The University Of Sheffield.

Mother-infant close body contact and maternal wellbeing: Exploring current literature and the feasibility of a sling study

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A thesis submitted in partial fulfilment of the requirement for the award of Doctor of Clinical Psychology.

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Declaration

I declare that this work has not been submitted for any other degree at the University of Sheffield or any other institution. This thesis is my own original work and all other sources have been referenced accordingly.

Structure and Word Counts

Section One: Literature Review

Excluding references and tables	7355
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Section Two: Research Report

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Overall Abstract

Worldwide, a significant proportion of women experience symptoms of postnatal depression following childbirth. There is a need for low-cost, low-intensity early interventions to reduce symptoms of postnatal depression and support mothers' well-being.

Section One of this thesis describes a scoping review, which aimed to map out current literature regarding the impact of close body contact interventions (e.g. Kangaroo Mother Care (KMC) or Skin-to-Skin Contact (SSC)) upon maternal psychological outcomes (e.g. mental health, parental self-efficacy, responsiveness, etc.). This review examined 18 relevant studies. The majority of these studies explored the impact of KMC or SSC interventions on psychological outcomes of mothers of hospitalised, preterm, Low Birth Weight infants. Studies varied widely in their design and the outcome measures that they used. Though most studies largely agreed in their descriptions of KMC or SSC, they varied in whether these terms referred to distinct interventions or were interchangeable. Moreover studies varied widely in the nature of their KMC or SSC intervention (e.g. duration, frequency, intervention components).

It was concluded that there is a need for close body contact studies based in the community and with full-term healthy infants, and for a standardised "KMC intervention", and standardisation of outcome measures within this field of research. These findings should be considered with an understanding that this review was subject to publication bias, as it excluded qualitative and grey literature, case studies, and studies that were not published in English.

Section Two presents a feasibility study. This study explored the feasibility and acceptability of implementing a randomised experimental study which examines the impact of providing free baby sling hire and sling-based support upon maternal mental health. The primary aim of this feasibility study was to gather information useful for

estimating study parameters (recruitment rates, attrition, etc.) for a future, definitive, Randomised Control Trial.

A randomised controlled design was used to compare mental health, wellbeing and parenting scores, pre-, mid- and post-intervention, across mothers receiving a twelve-week sling and support intervention compared with mothers in a control group.

In this study, feasibility targets (e.g. eligibility, consent, attrition) were largely met. Qualitative feedback indicated acceptability of the outcome measures used and of study participation. Intervention participants were found to engage with the sling and support intervention and find it acceptable. The majority reported positive effects of the intervention (e.g. feeling closer with their baby, greater confidence as a parent). A large percentage of control participants used slings independently from the study; however intervention participants used slings significantly more frequently. This indicates that, though some people are motivated to use slings, it is helpful to implement a sling and support resource to achieve high rates of engagement. Preliminary effectiveness analyses found no significant effect of the sling and support intervention upon maternal mental health.

It was concluded that it is feasible and acceptable to implement a randomised sling and support intervention study. These findings may be skewed due to the sampling methods used and an absence of feedback from mothers who discontinued their participation in the study.

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Section One: Literature Review

Evidence regarding the psychological impact of skin-to-skin and close body contact interventions upon mothers: A scoping review

Abstract

Objectives

This scoping review maps out the current quantitative evidence base regarding the impact of skin-to-skin, or close body, contact between mothers and infants, upon maternal psychological outcomes. By doing so, this review aimed to identify definitions used within the literature (e.g. of Kangaroo Mother Care) and to support future reviews in the identification of relevant research questions.

Method

Searches were conducted in January 2020 using PsycINFO, Medline (via Ovid), and Scopus. Search results were limited to English language, quantitative, studies published in peer-reviewed journals. Studies were included that were of mothers, and compared a close body contact intervention with either another intervention or a non-intervention control. Studies were included which examined relevant maternal psychological or relational outcomes, such as mental health, responsiveness, or parental self-efficacy. Data was extracted from the identified studies and presented in a charting table and a descriptive summary.

Results

Eighteen studies from 11 countries were identified. The majority of these studies explored the impact of KMC or SSC on mothers of hospitalised, preterm, Low Birth Weight infants. Studies were largely in agreement regarding their definitions of KMC or SSC, but varied widely in study design and outcome measures used, and in intervention definition, duration and frequency.

Conclusions

There is a paucity of close body contact studies based in the community and with full-term healthy infants. Moreover there is a need for a standardised “KMC

intervention", and standardisation of outcome measures. These findings should be considered within the context of likely publication biases.

Practitioner Points

- There is a need for further research regarding the impact of early close body contact interventions upon maternal psychological outcomes, with mothers of healthy full-term babies who have been discharged from hospital.
- Further clarifications are needed regarding the nature of a KMC or SSC intervention within research trials.
- Future studies should also work to standardise the outcome measures used to evaluate these interventions.
- These findings should be considered with an understanding that this review was limited in the extent to which it mapped out current literature, and subject to publication bias, due to the exclusion of qualitative and grey literature, case studies, and studies that were not published in English.

Evidence regarding the psychological impact of skin-to-skin and close body contact interventions upon mothers: A scoping review

The psychological impact of childbirth should not be underestimated. Studies have found that mothers experience increased levels of distress, depression and anxiety following childbirth (Skari et al., 2002). Moreover, when an infant is preterm, Low Birth Weight (LBW), or otherwise required to stay in hospital following birth, mothers are faced with coping with the complex health conditions of their child, the disruption of family routine, and physical separation from their infant, during this emotionally challenging period (Aagaard & Hall, 2008). It is important to consider options for alleviating mothers' distress, promoting maternal resilience and coping, and supporting the development of an emotional bond between mother and infant, following childbirth.

Skin-to-Skin Contact (SSC) refers to act of placing the naked infant prone on their mother's bare chest (Anderson et al., 2003). Kangaroo Mother Care (KMC) also involves the mother holding their infant in this way. But can also refer to a wider programme of continuous skin-to-skin contact, breastfeeding, and care centred on early discharge from hospital with follow-up community care and support provided (Charpak et al., 2005; Lawn et al., 2010). Scime et al. (2019) state that the mother-infant contact elements of SSC and KMC differ, with SSC an intermittent intervention, while KMC is provided continuously for a certain period of time. However within this research area, this distinction between these interventions does not appear to be well supported, with some studies implementing continuous SSC (Mörelius et al., 2015), or intermittent KMC (Sweeney et al., 2017).

Medical use of skin-to-skin contact in the form of KMC was introduced in 1978 by Edgar Rey Sanabria in Columbia as a strategy to replace incubators, which were in short supply (Charpak et al., 2005). It is generally posited that skin-to-skin provides

many of the physiological benefits of an incubator for the infant (e.g. temperature regulation), as well as enhancing the parent-child relationship, but with no specialist equipment required (Tessier et al., 1998).

Indeed, a large number of studies have researched the relationship between close body contact interventions (SSC or KMC), and infant physiological outcomes. KMC has been found to improve infant temperature regulation, respiratory rates, sleep, and weight gain (Bauer et al., 1996; Cleary et al., 1997; Feldman & Eidelman, 2003; Ferber & Makhoul, 2004; Ludington-Hoe et al., 2004; Rojas et al., 2003). Moreover infants receiving KMC have been found to breastfeed for longer (Charpak et al., 1997; Moore & Anderson, 2007) and also to cry less, particularly during routine painful procedures, such as vaccinations (Christensson et al., 1992; Gray et al., 2000). These benefits of KMC appear to contribute to improved mortality rates in preterm infants (Bergman & Jürisoo, 1994), as well as earlier discharge from hospital, in comparison to infants receiving treatment as usual (Cattaneo et al., 1998; Charpak et al., 2005).

Moreover recent longitudinal studies have found a positive impact of KMC upon infant cognitive, socio-emotional and neurological development (Akbari et al., 2018; Charpak et al., 2017; Ropars et al., 2018). In resource-rich countries SSC or KMC are often seen as complementary to incubator care within hospitals, and specifically Neonatal Intensive Care Units (NICUs). When babies are admitted to NICUs, arrangements are now often made to facilitate mothers providing intermittent SSC throughout admission, as a method of ameliorating the impact of traumatic birth upon both infant and mother (Seidman et al., 2015) and as part of the Baby Friendly Initiative (Taylor et al., 2011). As such, in addition to examining the effect of KMC upon infants, studies have begun to examine the relationship between KMC and maternal outcomes (Charpak et al., 2007).

To date, much of this literature has focused on infant-focused physiological outcomes for mothers, such as the impact upon establishment and duration of breastfeeding (Flacking et al., 2011; Whitelaw et al., 1988) or upon corresponding mother and infant salivary cortisol levels (Mörelius et al., 2015), with maternal mood or mother-infant interaction patterns a secondary consideration (Feldman, 2004). Subsequently, only a small number of literature reviews within this field of research have focused on the impact of SSC upon maternal psychological outcomes specifically.

One such review was conducted by Athanasopoulou and Fox in 2014. This systematic review examined the impact of SSC on maternal mood and the parent-infant relationship, within the preterm and LBW infant population. This review reported a positive relationship between SSC and maternal mood, evidenced by significant findings in five out of the nine included studies.

Scime et al. (2019) critiqued this review, identifying limitations regarding their definition of SSC, and the review including studies with heterogeneous intervention features and which employed non-validated outcome measures. To address these limitations, Scime et al. conducted a meta-analysis, focusing on literature regarding the impact of SSC on post-natal depression. This study reported a small protective effect of SSC upon maternal depression scores. However the authors noted marked heterogeneity between the included studies with regards to study design, sample sizes, intervention features and outcome measurement.

The above reviews by Athanasopoulou and Fox, and Scime et al., were limited in the degree to which they could synthesise the studies they reviewed and draw meaningful conclusions from this synthesis, due to the heterogeneous nature of the studies, as well as the small sample of studies available. This is not surprising, as research into the relationship between KMC, SSC or close body contact and maternal, rather than infant, outcomes is still emerging.

Scoping reviews are a relatively recent approach to the synthesis of literature (Arksey & O'Malley, 2005). Munn et al. (2018) described a range of circumstances in which researchers may conduct a scoping review rather than a systematic review. These include: to identify the types of evidence present in a given field, and also gaps in knowledge, to clarify key concepts or definitions within literature, to examine approaches to conducting research within a certain field, to identify key factors or aspects within a certain topic, or as a precursor to a systematic review.

With studies within this field of research still emerging, this scoping review aims to guide future literature reviews through mapping out the current quantitative evidence base regarding the impact of close body contact interventions upon maternal psychological outcomes. Within this scoping review psychological outcomes include mothers' postnatal mental health and wellbeing, and relationship with their child.

In particular, this review aims to map out the study designs generally employed within this area, and also to explore the KMC or SSC interventions (their nature, duration, etc.), and outcome measures, used within studies. The PICOS framework (Methley et al., 2014) will be used to structure this review, so that it may methodically examine the populations, interventions (nature, duration), comparators, outcomes and study types utilised or assessed by current literature.

By gathering and summarising this information in a descriptive way, this scoping review aims to guide future reviews in defining their research questions and specifying inclusion or exclusion criteria, in order to support their identification of studies which may be synthesised in a meaningful way.

Scime et al's approach to building on Athanasopoulou's work, by specifying definitions further and focusing on narrower outcomes, did not overcome the limitation of heterogeneity. By capturing this heterogeneity using a scoping review, rather than working to reduce it or to synthesise despite it (as a systematic review must do), this

study aims to identify gaps in this emerging field, and also capture a picture of the definitions generally used within studies, thus guiding future primary research as well as reviews.

Method

Protocol Registration

This scoping review was conducted following a predefined protocol. The protocol for this review is registered with the OSF (https://doi.org/10.17605/OSF.IO/UXZW2).

Inclusion/Exclusion Criteria

Search results were limited to English language, empirical, quantitative, studies published in peer-reviewed journals. Studies employing a primarily qualitative approach, reviews or meta-analyses, and case studies, were excluded.

Studies were included that were of human mothers, and examined skin-to-skin, "babywearing", or "kangaroo mother care" interventions. These interventions involve the mother holding the baby close to her chest in a vertical position, or using a sling or another structure to achieve this close contact. There were no inclusion/exclusion criteria around intervention duration (e.g. whether a study involves a one-off three hour session vs. three weeks of daily contact etc.). Studies were included if they compared a skin-to-skin based intervention with either another intervention or a non-intervention control condition. Studies comparing one skin-to-skin based intervention with another, with no other control condition; or which had only one, skin-to-skin, condition, were not included.

Studies were included which examined relevant, quantitative, maternal outcomes. Relevant outcomes included psychological outcomes regarding mental health, confidence, wellbeing, parental self-efficacy, and interactions or perceived relationship with their child. As this was an exploratory review, no specific outcome

measures (e.g. specific questionnaires or other psychometric measures) were identified to be included.

Studies in which physiological outcomes (e.g. cortisol levels, breastfeeding) were the primary outcomes and psychological outcomes were secondary were not included.

Search Strategy

Following scoping review methodology outlined by Levac et al. (2010), and further developed by Peters et al. (2015), initial limited searches were conducted in September and October 2019, using PsycINFO, Medline (via Ovid), and Scopus. As outlined by Peters et al., an iterative approach was taken with regards to the selection of search terms. As such, relevant search terms were identified and added through these initial searches. Through this iterative process, final search terms were selected. Please see Appendix for the search terms used. The PICOS framework was used to organise these search terms (Methley et al., 2014).

These search terms were used in a final search in January 2020, using the same online databases as in the initial search. During this final search, within each relevant facet of the PICOS framework (Population/Intervention/Outcomes/Study design), each of the terms were combined using the Boolean operator "OR". The results of the combined "P", "I", "O" and "S" terms were then combined using the operator "AND".

For example, the search terms, as entered into PsycINFO were as follows: ((“maternal” OR “mother*” OR “matern*” OR “women”) OR (“post-natal” OR “postpartum” OR “postnatal” OR “puerper*”)) AND (“skin-to-skin” OR “close body contact” OR “babywearing” OR “kangaroo care” OR “STS” OR “KMC” OR “Kangaroo mother care” OR “skin-to-skin contact” OR “skin to skin” OR “sling” OR “infant carrier”) AND (“coping” OR “cope*” OR “resilience” OR “resili*” OR “parent* stress*” OR “stress*” OR “wellbeing” OR “well-being” OR “postnatal depression” OR

"post-natal depression" OR "self-efficacy" OR "parental self-efficacy" OR "mental health" OR "mood" OR "confidence") AND NOT ("review" OR "meta-analysis" OR "case study").

Study Selection/Screening

Duplicates were removed from the search results. Titles and abstracts were manually screened by the author for relevance and eligibility. Following this manual screening of titles and abstracts, the reference lists of the papers that remained were used to identify further papers that may be relevant to the review. Forward citation searches were also used to identify further papers. The full texts of the studies identified through these processes were then screened using the eligibility criteria described above.

Data Analysis and Summary

Quality appraisal of the included studies was not conducted as this is not the aim of a scoping review (Arksey & O'Malley, 2005; Peters et al., 2015). Scoping reviews aim to provide a descriptive overview of the reviewed literature, rather than synthesising findings from different studies (Levac et al., 2010). In scoping reviews the process of data extraction is thus termed "charting" (Arksey & O'Malley, 2005), and involves the generation of a "descriptive numerical" summary (Levac et al., 2010; Peters et al., 2015).

The charting table for this review is presented below in Table 1. In line with Arksey and O'Malley's original guidance, the data presented in this table includes information regarding study design, year of publication, intervention, study population, and reported outcomes (Arksey & O'Malley, 2005). While the characteristics to be included in this charting table were based on this guidance, this was an iterative process, with characteristics removed or added according to the information that appeared relevant following data extraction from the first few studies (Levac et al., 2010).

As recommended by Levac et al. (2010), qualitative analysis techniques were used to provide a further descriptive summary of the review findings. Data extracted from the studies reviewed were coded into themes based on the "PICOS" method of approaching literature reviews (Methley et al., 2014). This method of coding was selected in order to support the utility of this scoping review for future systematic reviews, through highlighting data relevant to the determination of research questions and inclusion or exclusion criteria.

