	50	50	50	50	50		50	50
	Max	99	not asked to mother panel	99	99	99	99	99	99	not asked to mother panel	99	99
Phase II	Valid	7		7	7	7	7	7	7		7	7
	Missing	1		1	1	1	1	1	1		1	1
	Mean	78.71		73.14	86.57	74.00	76.71	75.71	79.14		84.86	76.57
	SD	12.37		8.86	7.93	7.96	13.21	10.98	10.79		9.69	11.83
	Min	62		61	74	63	50	56	59		73	61
	Max	96		85	97	85	92	91	92		95	92

SD= Standard Deviation

## Appendix E: What next?

### E1. Draft proposal for pilot testing of assessment

#### Background

Breastfeeding is important for babies and for their mothers and in some situations milk expression is needed. Hand expression is valued by the global WHO/UNICEF Baby Friendly Hospital Initiative, and offering all mothers assistance in learning to hand express is one of the standards or criteria that hospitals must meet to be accredited. Skills in assisting mothers to express their milk are also expected by the International Board of Lactation Consultant Examiners, as are techniques of adult learning and building a mother's self-efficacy. Assessment provides a means of checking the student's knowledge and skills, provides evidence that the student has reached an appropriate standard and is considered ready for safe practice, and can assist the student to be confidence in their practice. If the aim is to assess how effective the student lactation consultant is at assisting a mother to learn a skill, then it is important to include the mother's viewpoint. In addition, through self-assessment of their performance, the student develops their skills as a reflective practitioner and life-long learner.

#### Purpose of pilot testing

This pilot would aim to test if the mother-centred method that was developed could be used in a real setting to assess a lactation consultant student's performance in assisting a mother in learning skills for hand expression of her milk. This pilot would gather information on the feasibility of the assessment process, highlight changes that may be needed before wider field-testing, and provide data for consideration. Using a model of enquiry (adapted from Kane, 1992), the pilot would test the validity of the assumptions and interpretations described in the thesis, which could be made of the assessment process.

#### Overview of pilot testing

Assumption	Gathering information	Testing evidence
The items and descriptors in the tool are representative of and relevant to expected behaviours (of LC students on this topic)	Assessment forms for the 3 types of participants (mother, student and examiner) Review form for 3 types of participants	Analysis of completed forms: What other areas were noted in the comment space? Were some items less likely to be marked/ observed? Comments on descriptors. Responses to review questions.
The tool is useable by the 3 groups	Assessment forms for the 3 types of participants (mother, student and examiner) Review form for 3 types of participants	Analysis of completed forms: participation, items not completed Responses to review questions re: feasibility, willingness, understanding, time, process, VAS.

Assumption	Gathering information	Testing evidence
A poorly performing student is likely to be picked up	Assessment forms (3) Review form for student and examiner	Analysis of completed forms: 'pass' rate, are items 'not done' or 'done badly'? Responses to review questions.
The cut-off score / performance standard is realistic and acceptable	Assessment forms (3) Review forms (3)	Analysis of completed forms: scores marked, how scores match/don't, are some items consistently marked high/low? Responses to review questions.
The rating provides a reliable indicator of performance	Assessment forms (3)	Analysis of completed forms: similarities and differences across assessors and situations, probability calculation.
There is a high correlation between the findings of this assessment and other tests	Assessment forms (3) Data from other assessments if available	Compare rankings/banding from various assessments.
A high score on this assessment predicts that the performance would become normal work practice	Review form for student	Responses to review questions: views on effect of this assessment.
Mothers who are assisted are more confident and effective at hand expression, and more likely to use the skills	Review form for mother	Responses to review questions: views on effect of assistance.
The format assists in the provision of feedback to the student	Assessment forms (3) Review forms for student and examiner	Analysis of completed forms: do they provide information for feedback, additional areas noted? Responses to review questions: is feedback given, is it linked to assessment forms?
Results can improve curriculum and teaching of students	Review forms for site educator and student Discussion with educators and students	Responses to review questions: did it affect students learning? Effect on teaching? Discussion: views on assessment findings.

### Pilot study procedure

- \_ Determine a suitable site and contact person, and discuss pilot study with key stakeholders.
- \_ Gain ethical consent as needed.
- \_ Outline the underpinning knowledge and skills needed, and if necessary, discuss with the site how the learning opportunities could be provided.
- \_ Provide the assessment tools and supporting materials for review prior to the assessment, and provide materials for the pilot, including assessment tools, guidance sheet, information/consent sheet, pilot review forms.

- \_ Carry out the assessments. Gather views on the process, using semi-structured interviews with mothers, students, examiners and educators to explore their experience of the assessment.
- \_ Analyse information gathered and test the evidence with regard to the assumptions and interpretations. For the purpose of this pilot test, the mean pass cut-off point for each of the items as determined by the stakeholders review process would be used as a preliminary standard.
- \_ Report findings, and conclude if further piloting is needed or if ready to proceed to wider field-testing. Use the findings and views of the participants to change subsequent assessments as needed.
- \_ Give feedback to the site.

### **Pilot testing site**

The site would need to be a structured lactation consultant clinical programme that has access to mothers wishing to learn hand expression, and that will provide opportunities for the learning and practice needed prior to this assessment. The sample of students and the mothers that they provide care for will depend on the setting where the pilot is conducted and may include ante-natal, postnatal, neonatal unit, and community services. As this is a pilot study a power calculation is not possible; sufficient numbers of students and mothers are needed to provide familiarity with the tools in order to give a more accurate evaluation of their use. For the purpose of completing the pilot in a timely manner, the proposed sample size is three students, each working with three mothers in different situations, and three examiners who observe each student at least once. Mothers will not be asked to participate if they are ill, not able to read English, or not able to give informed consent to participate. Particular effort will be made to include mothers who are less likely to participate.

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## **E2. Possible areas for further research**

In an attempt to contribute to the wider and on-going research community, I have listed some possible future research questions and thoughts that arose from my work. They are in addition to those in the pilot testing, and not listed in any order of priority.

- If first-time mothers were observed hand expressing in the first weeks after giving birth, would they do so differently to the experienced mothers in this study?
- Is hand expression a normal useful skill that all mothers might want to learn, or only needing to be learnt when the mother is faced with special circumstances? How does the view of the value and normality of hand expressing affect teaching of health workers and of mothers, educational materials provided, attitudes to expressing, and assessment?
- What is the physiological base for the 49 statements that the Delphi respondents thought a mother needed to know or be able to do?
- Hands-on, hands-off, or something in between? What assistance do health workers think they should give and what do mothers want?
- Do structured assistance using self-efficacy and adult learning principles result in mothers that are more confident about expressing, and more likely to use the skills?
- Does a using different learning theory (behavioural, cognitive, and humanistic) to deliver the same intervention make any difference to mothers or to health workers?
- Do mothers and health workers in same setting similarly perceive the level of assistance and value of materials?
- How do health workers decide what educational materials to use with clients? Do they take learning theories into account?
- How do health workers learn about hand expression (content and learning methods – theory and practice and communication)? How might the health workers experience of learning affect their assisting mothers?
- Research on the physiology of the mechanical extraction of milk receives attention; perhaps the physiology of hand expression could also be explored?
- Is motivation to express milk and a positive attitude to the value of human milk enough without learning skills - for either mother or health worker?
- How good is good enough? Are the competence statement of IBLCE and ILCA seen as aspirations or as standards to be achieved by the point of certification?
- Could vignettes be made showing assisting of learning skills of hand expression? How would mothers and health workers feel about participating? Would they be useful in setting standards?

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