Results

Study Selection

Using the above search strategy, a total of 319 studies were screened. Below is a PRISMA diagram (Moher et al., 2009) outlining the process of study selection with reasons for exclusion given (Figure 1). Manual screening of titles and abstracts resulted in the exclusion of 293 studies. Full text screening of each of the 26 remaining studies led to the exclusion of 8 further studies. Altogether, 18 studies were selected to be included in this review.

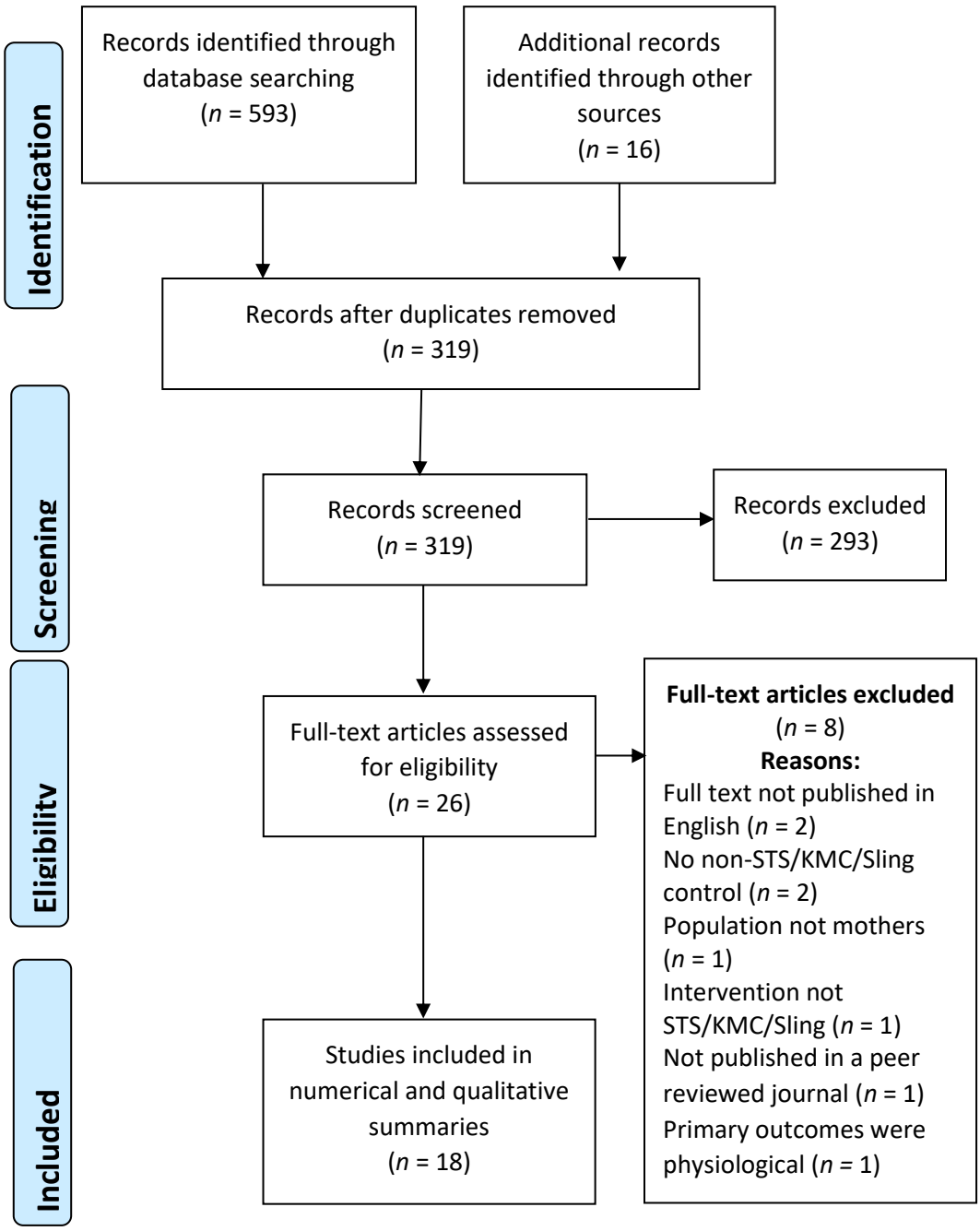

Figure 1. PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses; Moher et al., 2009) diagram of study selection process.

Charting Data

Eighteen studies were included in this review. The charting table below (Table 1) summarises these studies, including their design, sample, intervention, outcome measures and results.

Table 1.

Charting Table

Author, Year and Country	Study Design	*N*	$\bar{x}$ Mat. Age (years)		$\bar{x}$ Inf. GA (Weeks), and Birth Weight (g)		Setting	Intervention				Comparator	Relevant Measures	Follow-up	Reported Sig. Results
			IG	CG	IG	CG		Description	Dur. (mins)	Freq. (No. sessions)	Length (wks)				
Ahn et al. 2010 South Korea	KMC vs. TAU	20	30.1	31.3	32.1, 1486	31.9, 1572	NICU	KMC following birth	60	10 total	3	TAU	MAI, EPDS	3 wks	KMC attachment scores > control
Badiee et al. 2014 Iran	RCT, KMC vs. IC (TAU)	50	28.5	25.8	< 37, 1500 - 2500		Two hospitals	KMC	60	3 daily	1	TAU: IC	GHQ-28	-	KMC MH scores' improvement > control
Bigelow et al. 2010 South Africa	RCT follow-up, SSC vs. IC	12	23		32.2, 1807.9 ($\bar{x}$ across conditions)		Home visits	Continuous SSC	First 6 hours of infant's life.			IC	Maternal Behaviour Q-Sort, NCATS	3 mths	SSC independent predictor of mat. sensitivity
Bigelow, et al. 2012 Canada	Quasi-exp., SSC vs. TAU	90	31.7	28.3	NS	NS	Home visits.	Continuous SSC	6 hrs	1 daily	1 *then:*	TAU	EPDS, CESD	1 wk,1, 2, 3 mths	SSC dep. symptoms < control at 1 wk & 1 mth
					3640.9	3608.7			120	1 daily	3				
Chiu & Anderson 2009 USA	RCT. SSC vs. TAU	69 - 76	25	24.4	34.4, 2257	34.6, 2211	Two hospitals	SSC "as much as possible"	NS	NS	NS	TAU: IC	NCATS	6, 12, 18 mths	SSC teaching scores < control at 6 mths
Cho et al	Quasi-	40	Mode: "31-35"		30.1,	28.8,	Hospital	KMC	30	10 total	3-4	TAU: waitlist	M-I	-	Post-int.: KMC

2016 South Korea	exp.				NS	NS							attachment measure PSS		attachment scores >, stress scores <, control
de Macedo et al. 2007 Brazil	RCT. KMC vs. IC vs. TAU	90	24.2	22.6 (IC), 24.4 (TAU)	31.6, 1387	33.6, 1934 (IC), 38.7, 3162 (TAU)	NICU	KMC	NS	1	N/A	IC or TAU	VAMS	-	TAU: fewer dep.states. KMC: +ve mood change post-int.
Feldman et al. 2002 Israel	Longitud-inal. KMC vs. IC	146	29.6	29.1	31-34, 1245.9	31-34, 1289.9	NICU and home	KMC	60 +	1 daily	2 +	IC	M-I interactions videotaped BDI, NPI	3, 6 mths	KMC dep. <, +ve affect, touch, sensitivity >, control
Gathwala et al. 2008 India	RCT. KMC vs. TAU	100	26.7	25.5	35.5 < 1800	35.0	NICU and home	KMC	6 hrs total	4 daily	12	TAU: IC	Mat. attachment interview	3 mths	KMC attachment > control
Holditch-Davis et al. 2014 USA	RCT. KMC vs. ATVV vs. control	240	28.1	26.3 (ATVV), 26.6 (CG)	27.2 1012.8	27.0 (ATVV), 27.4 (CG)	Four hospitals	KMC	15 +	3 a week	NS	ATVV or 15 min discussion with nurse (CG)	CESDSSTAI PPQ PSS: PBC WI:CVS M-I interactions videotaped. HOME	2, 6, 12 mths	KMC: more rapid decline in worry. KMC/ ATVV parenting stress < control
Lee & Bang 2011 South Korea	Quasi-exp. KMC vs. TAU	34	32.7	32.4	27.5, 990	29.9, 1180	Hospital (NICU)	KMC post-feeding	30	1 daily	2	TAU	MSRI	-	KMC: self-esteem ↑

Little et al. 2019 USA	Between-subject (1) and within-subject (2) laboratory studies	1) 23 2) 20		NS	1) 36.8 CA ($\bar{x}$ across conditions) 2) 22.5 CA ($\bar{x}$ across conditions) Weight NS.		Both labor-atory	1) Sling the primary means of transportin g child (BW) 2) Mother-infant play while infant in infant carrier (IC)	N/A			1) BW not primary means of transporting child (NBW) 2) Mother-infant play while infant in high chair (HC)	1) M-I play videotaped. 2) Mat. vocalisation s and touch.	-	1) BW mat. responsiveness > NBW 2) IC mat. touch and responsiveness > HC
Miles et al. 2006 UK	Prospec-tive controlled trial. SSC vs. TAU	69	30.3	30.6	28, 1086	28, 1133	Two NICUs	SSC.	20	1 daily	4	TAU	EPDS STAI PSS:NIC MABS GHQ-28 PSI. PIAQ	4, 12 mths & 1 yr from term	No between-group diff.
Neu & Robinson20 10 USA	RCT. KMC vs. traditional holding (b) vs. control (c)	65	26.1	25.7(b), 26.0(c)	33.1, 2020	33.4, 1850(b), 33.5, 1980(c)	Home	KMC + weekly nurse visit - support and education	60	1 daily	8	(b) Nurse visits - holding with a blanket. (c) TAU + social nurse visits	M-I interaction during Still-Face paradigm	6 mths	KMC co-regulation > (b) or (c)
Priyanka et al. 2019 India	Quasi-exp. trial. Pre- vs. post-KMC	100	25.0	25.7	35.6, 1960	35.5, 1940	NICU.	KMC	4 hrs total	Daily	1	Not yet started KMC	HADS	-	Post-KMC $\bar{x}$ HADS score < pre-KMC
Tallandini & Scalembra 2006 Italy	Non-random trial. KMC vs. TAU.	40	30.4	33.1	30.2, 1179.7	31.6, 1459.7	Two NICUs	KMC	60 +	Daily	Until discharge.	TAU: IC	PSI-SF NCATS - Feeding scale	-	KMC emotional distress < TAU

Tessier et al. 1998 Colombia	Part of a wider RCT. KMC vs. TC	488	27.4	27.3	33.1, 1660.6	33.7, 1736.6	Hospital and home	KMC from mother/ other caregiver	24 hours	Daily	Until discharge. NS	IC	MPPBQ NCATS - Feeding scale	41 wks GA	KMC sense of competence >, perceived social support <, TC
Zahed-pasha et al. 2018 Iran	Quasi-exp., non-random. KMC vs. TAU	60	NS		< 37, 1000 - 2500		NICU	KMC	120 +	3 - 4 daily	1	TAU	GHQ-28	1 mth	KMC MH score improvement > control

Notes. **Acronyms (in order of appearance).**

IG - Intervention Group
CG - Control Group

GA - Gestational Age
CA - Corrected Age

NICU - Neonatal Intensive Care Unit
KMC - Kangaroo Mother Care
SSC - Skin-to-skin contact
TAU - Treatment-as-usual
TC- Traditional care
IC – Incubator care

RCT - Randomised Control Trial

M-I - Mother-Infant
MH - Mental Health

NS - Not Specified

Measures:
MAI - Maternal Attachment Inventory
EPDS - Edinburgh Postnatal Depression Scale
GHQ-28 - General Health Questionnaire (28 items)
NCATS - Nursing Child Assessment Teaching Scale
CESD - Center for Epidemiological Studies Depression Scale
PSS - Parental Stress Scale
VAMS - Visual Analogues Mood Scale
BDI - Beck Depression Inventory
NPI - Neonate Parental Inventory
HOME - Home Observation for Measurement of the Environment (Inventory)
MSRI - Maternal Self-Report Inventory
STAI - State-Trait Anxiety Inventory
PPQ - Perinatal PTSD Questionnaire
PSS:PBC - Parental Stress Scale: Prematurely Born Child
WI:CVS - Worry Index: Child Vulnerability Scale
PSS:NIC - Parental Stress Scale: Neonatal Intensive Care
MABS - Mother and Baby Scale
PSI: Parental Stress Index
PIAQ: Parent-Infant Attachment Questionnaire.
HADS - Hospital Anxiety and Depression Scale
MPPBQ - Mother's Perception of Premature Birth Questionnaire

Descriptive Summary

Study Design. The studies included in this review employed a range of study designs and methodologies. Eight of the studies were Randomised Control Trials (RCTs), five described themselves as "quasi-experiments". One quasi-experiment also described itself as a longitudinal study (Bigelow et al., 2012). Only one other study referred to itself as a longitudinal study (Feldman et al., 2002). One study was a "prospective controlled trial" (Miles et al., 2006), whilst another paper presented a series of experimental laboratory studies (Little et al., 2019). Two studies did not specify their design (Ahn et al., 2010; Tallandini & Scalembra, 2006).

Setting. The 18 studies included in this review were published between 1998 (Tessier et al.) and 2019 (Little et al.; Priyanka et al.), with the majority (11/18) published in the last ten years (since 2010).

Studies took place within 11 different countries across five continents. These included Brazil, Canada, Colombia, India, Iran, Israel, Italy, South Africa, South Korea, the UK and the USA. The most frequent countries in which studies were set were the USA (n = 4)(Chiu & Anderson, 2009; Holditch-Davis et al., 2014; Little et al., 2019; Neu & Robinson, 2010) and South Korea (n = 3)(Ahn et al., 2010; Cho et al., 2016; Lee & Bang, 2011).

For 11 of the 18 included studies, the mother's child was an inpatient in hospital. Of these 11 studies, within one study the mothers were also inpatients (de Macedo et al., 2007), whilst in three other studies the mothers had been discharged and participated in the study when visiting their child (Cho et al., 2016; Lee & Bang, 2011; Miles et al., 2006). The remaining seven studies did not clearly report whether the mother was an inpatient alongside the infant or had been discharged (Badiee et al., 2014; Feldman et al., 2002; Gathwala et al., 2008; Holditch-Davis et al., 2014; Priyanka et al., 2019; Tallandini & Scalembra, 2006; Zahedpasha et al., 2018). Of these seven studies, two

appeared to conduct their intervention or collect data within participants' homes as well as in a hospital setting (Feldman et al., 2002; Gathwala et al., 2008).

Two of the included studies did not clearly describe whether infants or mothers, or both, were hospital inpatients during the study, though participants were recruited through hospital systems (Ahn et al., 2010; Chiu & Anderson, 2009).

In Tessier et al.'s study, mothers began their treatment condition, and completed baseline measures, in hospital, then were asked to continue their treatment condition, and complete further outcome measures, at home (Tessier et al., 1998). Similarly, Neu and Robinson's study included both mother-infant dyads in which either the mother or infant (or both) were still hospital inpatients, and dyads in which either the mother or infant (or both) had been discharged.

Of the included studies, two took place solely within the community, within participants' homes (Bigelow et al., 2010; Bigelow et al., 2012), and one took place within a laboratory setting. (Little et al., 2019).

Population. Sample sizes for the included studies varied widely, between 12 (Bigelow et al., 2010) and 488 (Tessier et al., 1998), however the majority of the included studies were smaller scale studies (Median sample size= 67).

In contrast, the average age of the mothers included in each study, did not vary greatly, with 23 the lowest reported mean maternal age (Bigelow et al., 2010) and 33.1 the highest (Tallandini & Scalembra, 2006), with "31-35" reported as the mode for both conditions of Cho et al's study also (Cho et al., 2016).

Whilst only six of the studies included in this review described themselves as examining mothers of preterm infants specifically, for 16 out of the 18 studies, infants were preterm (less than 37 weeks Gestational Age (GA)). For these 16 studies, the average age of the infants ranged between 27 weeks' GA (Holditch-Davis et al., 2014) and 35.52 weeks' GA (Priyanka et al., 2019), though two studies gave infant ages as

"<37" rather than reporting averages (Badiee et al., 2014; Zahedpasha et al., 2018). Two studies did not specify whether infants were preterm or not (Bigelow et al., 2012; Little et al., 2019). The average infant participation age (rather than birth age) ranged from birth (Bigelow et al., 2012) to 36.8 weeks old (Little et al., 2019).

Similarly, while only four out of the 18 studies explicitly aimed to focus on mothers whose infants are preterm and also Low Birth Weight (LBW) (Badiee et al., 2014; Priyanka et al., 2019; Tessier et al., 1998; Zahedpasha et al., 2018)**,** altogether, in 15 of the 18 studies the participants' infants would be classed as LBW (under 2,500g; Conde-Agudelo & Díaz-Rossello, 2016). For these 15 studies, reported weights ranged between 990g (Lee & Bang, 2011) and 2,251g (Chiu & Anderson, 2009). Other than studies in which infants would be classed as LBW, two studies did not report average infant weight (Cho et al., 2016; Little et al., 2019), and in one average infant weight was 3,640.9g (intervention) and 3,608.7g (control) (Bigelow et al., 2012).

Altogether the majority of the included studies were of mothers of preterm, LBW, hospitalised infants.

Intervention.

KMC/SSC Interventions. The majority of studies (*n* = 13) presented their intervention as Kangaroo Mother Care (KMC) and described this as involving the infant being placed naked (aside from a diaper/nappy and a hat) in a vertical position upon their mother's chest/between their mother's breasts, with the mother's shirt or gown open at the front in order to achieve frontal skin-to-skin contact. In these studies the mother is described as sat in a chair, and a blanket was placed over the baby's back and the mother. Whilst two studies specified that this position must be maintained continuously (Bigelow et al., 2010; Tessier et al., 1998), the majority appeared to involve an intermittent approach to this intervention (*n* = 11).

A number of these studies (n = 5) used the term KMC interchangeably with skin-to-skin contact (SSC) (Badiee et al., 2014; Chiu & Anderson, 2009; Cho et al., 2016; Gathwala et al., 2008; Neu & Robinson, 2010). Three studies, described their intervention as SSC rather than KMC, though it involved the same positioning of the infant upon the mother, making direct skin-to-skin contact (Bigelow et al., 2010; Bigelow et al., 2012; Miles et al., 2006).

Table 2 below outlines the extent to which the interventions within each study included different components of KMC, as described by Chan et al. (2016). Two studies specified that their KMC intervention, rather than being solely skin-to-skin contact, also involved promoting feeding in this position (Priyanka et al., 2019; Tessier et al., 1998), while, Holditch-Davis et al. (2014) acknowledged that breastfeeding may occur during KMC. Tessier et al. (1998) described their KMC intervention as also involving "clinical control" in the form of daily, then weekly, monitoring of infant weight gain.

Table 2

Inclusion of KMC Components (as defined by Chan et al., 2016) for each reviewed study

Study	KMC Intervention Components				
	Skin-to-Skin Contact	Feeding	Clinical Monitoring	Continuous in Nature	Occurs Early on in Infant's Life
Ahn et al., 2010	Not Specified	Not Specified	Not Specified	Not Specified	✓
Badiee et al., 2014	✓	✕	✕	✕	✓
Bigelow et al., 2010	✓	✕	✕	✓	✓
Bigelow et al., 2012	✓	✕	✕	✕	✓
Chiu & Anderson, 2009	✓	✕	✕	✕	✓
Cho et al., 2016	✓	✕	✓	✕	✓
de Macedo et al., 2007	✓	✕	✓	✕	✓
Feldman et al., 2002	✓	Not Specified	Not Specified	✕	✓
Gathwala et al., 2008	✓	✕	✕	✕	✓
Holditch-Davis et al., 2014	✓	May Occur	✕	✕	✓
Lee & Bang, 2011	✓	✕	✕	✕	✓
Miles et al., 2006	✓	✕	✕	✕	✓
Neu & Robinson, 2010	✓	✕	✕	✕	✓

Priyanka et al., 2019	✓	✓	✕	✕	✓
Tallandini & Scalembra, 2006	✓	Not specified	Not specified	✕	✓
Tessier et al., 1998	✓	✓	✓	✓	✓
Zahedpasha et al., 2018	✓	✕	✓	✕	✓

KMC/SSC Intervention Duration. Again, studies varied widely in terms of duration, frequency and the number of weeks which participants were asked to maintain the intervention for (length). In terms of duration of individual sessions of KMC or SSC, interventions ranged between 15 minutes of KMC (Holditch-Davis et al., 2014) and 24 hours of continuous KMC (Tessier et al., 1998). Similarly, in terms of the number of sessions of KMC or SSC (frequency), this ranged between mothers being asked to engage in KMC/SSC only once (Bigelow et al., 2010; Priyanka et al., 2019), and four times daily (Gathwala et al., 2008). Finally, the number of weeks the intervention took place across ranged between a one-off session (Bigelow et al., 2010; Priyanka et al., 2019) and 12 weeks (Gathwala et al., 2008).

Altogether the longest amount of KMC or SSC contact encouraged within an intervention was 504 hours (Gathwala et al., 2008), which involved requesting mothers' provide 6 hours of KMC total per day, within a total of four sessions, across a period of 12 weeks. The shortest KMC intervention duration was 5 hours (Cho et al., 2016), which involved 10 sessions of 30 minutes of KMC across 3 to 4 weeks. Five studies did not specify either duration, frequency or length of the KMC/SSC intervention (or all three)(Chiu & Anderson, 2009; de Macedo et al., 2007; Holditch-Davis et al., 2014; Tallandini & Scalembra, 2006; Tessier et al., 1998), and so these studies could not be included in this description of overall KMC/SSC intervention duration.

Alternative Interventions. Little et al's paper presented a series of laboratory-based studies. The two studies included in this review did not involve a "KMC" or "SCC" intervention as such, but rather looked at the impact of close body contact. The first study examined differences in maternal responsiveness between those who identify babywearing (using an infant sling or carrier; Russell, 2015) as the primary means of transporting their child vs. those who identify strollers or another method as the primary means of transportation. Participants were allocated to these two groups by being asked about their primary method of transporting their child rather than a particular babywearing intervention being implemented. The second study assessed maternal responsiveness when mothers were asked to play with their child when the child was in an infant carrier (physical contact condition) vs. the same mothers playing with their child when the child was in a high chair (no physical contact).

Comparator/Control. All studies employed a between-subjects design, aside from one of Little et al.'s studies in which mothers experienced both conditions in a two-phase design (Little et al., 2019), and one study which implemented a pre-post study design (Zahedpasha et al., 2018). Of the 18 included studies, three studies involved more than one control condition, typically a comparative treatment plus Treatment As Usual (TAU) (de Macedo et al., 2007; Holditch-Davis et al., 2014; Neu & Robinson, 2010). Two studies matched the control group for infant demographics (e.g. age, weight) (Ahn et al., 2010; Feldman et al., 2002).

For the majority of studies (n = 12) at least one control condition involved "TAU". Of these, for five studies "TAU" consisted of incubator care (Badiee et al., 2014; Chiu & Anderson, 2009; Cho et al., 2016; Gathwala et al., 2008; Tallandini & Scalembra, 2006). The other seven did not specify the components of TAU (Ahn et al., 2010; Bigelow et al., 2012; de Macedo et al., 2007; Lee & Bang, 2011; Miles et al., 2006; Priyanka et al., 2019; Zahedpasha et al., 2018).

Other than describing TAU as incubator care, a further four studies employed incubator care as a control condition (Bigelow et al., 2010; de Macedo et al., 2007; Feldman et al., 2002; Tessier et al., 1998). Two studies used mother's holding their infant, but using a blanket to do so, rather than engaging in skin-to-skin contact, as a control condition (Chiu & Anderson, 2009; Neu & Robinson, 2010).

In Holditch-Davis et al's (2014) study, the control was a multi-sensory auditory, tactile, visual and vestibular (ATVV) intervention. This involved presenting stimulation over 15 mins, beginning with auditory only (voice), then auditory and tactile (voice and stroking/massage), then with visual stimulation (eye-to-eye) added. Horizontal rocking was added with stroking withdrawn in the final 5 minutes. This study also involved an attention control in which mothers spent 15 minutes with a nurse, discussing how to select equipment needed to care for their preterm infants at home.

Within Little et al's (2019) paper, the control for the first study was mothers who identified strollers or other methods, rather than babywearing, as their primary means of transporting their child. For the other study, the control was a condition in which mothers did not have physical contact with their child within a two-phased design.

Outcomes. The studies included in this review overall examined five different primary maternal outcomes. These were mental health (n = 9), parenting behaviours or mother-child interactions (n = 6), attachment (n = 4), wellbeing (n = 2) and mood (n = 1). Five studies investigated more than one of these five primary outcomes. Two studies examined both mental health and attachment as primary outcomes (Cho et al., 2016; Miles et al., 2006), whilst three assessed both mental health and parenting behaviours (Feldman et al., 2002; Holditch-Davis et al., 2014; Tallandini & Scalembra, 2006).

As can be seen within the charting table, a wide range of measures were used across the included studies to assess these different outcomes. Most studies (n =16) used

validated and standardised outcome measures, though several utilised these measures in another language, perhaps reducing their validity (*n* = 7). The majority of studies employed self-report measures (*n* = 12), though videotapes of mother-child interactions were used by a number of studies to assess parenting behaviours including maternal sensitivity and responsivity (*n* = 9), and structured attachment interviews were also utilised (*n* = 2; Ahn et al., 2010; Gathwala et al., 2008).

Of the 18 studies, 11 included follow-up assessment of outcomes. The follow-up time period ranged between 3 weeks (Ahn et al., 2010) and 18 months (Chiu & Anderson, 2009), post-intervention.

Discussion

This scoping review aimed to explore the quantitative evidence base regarding the impact of skin-to-skin (or close body) contact between mothers and infants, upon maternal psychological outcomes. This was in order to assist future reviews in the identification of relevant research questions and inclusion or exclusion criteria, supporting the validity of future research.

Altogether 18 studies were included in this review. The majority of these studies took place within a hospital setting (with either the infant, or mother, or both, admitted as an inpatient), and explored the impact of KMC or SSC on mothers of preterm, Low Birth Weight infants, specifically. There appeared to be a paucity of research regarding the impact of skin-to-skin interventions within community settings or with mothers of healthy full-term infants. Studies have shown that childbirth can impact maternal mental health even when the child is healthy and born at term (Soet et al., 2003; Tilden & Lipson, 1981). By focusing on mothers of preterm infants, within NICUs, the current literature may be limited in terms of the conclusions that may be drawn regarding the effectiveness of SSC interventions for mothers of healthy, full-term infants who have been discharged from hospital; yet this is a population for which SSC may be a

beneficial intervention. Thus there appears to be a gap in the current literature with regards to the effectiveness of KMC, SSC or other close body contact interventions, which would benefit from further research.

The studies included in this review varied in their reporting of sample demographics (both mother and infant), with some studies failing to report infant age or weight (Bigelow et al., 2012; Cho et al., 2016; Little et al., 2019) or maternal age (Zahedpasha et al., 2018). Studies also varied in the extent to which they detailed the intervention employed, with some studies failing to report the duration of KMC sessions (deMacedo et al., 2007), the amount of time the intervention took place over (e.g. Holditch-Davis et al., 2014; Tessier et al., 1998), or both (Chiu & Anderson, 2009). The limitations in reporting within this research field, highlighted here, are important to note for future reviews, as limited reporting such as this may limit the accuracy of studies' quality appraisal scores within subsequent systematic reviews or meta-analyses.

The 18 included studies varied widely in study design, though most described themselves as randomised trials of some kind. Most of the studies in this review included a "Treatment As Usual" control, but a number of studies failed to specify what this control involved (e.g. incubator care, set visitation or free contact between mother and baby, etc.). Thus it would be difficult to effectively or meaningfully synthesise these studies despite apparent similarities in methodology. Moreover studies varied widely in sample size (between 12 (Bigelow et al., 2010) and 488 (Tessier et al., 1998)) and follow-up periods (between three weeks (Ahn et al., 2010) and 18 months (Chiu & Anderson, 2009)).

Most of all, studies appeared to vary widely in intervention definition, duration and frequency. The studies included in this review were generally consistent with regards to their description of what SSC or KMC holding methods involved (e.g. upright position between the mother's breasts, baby naked other than a diaper/nappy

and a hat etc.). However studies varied in whether the terms SSC and KMC were used interchangeably, and also in whether KMC specifically referred to a wider programme of care (which includes "Kangaroo nutrition" (breastfeeding) and clinical monitoring) as described in World Health Organisation guidelines (*Kangaroo Mother Care: A Practical Guide*, 2003).

The large differences found between studies with regards to intervention duration (e.g. 15 minutes (Holditch-Davis et al., 2014) vs. 24 hours continuously (Tessier et al., 1998)) and frequency (e.g. once ever (Priyanka et al., 2019) vs. four times daily (Gathwala et al., 2008)) may be due to the included studies often assessing KMC methods already being implemented in hospitals (e.g. Priyanka et al., 2019), or working to match their intervention to fit current operating procedures within the hospitals (e.g. Miles et al., 2006). Whilst such methods increase the ecological validity of these individual studies, and are also likely to be more acceptable to hospital staff and participants, this does then run the risk of creating heterogeneity between studies, making it more difficult to gain meaningful findings from reviews of the literature. Moreover such individualised methods decrease study replicability, and therefore reliability.

It may be beneficial for future studies to utilise a manualised or standardised approach to KMC or SSC interventions, even if this requires additional training of hospital staff or changes in hospital procedures, in order to attain a certain standard of KMC/SSC implementation. Indeed a number of manuals exist for the implementation of KMC within clinical settings (Bergh et al., 2012; Daral et al., 2017), what is missing is an agreement on which manual to implement within research trials, and also these clinical manuals do not necessarily specify frequency or duration of the intervention etc. (Bergh et al., 2012). The components of KMC, as outlined by Charpak et al. (2005) and more recently by Chan et al. (2016), and as seen in Table 2 of this review, could be

utilised as a framework upon which to design an appropriate, standardised, intervention for clinical research trials. This would support the synthesis of results across studies, allowing reviews to draw more accurate conclusions regarding the effectiveness of KMC or SSC interventions.

Studies included in this review measured outcomes around five main areas; attachment, mental health, mother-infant interaction, wellbeing and mood; a small number of outcome measure categories given the otherwise heterogeneous nature of these studies. However, within each area, studies varied widely in the specific outcome measures employed, though most utilised standardised and well validated measures, such as the EPDS, GHQ-28, or NCATS. It may be helpful for studies within each area to employ a more consistent approach to outcome measurement, utilising a smaller number of different measures, in order to better establish the impact of KMC or SSC, and to enable more reliable and meaningful synthesis of studies within systematic reviews.

In medical research, initiatives have been established to create lists of "core" outcome measures for treatments of different conditions (e.g. chronic pain - IMMPACT, Dworkin et al., 2005; rheumatoid arthritis - OMERACT, Tugwell et al., 2007). These lists are not meant to limit the development and use of other outcomes, but rather provide a core set of standardised measures to be used routinely by researchers, and which researchers may supplement with other measures should they wish to do so (Clarke, 2007). Clarke (2007) recommends that researchers utilise such lists, and systematic reviewers build their reviews around them. In 2007, Devane et al. generated a list of 48 core outcome measures for maternity services. However this list is for physiological, rather than psychological, measures. It may be helpful for a future literature review to consider which psychological outcome measures may be added to this list of core measures in maternity services. This could then guide future studies of

the impact of KMC upon maternal psychological outcomes, such as mood or confidence, in their study design and use of standardised outcome measures.

The studies included this review were conducted in 11 countries, across five continents. This reduces the likelihood of the presence of cultural biases within this research area. Moreover this may offer some explanation for the heterogeneity seen between study designs, particularly as different countries have been found to differ in their parenting cultures (e.g. proximal cultures, in which parent-infant body contact is promoted, vs. distal cultures, whereby value is placed in encouraging early independence from the parent (Keller et al., 2009)). Future reviews may wish to examine culture, and more specifically, "parenting culture", as a factor in the effectiveness of close body contact interventions.

Altogether, this review corroborates with the findings of both Athanasopoulou and Fox (2014) and Scime et al. (2019), with regards to the heterogeneity of studies' design and methodology within this field of research. The findings of this scoping review indicate a gap in the literature with regards to quantitative studies of close body contact interventions (such as KMC or SCC) within the community rather than in a hospital setting, and a need for standardisation of both the KMC intervention, and outcome measures, employed by studies.

When determining their research question, and inclusion or exclusion criteria, future literature reviews may wish to consider factors such as country of origin (or parenting culture specifically), study design (e.g. whether a randomised control trial), intervention duration, or whether follow-up data collection occurred, as possible areas of interest.

Limitations

There are a number of limitations of this review that must be acknowledged. Firstly, though the inclusion and exclusion criteria used were minimal in this review in

the spirit of the exploratory nature of scoping reviews, still one requirement was that studies must be published in English. From the studies which were included in this review, it is apparent that research on this topic is multi-national, taking place across a range of countries, a number of which do not have English as their first language. As such, it is likely that this inclusion criterion has introduced a degree of publication bias as studies are more likely to have been published in English, and therefore included in this review, if they show a significant impact of KMC or SSC upon maternal outcomes.

Similarly, this review did not include qualitative, grey or "file drawer" literature. This is in contrast to other scoping reviews, which do include such literature in order to provide a more comprehensive understanding of the current literature (Arksey & O'Malley, 2005; Grant & Booth, 2009). Moreover, a wider range of databases could have been used for the search. Indeed, two studies included in this review (Badiee et al., 2014; Zahedpasha et al., 2018), were identified through the reference lists of identified studies, rather than via database searches. This indicates limitations to the search strategy employed, leading to the exclusion of, or failure to identify, potentially relevant studies. The search terms employed followed an iterative approach, with relevant search terms added as the search progressed, thus it appears more likely that the limited number of databases employed, rather than the search terms used, may have led to this exclusion of, or failure to identify, these two relevant studies.

Altogether, the exclusion of qualitative and grey literature, and limited database use, increases the likelihood that relevant research was not identified and limits the extent to which this review furthers an understanding of current literature around the impact of KMC or SSC upon maternal psychological outcomes.

Moreover, there is extensive anthropological research regarding proximal cultures; cultures that encourage close body contact between mother and child (Keller et al., 2009). As this research belongs to a different (though undeniably related) discipline

of study, this review does not acknowledge this body of literature. Again, this may mean that this review has not captured a full and comprehensive picture of literature regarding the impact of KMC or SSC upon mothers.

Daudt et al. (2013) suggested that, due to the omission of structured quality appraisal, the usefulness of a scoping review to practice or policy making is limited if it is done as a stand-alone project, rather than as a first step within a larger research programme. It must be acknowledged that, though it is hoped that this scoping review will help to guide future systematic reviews, particularly with regards to the identification of research questions and inclusion/exclusion criteria, this review is not currently part of a wider research or review programme, and its current utility may be limited by this.

Recommendations

- As this review focused on quantitative studies only, a scoping review of the qualitative research may be helpful in building a comprehensive understanding of current research regarding the impact of KMC or SSC upon mothers. A qualitative scoping review may be particularly useful in clarifying definitions of KMC or SSC as interventions.
- Similarly, if possible, it may be helpful for future reviews to include studies which are not published in English in order to capture research from other cultures as this review indicates a worldwide use of KMC and SSC as interventions.
- It would be useful for both future reviews and future empirical studies if a consensus could be reached regarding the nature of a KMC intervention or of an SSC intervention, including: recommended frequency, duration and length, whether KMC and SSC differ or may be used interchangeably as terms, and

whether KMC particularly includes a wider programme of care and parenting behaviours (e.g. breastfeeding).

- It may be useful for more studies of close body contact interventions to take place outside of a hospital or NICU setting, and with full-term infants, in order to assess the generalisability of the findings from hospital-based studies.
- Greater and more consistent use of a limited number of validated measures within certain areas of interest (maternal wellbeing, mental health, parenting and attachment) may support the quality of research in this area. To this end, the generation of a list of "core" outcome measures (as seen in medical research) may assist in the standardisation of outcome measure use across studies of the impact of close body contact interventions upon maternal psychological outcomes.

Conclusions

This scoping review explored the current literature regarding the impact of close body contact interventions (e.g. KMC or SSC) upon maternal psychological outcomes. Of the 18 studies included in this review, the majority took place within a hospital setting, with mothers of preterm and/or Low Birth Weight infants. Each study's design varied greatly, particularly in terms of sample size, outcomes measured and the nature of both the intervention and the control condition. Across the included studies, there appeared to be a consensus regarding the definition of the "action" of KMC or SSC (i.e. the placement of the baby in a specified position, that it involves skin-to-skin mother-infant contact, etc.). However the nature of the KMC or SSC "intervention" employed within each study (e.g. duration, frequency) varied widely. Moreover whilst some studies viewed KMC as involving a wider programme of care in addition to SSC, others used the terms KMC and SSC interchangeably. The heterogeneity found between study designs supports the heterogeneity seen in recent systematic reviews.

The effectiveness of this study in mapping out current literature within this research area is bounded by the use of only three databases and the omission of qualitative studies, grey literature and studies that are not published in English. In particular, limiting this review to studies published in English in peer-reviewed journals increases the likelihood of an impact of publication bias upon the results of this study. As such conclusions must been drawn tentatively and there is a need for further reviews of the current literature to corroborate or dispute this study's findings.

Nevertheless, from this study, there appears to be a need for further clarification regarding the relative definitions of SSC and KMC, as well as for a standardised "KMC intervention", and the use of a core set of outcome measures within this area, in order to attain a certain quality of research within this field and to support the comparison of findings across studies.

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Appendix

Search Strategy Table

Table 1

Search Strategy

Population (P)	**Intervention (I)**	**Comparison (C)**	**Outcome (O)**	**Study Design (S)**
a) "maternal" OR "mother*" OR "matern*" OR "women" *b)* "post-natal" OR "postpartum" OR "postnatal" OR "puerper*"	"skin-to-skin" OR "close body contact" OR "babywearing" OR "kangaroo care" OR "STS" OR "KMC" OR "Kangaroo mother care" OR "skin-to-skin contact" OR "skin to skin" OR "sling" OR "infant carrier".		"coping" OR "cope*" OR "resilience" OR "resili*" OR "parent* stress*" OR "stress*" OR "wellbeing" OR "well-being" OR "postnatal depression" OR "post-natal depression" OR "self-efficacy" OR "parental self-efficacy" OR "mental health" OR "mood" OR "confidence"	NOT ("review" OR "meta-analysis" OR "case study")

Section Two: Research Report

Evaluating the impact of sling provision and training upon maternal mental health, wellbeing and parenting: A randomised feasibility trial

Abstract

Objectives

Close body contact interventions such as Kangaroo Mother Care have been shown to improve maternal mental health following birth. No studies have specifically examined the relationship between sling use (including the use of sling-based support services such as sling libraries) and maternal mental health. A full-scale efficacy study is needed to establish this relationship. This feasibility study aimed to gather information to support the design of a future RCT, such as acceptability and study parameters (recruitment rates, attrition etc.).

Method

Mothers of infants aged 0-6 weeks were randomised to one of two conditions (intervention (n = 35) vs. waitlist control (n = 32)). Intervention mothers received sling training, support, and 12 weeks' free sling hire. Mothers completed self-report measures of mood, wellbeing and parenting online at baseline, and 6- and 12-weeks post-baseline.

Results

Eligibility and consent rates met feasibility objectives, though difficulties regarding participant retention were evident. Preliminary effectiveness analyses showed no significant effects of the sling and support intervention upon maternal mental health. Qualitative feedback indicated acceptability of the intervention and study participation. For example, intervention participants attributed greater autonomy, bonding with their baby, and parental self-confidence, to the intervention.

Conclusions

It is feasible and acceptable to conduct a randomised study of the impact of a sling and support intervention upon maternal mental health. This study's findings should be interpreted within the context of sampling bias (due to the use of volunteer

sampling methods) and an absence of feedback from those who discontinued participation in the study.

Practitioner Points

- It is feasible and acceptable to conduct a study examining the impact of a sling and support intervention upon maternal mental health.
- Sling use, with sling library support, may be an acceptable psychosocial intervention for improving new mothers' mental health and wellbeing.
- These findings should be considered in the context of sampling bias and with an understanding that no feedback was gathered from mothers who discontinued their participation in the study.

Evaluating the impact of sling provision and training upon maternal mental health, wellbeing and parenting: A randomised feasibility trial

Women commonly experience both physical and psychological difficulties following childbirth (Rowlands & Redshaw, 2012). Worldwide, 10-15% of mothers suffer from postnatal depression (PND) (Cox et al., 1993). A greater percentage of mothers (around 30%) may experience subthreshold depressive symptoms following childbirth (Kingston et al., 2018). There is a need for low intensity interventions to mitigate these symptoms, and support mothers' well-being.

As with other depressive disorders, the biopsychosocial model (Engel, 1977) may be used to conceptualise the causes and maintaining factors of postnatal depression. This model proposes that biological, psychological and social factors are all interlinked and important in causing and maintaining illness (Engel, 1981). A number of biological, psychological and social factors have been shown to impact upon the prevalence and severity of postnatal depression symptoms (Harris, 1994; Nielsen et al., 2000), such as the functioning of the endocrine (hormone) and immune systems (Harris, 1994), social isolation (Nielsen et al., 2000), and mothers' negative thoughts about their ability to parent (Milgrom & McCloud, 1996).

For those with mild to moderate symptoms of PND, National Institute for health and Care Excellence (NICE) guidelines recommend seeking healthy lifestyle advice, self-help programmes, computerised behavioural therapy, or exercise programmes (NICE, 2009). These low-level interventions can be onerous for mothers to access soon after giving birth (Bigelow et al., 2012), yet without early intervention PND symptoms can worsen (Kingston et al., 2018).

Evidence is emerging for alternative early intervention methods, including psycho-educational home visits (Ammaniti et al., 2006), parenting groups (Puckering et

al., 2010), and baby massage (Onozawa et al., 2001), but these are not yet well-supported.

A low cost, low intensity intervention known to have beneficial effects on both maternal and infant wellbeing is close body contact (Winberg, 2005). Skin-to-skin contact (SSC) and Kangaroo Mother Care (KMC) both involve placing the infant upon the mother's chest in a vertical position, dressed only in a nappy, so that mother and infant frontal body contact is skin-to-skin (Bigelow et al., 2012; Scime et al., 2019). Scime et al. (2019) state that SSC and KMC differ, with SSC an intermittent intervention, while KMC is provided continuously for a certain period of time. However this distinction does not appear to be well supported, with some studies implementing continuous SSC (Bigelow et al., 2010), or intermittent KMC (Ahn et al., 2010; Holditch-Davis et al., 2014).

Both SSC and KMC have been found to be associated with significant reductions in maternal symptoms of depression, in comparison to treatment-as-usual (Badiee et al., 2014; Bigelow et al., 2012; Feldman et al., 2002). For example, Bigelow et al. (2012) found that mothers who provided regular skin-to-skin contact for the first month of their infant's life had lower depression scores than mothers who provided little or no skin-to-skin contact.

Moreover SSC and KMC have been found to impact positively upon parenting behaviours, including maternal sensitivity and responsiveness to infant cues (Bigelow et al., 2010; Feldman et al., 2002; Little et al., 2019), maternal confidence (Lee & Bang, 2011; Tessier et al., 2018), and mother-infant attachment scores (Ahn et al., 2010; Cho et al., 2016).

One way in which a mother may increase close body contact with their infant is through the use of a "baby sling". This is a structured piece of fabric that allows the parent to carry the infant against their body (Williams & Turner, 2020). There are many

different types of sling available (e.g. ring-sling, stretchy-wrap, structured carrier etc.) in order to suit different body shapes, postures, infant weights etc. The word "sling" when discussed in this study refers to all sling types. There are clear similarities between sling use and SSC or KMC as each includes positioning the infant upright against the mother's body, and each enables the infant to sense the mother's breathing, temperature and heartbeat (Reynolds-Miller, 2016).

In addition to the benefits of close body contact as described above, drawing from biopsychosocial models of depression, there are several mechanisms by which sling use might positively affect PND and maternal wellbeing. For example, through promoting the release of oxytocin (Uvnäs-Moberg & Prime, 2013), promoting secure mother-infant attachments (Anisfeld et al., 1990), and reducing infant crying (Hunziker & Barr, 1986). Moreover, sling use may promote mothers' autonomy and social engagement through allowing mothers to have their hands free, travel more easily, and access a range of sling-based social networks (e.g. via social media)(Blois, 2005; Russell, 2015). In particular, "sling libraries" loan out slings, offering advice and information on safe and functional sling use. Furthermore these organisations often offer psycho-education regarding infant development and mother-infant bonding, and allow parents to connect with, and support, one another (Whittle, 2019). For these reasons, it may be that sling use, and in particular using slings through a sling library, may increase feelings of parental self-efficacy and improve maternal mental health (Jackson, 2000).

Whilst the above studies examine the impact of sling use upon factors that may affect maternal mental health, studies so far have not explored whether there is a causal relationship between sling use, including accessing sling-related social support or services (e.g. sling libraries), and improvements in maternal postnatal depression symptoms. To establish such a relationship, a full-scale efficacy study, utilising a

Randomised Control Trial (RCT) design is needed (Cartwright, 2010). A full scale RCT is time-consuming and costly. It is therefore important to evidence feasibility and acceptability, and to identify key study parameters, prior to undertaking such a study.

As such, this study is a feasibility study, defined by Eldridge et al. (2016) as a study which asks whether, and how, something can or should be done. They contrast this definition with the definition of a pilot study, which also looks at whether something can be done and how, but includes all the features of the full trial on a smaller scale. Thus while all pilot studies are feasibility studies, not all feasibility studies are pilot studies. In this feasibility study, the research aim was to explore the feasibility and acceptability of this study design and a sling and support intervention, and to provide data to estimate the parameters required to design a definitive RCT.

Aims and Hypotheses

This primary aim of this study is to explore the following study parameters and aspects of feasibility (based on Peters et al., 2013; Appendix A):

- Adoption

  Of those screened, how many are eligible to participate in the study (eligibility rate)? And, of those who are approached to participate, how many consent (consent rate)? Based on studies of close body contact, KMC and other psychosocial interventions for postnatal depression, an eligibility rate of around 60% or above (Milgrom et al., 2015; Muzik et al., 2012; Tsivos et al., 2015) and a consent rate of around 70%, or above (Hunziker & Barr,1986; Kadam et al., 2005; Lima et al., 2000; Sharp et al., 2012), would be acceptable.

- Practicality (or actual fit)

  Is it possible to implement this study as it was designed within the research protocol? Of those who consent, how many do and do not complete the study (attrition rate)? This study aims for an attrition rate of below 15% as a rate higher

than this is difficult to address using missing value methods (e.g. multiple imputation) (Tarrier & Wykes, 2004).

At the point of analysis, what percentage of data is missing? If more than 40% of data is missing, then it is unlikely that a full trial will be seen to be feasible unless significant changes are made to the study design (as seen in Bryant et al., 2018).

- Resource Uptake

Do those in the intervention condition use a sling regularly and access sling library services? And do those in the control condition use slings independently from the study? Is there a significant between-group difference evident for sling and sling library use? To examine these questions, frequency of participant sling and sling library use will be recorded for both conditions.

- Acceptability

Are study participation, the intervention and the outcome measures administered, perceived by participants to be acceptable? Qualitative questions included at the final data collection time point will explore participants' experiences of the study. This qualitative data will be analysed using the seven "component constructs" of acceptability outlined by Sekhon et al. (2017) as a priori themes. These are detailed in the *Method* section below.

The secondary aim of this feasibility study is to gather preliminary data regarding treatment effectiveness (Orsmond & Cohn, 2015). It is predicted that sling use with the support of sling library services will lead to lower postnatal depression scores, and higher wellbeing, mother-infant bonding and parental self-efficacy scores in the intervention group, in comparison to the control group.

Method

Design

This is a primarily quantitative, experimental, feasibility study, which followed a predefined protocol (registered with OSF: https://doi.org/10.17605/OSF.IO/UXZW2). Participants were randomised to one of two conditions (intervention vs. control) using a computer-generated random number sequence (following a 1:1 randomisation ratio). Neither the research team, nor participants, were blind to participants' allocated condition.

Service User Involvement

This study was designed and implemented in collaboration with staff and volunteers from Sheffield Sling Surgery. A service user involvement group of seven mothers provided feedback regarding the acceptability and relevance of proposed outcome measures. From this feedback, qualitative question phrasing was altered and the mother-child relationship measure was changed from the Caregiving Experience Questionnaire (Brennan et al., 2013) to the Maternal Postnatal Attachment Scale (Condon & Corkindale, 1998).

Participants

Inclusion/Exclusion Criteria. Mothers were eligible to participate if they were due to give birth within the baseline data collection period, able to travel to the sling library, and if they had not regularly used a sling previously. Mothers of twins were included in the study, but completed measures based on one child only. Mothers of infants with a serious illness or disability were excluded as they require a greater level of sling support and training than this study provided.

Recruitment. Participants were recruited while pregnant. Flyers and posters were shared on social media and distributed in shops, community centres, libraries, toddler groups and cafes (Appendix B). Two charities; the National Childbirth Trust and Forging Families, advertised the study locally also.

Sample Size. As a feasibility study, sample size was selected based on whether it could adequately estimate parameters that would support the design of a future RCT, rather than a power calculation (Eldridge et al., 2016; Williams, 2016). Following the recommendations of the National Institute of Health Research (Hooper, 2014), a sample size of 50-60 participants (25-30 per condition) was selected.

Ninety-one mothers expressed interest in study participation. Sixty-seven were eligible, consented, and were randomly allocated to either the intervention (n = 35), or control (n = 32) condition. Sixty-one completed baseline measures (32 intervention, 29 control) and thus were included in data analysis.

Measures

All measures were self-reported and completed online using Qualtrics, a web-based survey tool.

Primary Measures.

Postnatal Depression. The Edinburgh Postnatal Depression Scale is a 10-item scale designed to screen for postnatal depression in nonclinical populations (EPDS; Cox et al., 1987) (Appendix C). Participants used a 4-point Likert scale to indicate frequency for 10 statements. A higher total score indicates greater postnatal depression symptomatology. The EPDS is a widely used and validated measure (Cronbach's $\alpha >$ .80; Bunevicius et al., 2009; Teissedre & Chabol, 2004), often used within the National Health Service (NHS) (Leahy-Warren et al., 2012).

Sling and Sling Library Use. An idiographic measure was designed to assess frequency of sling use and use of sling library services. Participants used Likert-scales to indicate how often they had used a sling, pram and sling library services, over the past six weeks (Appendix D). Participants were asked the same questions in relation to their partner (if applicable) to control for partner sling and sling library use as possible confounding variables.

Secondary Measures.

Mental Health. The sensitivity and specificity of the EPDS has been found to vary between different studies and settings (Novotney & Maurer, 2017). Miller et al. (2006) recommend supplementing the EPDS with a second validated measure of depression. In this study, the EPDS is supplemented with the 21-item Depression Anxiety and Stress Scale (DASS-21; Lovibond & Lovibond, 1995) (Appendix E), which has established reliability and validity with clinical and non-clinical populations (Cronbach's $\alpha > .76$; Le et al., 2017; Ng et al., 2007). Participants indicated the degree to which statements applied over the past week using a 4-point Likert scale. This generated three scores: Anxiety, Depression and Stress; with higher scores indicating greater levels of each difficulty.

Wellbeing. The Warwick Edinburgh Mental Wellbeing Scale (WEMWBS) is a validated 14-item wellbeing scale (Cronbach's $\alpha = .91$; Tennant et al., 2007) (Appendix F). Participants rated positively worded statements on a 5-point Likert scale, with a higher total score indicating greater wellbeing.

Parental Self-Efficacy. The Parenting Sense of Competency Scale (PSCS; Gibaud-Wallston & Wandersman, 1978) is a validated 16-item Likert-scale questionnaire (Cronbach's $\alpha = .80$; Ohan et al., 2000) (Appendix G). Participants indicate agreement with statements relating to their confidence as a parent. A higher total score indicates greater parental self-efficacy.

Mother-Infant Relationship. The Maternal Postnatal Attachment Scale (MPAS) is a validated 19-item Likert-scale questionnaire (Cronbach's $\alpha = .78$; Condon & Corkindale, 1998) (Appendix H). Participants rated statements regarding their feelings towards their child, generating three scores; Quality of Attachment, Absence of Hostility, and Pleasure in Interaction.

Perceived Social Support. A five-item version of the Social Provisions Scale

(SPS; Russell & Cutrona, 1984) was administered (Cutrona & Troutman, 1986; Appendix I). This version has a reported internal consistency of .65 (Cutrona & Troutman, 1986). Participants rated statements on a seven-point Likert scale. A higher total score indicates greater perceived social support.

Stroking. This study utilised a measure of infant stroking by mothers developed by Sharp et al. (2012) (Appendix J). Higher scores indicate more frequent stroking.

Breastfeeding. Participants reported their preferred feeding method (Appendix K).

Covariates. A number of factors may relate to both the independent variable (provision of sling and support vs. no sling and support provision) and the outcomes measured (e.g. PND, parenting, etc.), including: maternal attachment style, infant temperament, infant illness or discomfort and participant demographics. To potentially control for these variables, each was measured and it was planned that they would be included as covariates in effectiveness analyses should scores for each differ between conditions.

Attachment. The 12-item version of the Experiences in Close Relationships Scale (ECR-12) is a validated measure of adult attachment style consisting of two subscales: Anxiety and Avoidance (Cronbach's $\alpha = 0.87$ and 0.79, respectively; Lafontaine et al., 2016) (Appendix L). Participants used a 7-point Likert scale to rate their agreement with statements. Higher scores indicate higher levels of attachment anxiety or avoidance.

Infant Temperament. The Infant Behaviour Questionnaire-Revised Very Short Form (IBQ-R VSF; Putnam et al., 2014) was administered (Appendix M). This measure has been shown to have good validity (Cronbach's $\alpha = 0.62$-0.90; Peterson et al., 2017). Participants used a 7-point Likert scale to indicate the frequency with which their child displayed specific behaviours within certain situations, generating three scores: Negative Affect, Surgency, and Effortful Control.

Infant Illness/Discomfort. Mothers reported the number of days out of the past week that their infant had been unwell or experiencing physical discomfort (Appendix N).

Demographics. Participants answered a range of demographic questions, including: age, ethnicity, marital status, education, income, mental health history, infant age and infant birth order (Appendix O).

Qualitative Questions. Using free text boxes, participants answered open-ended questions about their experience of participating in the study and of the intervention (intervention participants only) (Appendix P).

Procedure

Figure 1 outlines the procedure of this study. Following recruitment, participants were given further information about the study (Appendix Q) and a consent form to complete online (Appendix R). Participants were then randomised to one of two conditions (intervention vs. control).

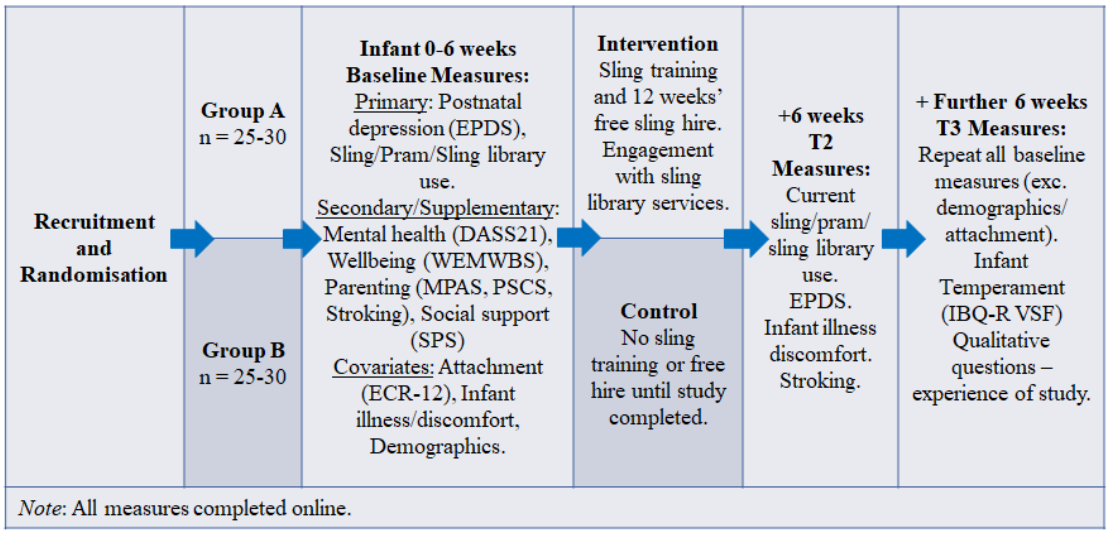

Figure 1. Study procedure diagram.

Intervention and control participants completed the same measures at the same timepoints. Participants completed baseline measures when their child was between 0 and 6 weeks old (T1). To more closely monitor resource uptake, and gather preliminary data regarding the point at which an effect of the intervention may be seen, an additional battery of measures was administered 6 weeks post-baseline (T2). T2 measures included

the EPDS, sling/pram/sling library use, stroking and infant illness/discomfort scales, only.

12 weeks post-baseline (T3), participants completed the same measures as at T1, excluding demographics or the ECR-12 (as adult attachment style is considered a stable trait; Zhang & Labouvie-Vief, 2010), but with the addition of qualitative questions regarding their experience of participation, and a measure of infant temperament (as infant temperament is also a stable trait (Bornstein et al., 2015) and the IBQ-R VSF is validated for infants aged 12-weeks plus (Putnam et al., 2014)).

Participants were debriefed via email at the end of the study (Appendix S).

Intervention. Upon completion of baseline measures, intervention participants were invited to attend a drop-in session at the sling library. These drop-in sessions are part of the sling library's usual provision. They run for two hours. Parents are welcome to stay for as long as they like within this time period. Parents attend these sessions seeking advice for slings that they are currently using, or to try using a sling for the first time before buying or hiring. As a drop-in, all contact between staff or volunteers and parents takes place within one large room. As such, staff or volunteers may sometimes demonstrate a sling to a group of interested parents, and parents are able to meet and chat to each other, rather than sessions being 1:1 consultations.

To support standardisation of session content and improve replicability, a checklist was created to be used during sessions with study participants (Appendix T). Following the session checklist, participants were offered sling training and advice, and a sling use demonstration. Participants learned how to use one of two different types of sling: a close caboo or buckle carrier, dependent on the parent and infant's needs and preference. Participants were given this sling to hire for free for the duration of the study.

Participants were invited to join an online sling community for further support, and were given information about safe sling use and further sling library services (Appendix U). Throughout the study participants were able to attend further sling library sessions and swap their sling if they had any concerns or felt that another sling may be more suited to themselves and their infant.

Control. Control participants were not offered the intervention (provision of a sling and sling library support) during the study. However they were not asked to refrain from sling use or from accessing the sling library during this time, as this would have been an unethical withholding of benefits (Barker et al., 2016). Therefore it was possible for control participants to independently access the same sling library services as intervention participants, but with no access to free sling hire. Control participants were offered free sling hire and support following completion of T3 measures.

Ethics

Ethical approval was granted by the University of Sheffield (Appendix V). As the EPDS is used in the NHS as a screening tool for PND, participants who scored above the clinical threshold for this measure were informed of this and encouraged to contact their GP or health visitor for further support (n = 9) (Appendix W).

Analysis

Quantitative Analysis. Eligibility, consent and attrition rates are presented below. Frequencies and descriptive statistics for demographic measures were examined and compared between groups.

With regards to treatment fidelity, frequency totals for sling and sling library use are presented for both groups across timepoints. Between-group comparisons of sling use were conducted using Mann Whitney U tests. Participants' partner sling use was also compared between groups as a possible confounding variable.

Preliminary effectiveness data was examined using Intention-To-Treat (ITT) analysis. Between-group comparisons of EPDS, possible covariate (attachment, infant temperament, infant illness), and secondary outcome measure scores, were conducted using t-tests or Mann Whitney U tests.

A 2x3 mixed ANOVA, with the between-subjects variable condition (intervention, control) and repeated variable time (T1, T2, T3) was conducted on participants' EPDS scores. Post-hoc between-group comparison of estimated marginal means for EPDS scores was conducted. 2x2 mixed ANOVAs (between-subjects variable: condition; repeated variable: time (T1, T3)) were conducted for scores on secondary outcome measures (DASS21, WEMWBS, SPS, PSCS, MPAS, stroking).

Qualitative Analysis. To gather information regarding acceptability, participants' responses to the qualitative questions asked at T3 were thematically analysed, following procedures outlined by Braun and Clarke (2006)(Appendix X). A deductive approach to the generation of themes was utilised (Hayes, 1997). Participants' responses were coded, then clustered into a priori themes taken from a model proposed by Sekhon et al. (2017). This model conceptualises acceptability as consisting of seven "component constructs". These include: participants' feelings towards participation (affective attitude), perceived burden, ethicality, opportunity costs, ability to implement the intervention and intervention effectiveness (Appendix Y).

Results

Adoption and Practicality

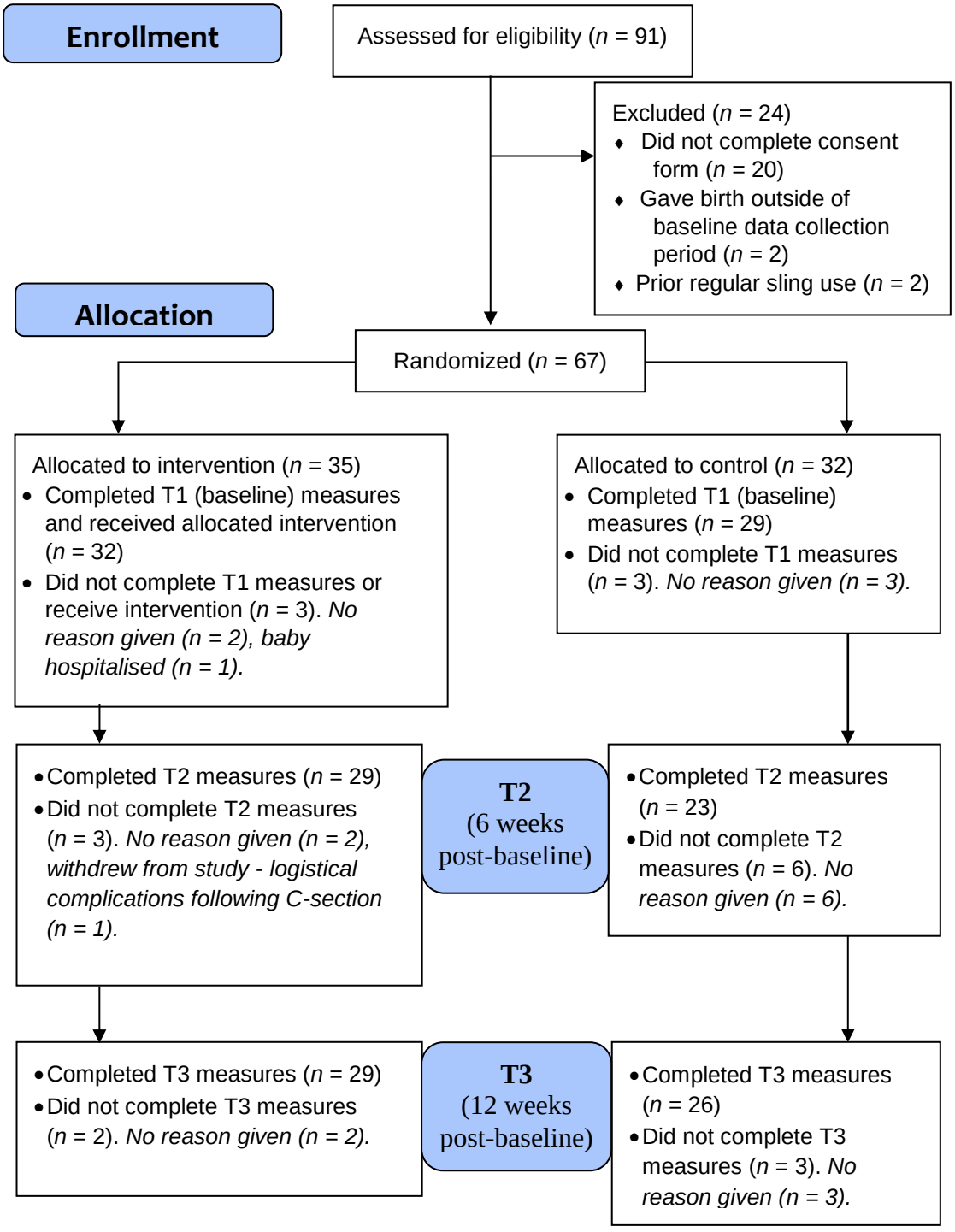

Figure 2. CONSORT diagram of participant flow (Moher et al., 2001).

Eligibility Rate. As seen in Figure 2, of the 91 mothers who expressed an interest, 87 (96%) were eligible to participate.

Consent Rate. Of the 87 mothers eligible to participate, 67 (77%) consented. Mothers who did not consent to participate automatically did not consent to further contact. Therefore information was not gathered regarding reasons for non-consent.

Attrition Rate. Of the 67 mothers who consented to participate, 61 (91%) completed T1 measures. Only those who completed T1 measures were asked to complete T2 and T3 measures. Of the participants who completed T1 measures, 52 (85%) completed measures at T2, and 55 (90%) at T3, with 50 completing measures at all three time-points, giving an overall attrition rate of 18%. Most of the participants who discontinued gave no reason for their discontinuation.

Of the 61 participants who completed T1 and thus were included in data analysis, 12 (20%) had data missing for at least one variable at at least one timepoint. Out of a total of 4,148 possible values in the dataset, 127 (3%) were missing.

Sample Characteristics. Table 1 shows maternal and infant demographics by condition. Between-group differences in categorical demographic variables were assessed using Pearson's chi-square tests. For continuous demographic variables (infant age and illness/discomfort), scores were not normally distributed, therefore Mann-Whitney U tests were used to conduct between-group comparisons (McKnight & Najab, 2010).

Table 1

Comparison of Demographic Information for Intervention and Control Participants

Characteristics	Categories	Intervention Group (n = 32) n (%) or Mean (SD)	Control Group (n = 29) n (%) or Mean (SD)	χ^2 or U	p
T1 Infant's age (weeks)		1.4 (1.1)	1.2 (1.1)	417.00	.440
Mother's age	Under 18	0	0	2.95	.399
	18-25	2 (6.3)	0		
	26-35	21 (65.6)	22 (75.9)		
	36-45	8 (25.0)	7 (24.1)		
	46-55	1 (3.1)	0		
	Over 55	0	0		
# Child	Firstborn (1)	25 (78.1)	25 (86.1)	1.52	.677
	Second born (2)	4 (12.5)	2 (6.9)		
	Third born (3)	2 (6.3)	2 (6.9)		
	Fourth born (4)	1 (3.1)	0		
	Fifth born + (5)	0	0		
Ethnicity[a]	White British	25 (78.1)	27 (93.1)	8.95	.442
	Asian/Asian British	2 (6.3)	0		
	Mixed Asian/White British	1 (3.1)	0		

	White European	2 (6.3)	1 (3.4)		
	White – Other	1 (3.1)	0		
	South American	1 (3.1)	0		
	Latin American	0	1 (3.4)		
Marital status	Single	2 (6.3)	0	6.71	.152
	Married	22 (68.8)	16 (55.2)		
	Co-habiting	7 (21.9)	11 (37.9)		
	In a relationship, not co-habiting	0	2 (6.9)		
	Separated/divorced	1 (3.1)	0		
	Widowed	0	0		
Employment	Employed full-time	22 (68.8)	20 (69.0)	1.62	.806
	Employed part-time	6 (18.8)	6 (20.7)		
	Unemployed	2 (6.3)	1 (3.4)		
	Student	0	1 (3.4)		
	Other	2 (6.3)	1 (3.4)		
Partner’s employment	Employed full-time	27 (84.4)	26 (89.7)	3.21	.523
	Employed part-time	1 (3.1)	1 (3.4)		
	Unemployed	2 (6.3)	0		
	Student	0	0		
	Other	1 (3.1)	2 (6.9)		
	N/A	1 (3.1)	0		
Education	High school	0	2 (6.9)	3.43	.489
	Apprenticeship	0	0		
	College Qualification	5 (15.6)	5 (17.2)		
	University - undergraduate degree	13 (40.6)	8 (27.6)		

	University - post-graduate degree	12 (37.5)	13 (44.8)		
	Professional or other vocational qualification	2 (6.3)	1 (3.4)		
Income	Less than £10,000	0	0	4.78	.443
	£10,000-£19,999	4 (12.5)	1 (3.4)		
	£20,000- £29,999	1 (3.1)	5 (17.2)		
	£30,000-£39,999	2 (6.3)	2 (6.9)		
	£40,000-£49,999	5 (15.6)	5 (17.2)		
	£50,000-£59,999	6 (18.8)	5 (17.2)		
	£60,000 or over	14 (43.8)	11 (37.9)		
Postcode affluence	Affluent	11 (34.4)	10 (34.5)	0.00	.993
	Not affluent	21 (65.6)	19 (65.5)		
T1 Feeding method	Formula	1 (3.1)	1 (3.4)	2.00	.368
	Breastfeeding	25 (78.1)	18 (62.1)		
	Both formula and breastfeeding	6 (18.8)	10 (34.5)		
Infant Illness/Discomfort	At T1	3.2 (4.7)	3.6 (3.4)	363.50	.141
	At T2	3.9 (3.5)	5.0 (4.4)	406.50	.401
	At T3	3.6 (3.6)	3.3 (3.3)	458.00	.930
T1 Current mental health	Good	18 (56.3)	22 (75.9)	3.60	.308
	Somewhat good	9 (28.1)	5 (17.2)		
	Average	3 (9.4)	2 (6.9)		
	Somewhat poor	2 (6.3)	0		
	Poor	0	0		
Diagnosis	Yes, prior to pregnancy	14 (43.8)	12 (41.4)	1.01	.604

	Yes, during pregnancy	1 (3.1)	0		
	No	17 (53.1)	17 (58.6)		
T1 Accessing mental health support	Yes	7 (21.9)	2 (6.9)	2.71	.099
	No	25 (78.1)	27 (93.1)		
Family history of mental health	Yes	15 (46.9)	12 (41.4)	1.32	.516
	No	14 (43.8)	16 (55.2)		
	I don't know	3 (9.4)	1 (3.4)		

[a] *Note:* Only selected ethnicities are included in this table.

Table 2

Summaries and Comparisons of Maternal Attachment Style Scores

		Intervention Group (n = 32)	Control Group (n = 29)		
Variable	Subscale	Mean (SD)	Mean (SD)	*U*	*p*
Maternal Attachment Style (ECR-12)	Anxiety	18.4 (5.2)	18.6 (5.8)	459.00	.942
	Avoidance	11.5 (5.4)	9.3 (3.9)	340.00	.071

Table 3

Infant Temperament Scores: Mean and Comparison between Intervention and Control

		Intervention Group (n = 32)	Control Group (n = 29)		
Variable	Subscale	M (SD)	M (SD)	*t*	*p*
Infant Temperament (IBQ-R VSF)	Surgency	3.7 (1.0)	4.1 (0.8)	1.59	.643
	Negative Affect	3.4 (0.9)	3.5 (0.9)	0.80	.741
	Effortful Control	5.0 (0.7)	4.7 (0.7)	-1.30	.856

As seen in Table 1**,** these tests indicate that mothers' in each group did not differ significantly for any demographic variables or for frequency of infant illness or discomfort over the past week.

Adult attachment style was assessed at baseline using the ECR-12. Mean Anxiety and Avoidance subscale scores and between-group comparisons of these scores are presented in Table 2. Due to non-normal distribution of scores, Mann-Whitney tests were used for between-group comparisons of both Anxiety and Avoidance scores. No significant between-group difference was found for either subscale (Anxiety: U = 459.00, p = .942; Avoidance: U = 340.00, p = .071).

Infant temperament was assessed using the IBQ-R VSF. Mean IBQ-R subscale scores for each condition are presented in Table 3. IBQ-R scores met assumptions of both normal distribution and homogeneity of variance. Independent t-tests found no significant difference between intervention and control IBQ-R VSF subscale scores (Surgency: $t(59) = 1.59$, p = .117; Negative Affect: $t(59) = .80$, p = .427; Effortful Control: $t(59) = -1.30$, p = .198).

Eleven mothers did not complete outcome measures at all three timepoints. Appendix Z shows comparisons of demographics and baseline outcome measure scores for participants who completed outcomes measures at all three timepoints vs. those who did not. Pearson's chi-square and Mann-Whitney tests found that mothers' in these two categories did not differ significantly on any demographic or baseline variables (Appendix Z).

Uptake

All intervention participants had used a sling in the past six weeks at both T2 and T3. At T2, 5/23 control participants (22%) had not used a sling in the past six weeks, decreasing to 2/26 (8%) at T3.

Figure 3 displays sling and pram use total frequency scores at T2 and T3 for each condition. These scores were calculated by assigning ordinal values to participants' responses and totalling these values.

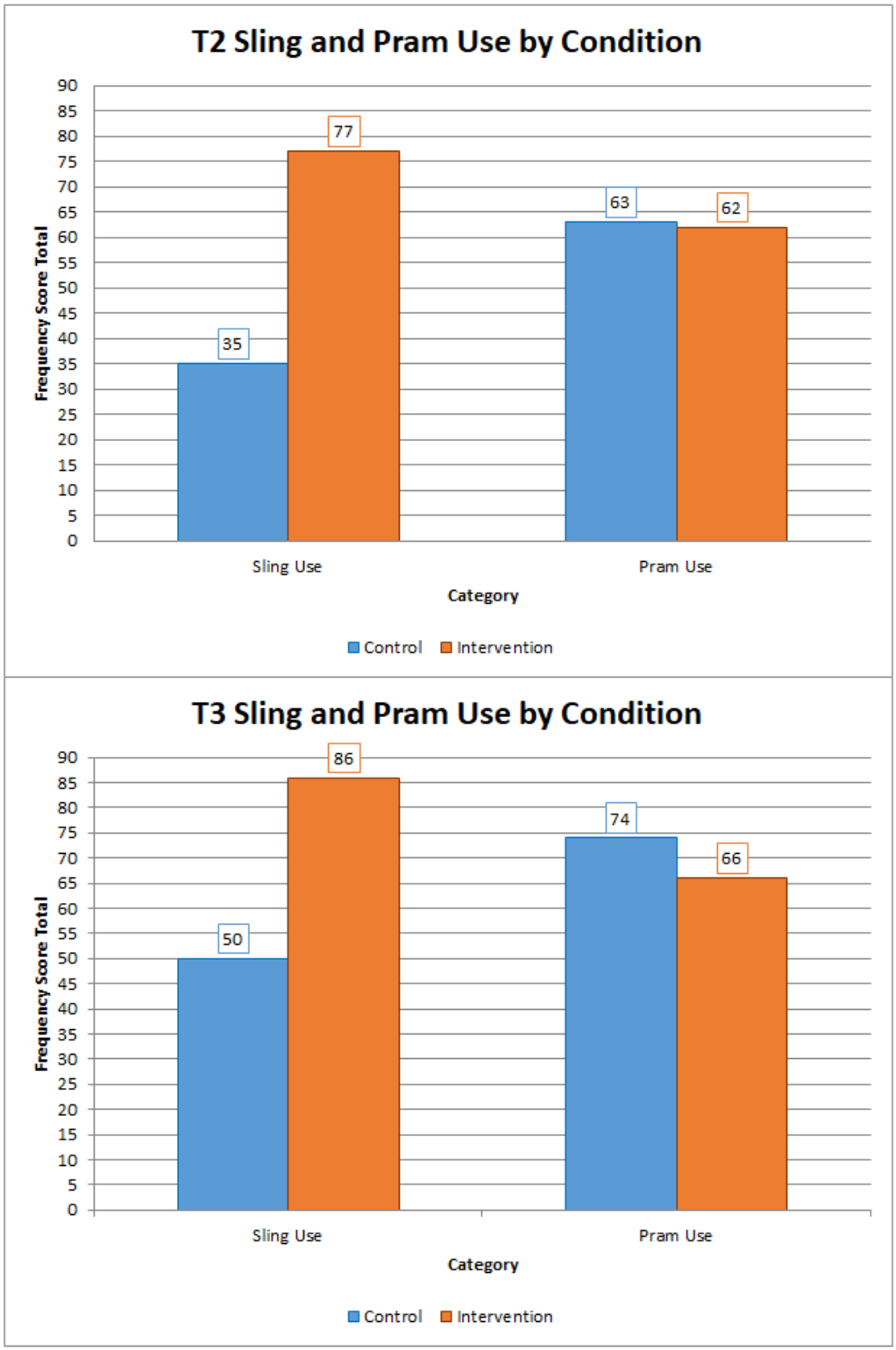

Figure 3. Total sling and pram use frequency scores at each timepoint by condition.

Sling and Pram Use. Mann-Whitney U tests found a significant between-group difference in sling use frequency both at T2 (U = 230.50, p < .001) and at T3 (U = 211.00, p < .001), with median scores higher for the intervention (Mdn = 3) than the control group (Mdn = 2) at both timepoints. Pram use also differed significantly between groups at T2 (U = 304.00, p = .012) and T3 (U = 260.50, p = .002), with median pram use frequency scores higher for control (Mdn = 3) than intervention participants (Mdn = 2) at both timepoints.

Use of Sling Library Services. Figure 4 shows total sling library use frequency scores for each condition, at T2 and T3.

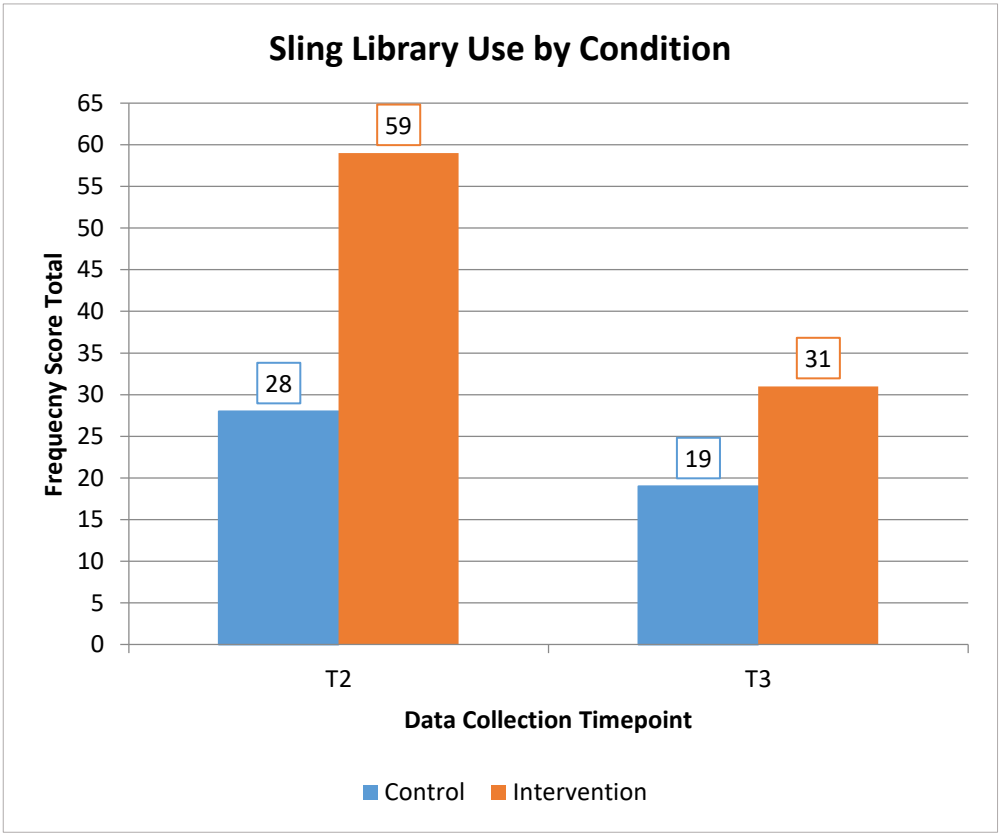

Figure 4. Total sling library use frequency scores at each timepoint by condition.

Mann Whitney tests found a significant between-group difference in participants' sling library use at T2 (U = 313.50, p = .023), but not T3 (U = 398.00, p =

.292), with median frequency scores 3 (intervention) and 0 (control), and 0.5 (intervention) and 0 (control) at T2 and T3, respectively.

Partner Sling, Pram and Sling Library Use. Appendix AA displays frequency scale totals for sling, pram and sling library use for participants' partners. No significant between-group differences in partner sling, pram or sling library use frequencies were found at either T2 (sling: $U = 381.00$, $p = .208$; pram: $U = 416.00$, $p = .438$; sling library: $U = 388.50$, $p = .174$) or T3 (sling: $U = 368.00$, $p = .141$; pram: $U = 402.50$, $p = .351$; sling library: $U = 419.00$, $p = .292$).

Effectiveness

Assumptions of normal distribution of the dependent variable and homogeneity of variance, and the presence of outliers, were checked prior to each analysis. All variables, including the EPDS, were found to have non-normal distributions at one or more timepoints, with the exception of the PSCS. All variables met the homogeneity of variance assumption. There were outliers present at one or more timepoints for the majority of variables, with the exception of the WEMWBS, PSCS, MPAS Quality of Attachment subscale, and stroking.

ANOVAs may be robust to non-normality and the presence of outliers, particularly if the homogeneity of variance assumption is met (Blanca et al., 2017). Thus in this study ANOVAs were still conducted, but with an understanding that in this circumstance a Type 1 error (false positive) is more likely to occur.

For the ANOVA in which the dependent variable was stroking, Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been violated ($\chi^2(2) = 0.58$, $p = .749$). For all other ANOVAs, this assumption was violated and the Greenhouse Geisser correction was used.

Participants' scores in each group did not differ significantly for any variables at baseline (as seen across Tables 1, 2, 4 and 6), including adult attachment style, infant

illness/discomfort, and infant temperament (at T3, Table 3), or for partner sling and sling library use at T2 and T3. Therefore it was not necessary to include any covariates within the analyses (Miller & Chapman, 2001).

Table 4 shows mean EPDS scores. A 2x3 mixed ANOVA was conducted in which mothers' EPDS scores were the dependent variable, condition was the between-subjects independent variable (intervention vs. control), and time was the within-subjects independent variable (T1,T2, T3).

Table 4

Postnatal Depression Score Means

		Intervention Group (n = 32)	Control Group (n = 29)
Variable	Timepoint	Mean (SD)	Mean (SD)
Postnatal Depression (EPDS)	T1	8.0 (4.5)	7.2 (4.1)
	T2	7.1 (5.4)	5.7 (4.0)
	T3	6.4 (3.5)	7.1 (2.5)

This ANOVA found no significant main effects for either time (F(1.68, 98.98) = 2.33, p = .111) or condition (F(1, 59) = 0.36, p = .553), and no significant time*condition interaction (F(1.68, 98.98) = 1.85, p = .169). Follow-up comparisons of estimated marginal means (EMMs) were conducted for EPDS scores at each timepoint and are presented in Table 5. As Table 5 shows, no significant between-group differences were found for these EMMs at any timepoint.

Table 5

Summary and Pairwise Comparison of EPDS Estimated Marginal Means

Variable	Timepoint	Intervention Group (n = 32) Mean	SE	Control Group (n = 29) Mean	SE	Mean Difference	p
Postnatal Depression (EPDS)	T1	8.0	0.8	7.2	0.8	0.73	.514
	T2	7.1	0.8	5.7	0.9	1.45	.240
	T3	6.4	0.5	7.1	0.6	0.70	.381

Table 6

Summaries and Comparisons of Secondary Outcome Scores

Variable	Subscale	Timepoint	Intervention Group (n = 32) Mean (SD)	Control Group (n = 29) Mean (SD)	t or U	p
Mental health (DASS21)	Depression	T1	5.0 (4.7)	4.5 (3.9)	449.50	.832
		T3	4.5 (5.7)	5.2 (6.0)	437.50	.692
	Anxiety	T1	5.8 (6.8)	4.3 (3.6)	448.00	.814
		T3	3.7 (4.6)	2.9 (3.0)	462.50	.982
	Stress	T1	13.3 (9.1)	11.4 (6.7)	426.50	.587
		T3	11.4 (8.8)	13.5 (8.9)	389.50	.280

Wellbeing (WEMWBS)		T1	49.6 (8.0)	50.6 (8.5)	397.00	.333
		T3	53.0 (8.9)	50.3 (9.9)	-1.08	.283
	Quality of Attachment	T1	39.3 (4.5)	39.7 (6.0)	394.00	.309
		T3	40.0 (4.2)	40.4 (4.3)	417.50	.499
Mother-child relationship (MPAS)	Absence of Hostility	T1	20.0 (2.5)	20.3 (3.6)	411.00	.443
		T3	18.4 (3.1)	18.4 (3.7)	-0.01	.993
	Pleasure in Interaction	T1	22.0 (2.7)	21.4 (4.2)	462.50	.982
		T3	22.6 (2.4)	20.9 (3.9)	345.50	.083
Parental self-efficacy (PSCS)		T1	29.9 (4.5)	31.2 (3.1)	393.00	.302
		T3	78.5 (8.9)	73.9 (9.7)	-1.93	.059
Perceived social support (SPS)		T1	71.1 (10.6)	72.2 (1.9)	0.42	.675
		T3	30.2 (3.3)	30.3 (4.1)	423.00	.551
Maternal stroking of infant		T1	12.5 (2.9)	12.7 (2.4)	440.50	.731
		T2	12.7 (2.6)	12.4 (2.7)	435.00	.672
		T3	13.6 (2.5)	13.0 (2.5)	392.50	.296

Table 6 shows mean scores for secondary measures across the timepoints and the results of between-group comparisons of these scores. Independent t-tests and Mann Whitney U tests found no significant between-group differences for any secondary measure scores at any timepoint.

2x2 mixed ANOVAs were conducted for scores on these secondary outcome measures, including DASS-21 subscale, WEMWBS, SPS, PSCS, MPAS subscale and stroking scores. For these ANOVAs, time (T1, T3) and condition (intervention vs. control) were again the within- and between-subject independent variables, respectively.

No significant effects were shown for DASS-21 depression or stress subscale scores (Depression: time: $F(1, 59) = 0.03$, $p = .861$; condition: $F(1, 59) = 0.01$, $p = .919$; time*condition: $F(1, 59) = 0.73$, $p = .396$; Stress: (time: $F(1, 59) = 0.01$, $p = .939$; condition: $F(1, 59) = 0.00$, $p = .952$; time*condition: $F(1, 59) = 2.41$, $p = .126$), WEMWBS scores (time: $F(1, 59) = 1.87$, $p = .177$; condition: $F(1, 59) = 0.17$, $p = .684$; time*condition: $F(1, 59) = 2.48$, $p = .121$), SPS scores (time: $F(1, 59) = 0.37$, $p = .544$; condition: $F(1, 59) = 0.80$, $p = .374$; time*condition: $F(1, 59) = 1.50$, $p = .225$), or scores on the Quality of Attachment or Pleasure in Interaction subscales of the MPAS (Quality of Attachment: time: $F(1, 59) = 1.31$, $p = .257$; condition: $F(1, 59) = 0.16$, $p = .696$; time*condition: $F(1, 59) = 0.00$, $p = .982$; Pleasure in Interaction: time: $F(1, 59) = 0.01$, $p = .913$; condition: $F(1, 59) = 2.12$, $p = .150$; time*condition: $F(1, 59) = 1.51$, $p = .223$).

A significant main effect of time was shown for stroking ($F(1, 59) = 3.47$, $p = .34$), the anxiety DASS21 subscale ($F(1, 59) = 5.13$, $p = .27$), the MPAS Absence of Hostility subscale ($F(1, 59) = 21.41$, $p < .01$), and the PSCS ($F(1, 59) = 11.57$, $p < .01$), such that maternal stroking of infants and self-efficacy were found to significantly increase, whilst anxiety and absence of hostility were found to significantly decrease,

over time for both conditions. For parental self-efficacy scores, a significant time*condition interaction was shown ($F(1, 59) = 4.64$, $p = .35$). Examination of means and profile plots indicate that mean PSCS scores for the intervention group showed a significantly greater increase than control PSCS scores (Figure 5).

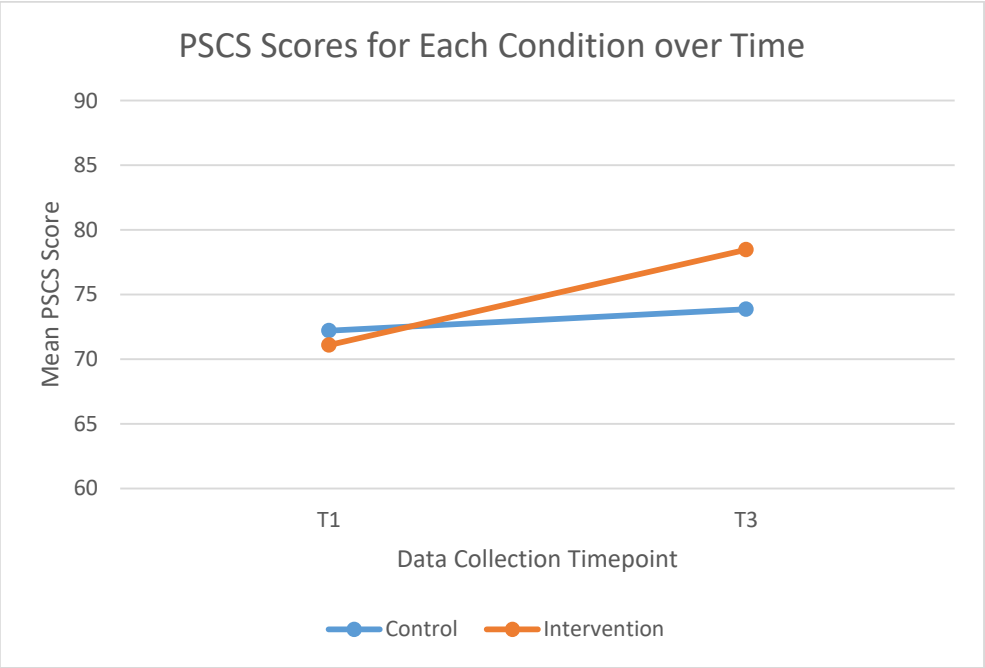

Figure 5. Mean PSCS scores by condition at T1 and T3.

Acceptability

Twenty-nine intervention and eight control participants completed qualitative questions at T3. Responses were coded, with codes clustered into a priori themes taken from Sekhon et al.'s model of acceptability (Appendix Y; Sekhon et al., 2017). Appendix AB shows example participant statements for each theme.

Burden. Sekhon defines "burden" as the perceived effort of participation. Eight participants described participation in the study as "not a problem" and the outcome measures as "ok" to complete. In contrast three participants described the outcome measures as "long", repetitive, or onerous to complete. 13 participants described using a sling as "easy", whilst another eight reported that using a sling was difficult at first, but became easier over time.

Affective Attitude. "Affective Attitude" refers to the feelings expressed by participants towards the study. 24 participants expressed positive feelings ("interesting", "enjoyable") towards study participation, or using a sling or the sling library.

Ethicality. "Ethicality" is the extent to which the study fits with participants' values. 12 participants reported that it felt positive to contribute to research. 14 participants reported that completing the outcome measures offered them the opportunity to reflect on their mental health and experiences of motherhood. Whilst the majority of participants spoke about this as a positive, two mothers found it distressing.

Intervention Coherence. "Intervention Coherence" refers to participants' understanding of the intervention. Most participants did not comment on their understanding of the intervention or of the study as a whole. However participants described the sling library sessions as informative or helpful when learning to use their sling (n = 19). One participant described specific outcome measure questions as "confusing".

Opportunity Costs. Sekhon described "Opportunity Costs" as the extent to which participants gave up benefits or values to engage in the intervention (study). Participants appeared to report gains rather than losses, such as gaining free sling hire (n = 7), being made aware of the sling library (n = 6), and the practical benefits and increased freedom of using a sling (n = 13). Some participants reported wanting more sling options (n = 8) and one-to-one sling library consultations or further sessions (n = 9), to be included in the intervention.

Perceived Effectiveness. "Perceived Effectiveness" is the extent to which participants view the intervention as likely to achieve its purpose. Participants described the sling and support intervention as useful or helpful (n = 11) and sling

library staff as friendly and knowledgeable (n = 16). Participants listed a number of positive effects of the intervention, including: their baby enjoying being in the sling and being easier to soothe or settle when in the sling (n = 14), feeling closer, or bonding, with their baby, feeling more confident as a parent (n = 20), and the opportunity to meet other parents (n = 10). 24 participants reported positive and effective experiences of the sling library specifically. Eight described their sling library session as rushed or overwhelming.

Self-Efficacy. Self-efficacy refers to participants' confidence in their ability to implement the intervention. Attending the sling library session and practice were described by participants as helpful for building confidence in using a sling (n = 8).

Discussion

This study explored whether it is feasible and acceptable to conduct a randomised trial examining whether sling use and support impacts upon maternal mental health and wellbeing. This study aimed to support the design of a future RCT through the assessment of feasibility indicators (recruitment, attrition), acceptability, and preliminary effectiveness data.

Both eligibility and consent rates (96% and 77%, respectively) were found to meet this study's feasibility objectives, indicating that mothers of newborns are able and willing to participate in a sling and support intervention trial. While this study's consent rate is similar to rates seen in feasibility studies of other close body contact interventions, such Kangaroo Mother Care (Kadam et al., 2005), or maternal stroking (Sharp et al., 2012), the eligibility rate is higher than rates seen in studies of other psychosocial interventions (Milgrom et al., 2015; Tsivos et al., 2015). In this study, eligibility criteria were included on recruitment materials, perhaps increasing the likelihood that mothers contacting the research team would be eligible to participate.

The majority of participants completed measures at all three timepoints across 12 weeks, however attrition was higher than 15%. This rate is comparable to that seen in Neu and Robinson's study, which also took place within a community setting, and examined the impact of skin-to-skin contact upon mother-infant interactions across six months (Neu & Robinson, 2010). Hospital-based studies of close body contact interventions appear to show lower rates of attrition (Cho et al., 2016; de Macedo et al., 2007; Lee & Bang, 2011). It is not possible to suggest effective methods for promoting participant engagement and retention in future sling studies on the basis of this study. This is because, for the majority of mothers who did not consent to participate or discontinued participation, information was not gathered regarding reasons for non-consent or discontinuation. In total, less than 20% of data was missing at the point of analysis, indicating that a full-scale RCT may be feasible (Bryant et al., 2018).

Preliminary effectiveness analyses found no significant impact of the sling and support intervention upon maternal mental health, wellbeing or parenting outcomes, other than a positive association with parental self-efficacy. Other than this association between the intervention and maternal confidence, these quantitative findings do not reflect qualitative feedback from participants, who spoke about enjoying using the sling and sling library services, and attributed improvements in their relationship with their baby, and increased autonomy and social engagement, to the sling and support intervention.

This contrast between quantitative and qualitative results may reflect that this feasibility study was not designed to be powered sufficiently to show significant effects of the sling and support intervention upon outcome measure scores (Arain et al., 2010). Still, it should be noted that the effects seen, though small (d = .23) and non-significant, were in the expected direction, with intervention participants showing

lower mean EPDS scores at T3 than control participants. A study with a larger sample may be more able to capture the outcomes reported within the qualitative feedback, and to show a statistically significant relationship between a sling and support intervention, and maternal psychological outcomes.

There were no difficulties found regarding engaging mothers in the intervention group with the sling and support intervention. This is in contrast to Bigelow and Power's study of the impact of SSC upon mother-infant interaction, in which 33% of participants in a skin-to-skin contact intervention condition were excluded from the study due to poor treatment adherence (Bigelow & Power, 2012). Most control participants also engaged in sling use and accessed sling library services, but to a lesser extent than mothers in the intervention group. These findings indicate that mothers may be motivated to use slings without encouragement or support, but implementing a sling and support resource can be helpful in supporting mothers to use slings.

The majority of participants appear to have found the sling and support intervention, and the study as whole, acceptable. Participants appeared to value contributing to research in this area, and also the apparent benefits of the sling for their baby (e.g. being easier to soothe, sleeping more) or for themselves (increased autonomy, feeling closer to their baby and less anxious as a parent, meeting other parents). A number of participants wished for greater one-to-one sling library input as part of the intervention, with some describing the drop-in session as busy or rushed. Within this study, mothers in the intervention group had been encouraged to access further sling library services if they wished, but did not seem to do so often. It may be that participants are more likely to access further services within this context if they are formally invited to sessions or groups.

In terms of the outcome measures, a number of participants appeared to view completing the measures as a valuable opportunity to reflect on their mental health and their relationship with their child. A small minority found completing the measures distressing, confusing or onerous. It seems likely that the process of gaining feedback regarding possible outcome measure batteries from a service user involvement group contributed to the acceptability of these measures within this study (Staley et al., 2013).

Overall the majority of participants reported positive feelings regarding their participation in the study, using a sling, or accessing sling library services, with very few mothers describing participation as onerous or distressing. However it must be noted that this feedback is gained exclusively from participants who completed the study with minimal information collected from those that discontinued participation. Nevertheless, this study indicates that sling use with support may be viewed by mothers as an acceptable psychosocial intervention for mood or wellbeing following birth, should future studies establish a significant positive impact of sling use and support upon maternal mental health.

Limitations

This study has a number of limitations. Due to the study design, it was not possible to provide screening rates or comment on reasons for discontinuation. Without this information it is difficult to understand barriers to engagement within this research area. Moreover, qualitative feedback was only provided by those who completed the study. It is likely that this biases findings with regards to the acceptability of the study.

A volunteer sampling method was utilised. Social media and word-of-mouth were found to be effective recruitment strategies. However, the use of such methods increases the risk of selection bias and of contamination between conditions, with

intervention participants perhaps discussing slings and the sling library with control participants. Indeed the majority of participants were from a similar demographic background (White British, educated, high annual income) and some mothers knew each other through community or parenting groups. This also increased the risk of social desirability effects upon study results. The presence of selection bias and contamination brings into question the validity and generalisability of the results of this study. To reduce the risk of selection bias, it would have been better to utilise a random sampling method across several, demographically diverse, locations and settings. Moreover, in a future RCT, cluster randomisation methods may be used to reduce the risk of contamination (Magill et al., 2019).

The use of a Likert scale-based idiographic measure to record frequency of participant sling, pram and sling library use, limits the extent to which participants' use of these resources was accurately captured. For example, within the sling and pram use Likert scales, response options went from "a few times" to "once a day" with regards to frequency of use over the past six weeks. Participants using a sling about once a week would have to choose between these two options, neither of which truly reflects this frequency. Asking participants to keep a diary of time spent using their sling, and accessing sling library services (including online services, e.g. their social media page), may have better captured participants' sling and sling library use, as mothers would not have been required to choose between set response options which may not be reflective of their actual frequency of sling or support use.

The intervention received within this study was matched to the service that mothers typically receive when accessing slings via a sling library, promoting the ecological validity of this study's results. However as such, no steps were taken to ensure that the sling and support intervention was standardised across participants other than providing the sling library with a session checklist to use. Fidelity to the

intervention model outlined by this checklist was not monitored (e.g. by recording and rating library sessions for fidelity to the checklist). This makes it more difficult to attribute any effects seen to the intervention, and will have increased the likelihood of a Type 1 error. Future studies may wish to consider developing a manualised sling intervention, within a one-to-one or group setting (rather than a drop-in session as seen in this study), and monitoring fidelity to the treatment model, in order to support standardisation of the intervention across participants. Such an approach may minimise the risk of Type 1 error, but would have more limited ecological validity than this study.

Lastly, this study examined only maternal outcomes. However fathers are often primary caregivers also, and are using slings (Russell, 2015). It may be that a sample of both mothers and fathers better captures the impact of sling use and support upon psychological outcomes.

Recommendations

- Using information gathered from this study to calculate parameters, a larger, appropriately powered, study should be conducted in order to effectively examine the impact of a sling and support intervention upon maternal psychological outcomes within the community.
- Future studies may wish to utilise a manualised sling intervention, and to take steps to monitor adherence to the intervention model, in order to support standardisation of the intervention across participants.
- This study was limited in the extent to which it recorded reasons for participant non-consent or discontinuation. Future studies in this area should work to gather such information so that barriers to engagement may be better understood.

- Implementation of a “sling and support” model, similar to the intervention seen in this study, may be helpful in promoting sling use. In a future RCT, a model such as this may support participant engagement in a sling intervention condition.
- Future research should consider the method by which sling use is reported. It may be better to ask mothers to record hours using a sling, rather than using a frequency-based Likert-scale.
- Future studies may find it helpful to test proposed batteries of outcome measures with a focus group of mothers, in order to increase the likelihood that the measures used within the study will be acceptable, appropriate and relevant.
- Future research should examine the impact of sling use and support upon paternal, as well as maternal, psychological outcomes, as fathers may also be a primary caregiver.

Conclusions

Overall, this study found it feasible to recruit mothers of young infants, to implement a sling use and support intervention within the community, and to collect relevant outcome data. There were a number of limitations to this study, particularly with regards to the sampling methods employed and difficulties around standardisation of the intervention across participants. Nevertheless, it is hoped that the information gathered in this study supports the design of a future RCT; particularly as qualitative feedback from participants indicates that sling use and support may be an acceptable psychosocial intervention for mothers, should it be found to significantly improve maternal mental health.

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Appendix A

Model of Feasibility (Peters et al., 2013)

Table 1| **Implementation outcome variables**

Implementation outcome	Working definition*	Related terms†
Acceptability	The perception among stakeholders (for example, consumers, providers, managers, policy makers) that an intervention is agreeable	Factors related to acceptability (for example, comfort, relative advantage, credibility)
Adoption	The intention, initial decision, or action to try to employ a new intervention	Uptake, utilisation, intention to try
Appropriateness	The perceived fit or relevance of the intervention in a particular setting or for a particular target audience (for example, provider or consumer) or problem	Relevance, perceived fit, compatibility, perceived usefulness or suitability
Feasibility	The extent to which an intervention can be carried out in a particular setting or organisation	Practicality, actual fit, utility, trialability
Fidelity	The degree to which an intervention was implemented as it was designed in an original protocol, plan, or policy	Adherence, delivery as intended, integrity, quality of programme delivery, intensity or dosage of delivery
Implementation cost	The incremental cost of the implementation strategy (for example, how the services are delivered in a particular setting). The total cost of implementation would also include the cost of the intervention itself	Marginal cost, total cost‡
Coverage	The degree to which the population that is eligible to benefit from an intervention actually receives it.	Reach, access, service spread or effective coverage (focusing on those who need an intervention and its delivery at sufficient quality, thus combining coverage and fidelity), penetration (focusing on the degree to which an intervention is integrated in a service setting)
Sustainability	The extent to which an intervention is maintained or institutionalised in a given setting	Maintenance, continuation, durability, institutionalisation, routinisation, integration, incorporation

Adapted from references 6 and 33.

*Original definitions referred to individual "innovations or evidence-based practices." This table uses the term "intervention" so that the definitions are more broadly applicable to programmes and policies. The original authors used the term "penetration" rather than "coverage."

†Other terms are more commonly found in implementation literature on large scale programmes and policies.[8,34-36]

‡Cost data also provide numerators for measures of efficiency and specifically measures of cost-utility, cost-benefit, or cost effectiveness.

Appendix B

Recruitment Materials

B.1: Recruitment Poster.

The University Of Sheffield.

Sheffield Sling Surgery

Participants Needed - Free Sling Hire!

We are seeking volunteers for a **maternal mental health and wellbeing** research project.

We are looking for women who are due to give birth between February 2019 and July 2019, and who have not used a baby sling before.

We want to see if using a sling might influence your mood, your general wellbeing, or your parenting experiences.

If you agree to participate:

- When your child is born, we would ask you to complete a set of online questionnaires 3 times over the course of 12 weeks.
- We would need you to travel to the Sheffield Sling Surgery for a one-off session where you will learn how to safely use a sling and be given a sling to hire for free for the duration of the study.
- You would be randomly assigned to one of two groups. For one group you will be asked to attend this session when your child is between 0 and 6 weeks old. If you are in the other group you will be asked to attend when your child is between 12 and 18 weeks old.

If you or anyone you know might be interested in participating, to learn more about it please email Helen Wigglesworth (Trainee Clinical Psychologist and Principal Investigator) at:

hmwigglesworth1@sheffield.ac.uk

Contacting us in no way commits you to participate. And if you do agree to take part in this study, you can stop participating at any time.

This study has been approved by the University of Sheffield's Ethics Committee, reference XXXX .

B.2: Recruitment Flyer (Double-Sided A5)

The University Of Sheffield.

Sheffield Sling Surgery

Participants Needed - Free Sling Hire!

We are seeking volunteers for a **maternal mental health and wellbeing** research project.

We are looking for women who are due to give birth between February 2019 and July 2019, and who have not used a baby sling before.

We want to see if using a sling might influence your mood, your general wellbeing, or your parenting experiences.

If you agree to participate:

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If you, or anyone you know, might be interested in participating, to learn more about it please email Helen Wigglesworth (Trainee Clinical Psychologist and Principal Investigator) at:

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Appendix C

Edinburgh Postnatal Depression Scale

(EPDS; Cox et al., 1987)

As you are pregnant or have recently had a baby, we would like to know how you are feeling. Please check the answer that comes closest to how you have felt **IN THE PAST 7 DAYS**, not just how you feel today.

Here is an example, already completed.

I have felt happy:
- ☐ Yes, all the time
- ☒ Yes, most of the time — This would mean: "I have felt happy most of the time" during the past week.
- ☐ No, not very often — Please complete the other questions in the same way.
- ☐ No, not at all

In the past 7 days:

1. I have been able to laugh and see the funny side of things
   - ☐ As much as I always could
   - ☐ Not quite so much now
   - ☐ Definitely not so much now
   - ☐ Not at all

2. I have looked forward with enjoyment to things
   - ☐ As much as I ever did
   - ☐ Rather less than I used to
   - ☐ Definitely less than I used to
   - ☐ Hardly at all

*3. I have blamed myself unnecessarily when things went wrong
   - ☐ Yes, most of the time
   - ☐ Yes, some of the time
   - ☐ Not very often
   - ☐ No, never

4. I have been anxious or worried for no good reason
   - ☐ No, not at all
   - ☐ Hardly ever
   - ☐ Yes, sometimes
   - ☐ Yes, very often

*5 I have felt scared or panicky for no very good reason
   - ☐ Yes, quite a lot
   - ☐ Yes, sometimes
   - ☐ No, not much
   - ☐ No, not at all

*6. Things have been getting on top of me
   - ☐ Yes, most of the time I haven't been able to cope at all
   - ☐ Yes, sometimes I haven't been coping as well as usual
   - ☐ No, most of the time I have coped quite well
   - ☐ No, I have been coping as well as ever

*7 I have been so unhappy that I have had difficulty sleeping
   - ☐ Yes, most of the time
   - ☐ Yes, sometimes
   - ☐ Not very often
   - ☐ No, not at all

*8 I have felt sad or miserable
   - ☐ Yes, most of the time
   - ☐ Yes, quite often
   - ☐ Not very often
   - ☐ No, not at all

*9 I have been so unhappy that I have been crying
   - ☐ Yes, most of the time
   - ☐ Yes, quite often
   - ☐ Only occasionally
   - ☐ No, never

*10 The thought of harming myself has occurred to me
   - ☐ Yes, quite often
   - ☐ Sometimes
   - ☐ Hardly ever
   - ☐ Never

Appendix D

Idiographic Sling, Pram and Sling Library Use Measure

Sling Use and Access to Sling Surgery Services

Over the past 6 weeks, how often would you say that you have used your sling?

- ☐ Not at all
- ☐ Once or twice
- ☐ A few times
- ☐ About once a day
- ☐ About twice or three times a day
- ☐ More than three times a day

Over the past 6 weeks, how often would you say that you have used a pram or buggy (or similar)?

- ☐ Not at all
- ☐ Once or twice
- ☐ A few times
- ☐ About once a day
- ☐ About twice or three times a day
- ☐ More than three times a day

Over the past 6 weeks, how often would you say that you have accessed the sling library services (either online, in person, or other)?

- ☐ Not at all
- ☐ Once
- ☐ Two or three times
- ☐ About once a week
- ☐ About twice a week
- ☐ Generally more than three times a week
- ☐ Daily

You will be now be asked the same questions again, but about your partner:

Over the past 6 weeks, how often would you say that your partner has used the sling?

- ☐ Not at all
- ☐ Once or twice
- ☐ A few times
- ☐ About once a day
- ☐ About twice or three times a day
- ☐ More than three times a day
- ☐ N/A

Over the past 6 weeks, how often would you say that your partner has used a pram or buggy (or similar)?

- ☐ Not at all
- ☐ Once or twice
- ☐ A few times

- ☐ About once a day
- ☐ About twice or three times a day
- ☐ More than three times a day
- ☐ N/A

Over the past 6 weeks, how often would you say that your partner has accessed the sling library services (either online, in person, or other)?

- ☐ Not at all
- ☐ Once
- ☐ Two or three times
- ☐ About once a week
- ☐ About twice a week
- ☐ Generally more than three times a week
- ☐ Daily
- ☐ N/A

Over the past six weeks, have you needed to swap your sling for a different one, and if so, how many times have you swapped slings?

- ☐ I have not swapped slings.
- ☐ Yes, I have swapped slings once.
- ☐ Yes, I have swapped slings twice.
- ☐ Yes, I have swapped slings three times.
- ☐ Yes, I have swapped slings more than three times.

Appendix E

Depression Anxiety and Stress Scales-21 (DASS-21; Lovibond & Lovibond, 1995)

DASS21

Name:

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you *over the past week*. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

0 Did not apply to me at all
1 Applied to me to some degree, or some of the time
2 Applied to me to a considerable degree, or a good part of time
3 Applied to me very much, or most of the time

1	I found it hard to wind down	0 3	1	2
2	I was aware of dryness of my mouth	0 3	1	2
3	I couldn't seem to experience any positive feeling at all	0 3	1	2
4	I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)	0 3	1	2
5	I found it difficult to work up the initiative to do things	0 3	1	2
6	I tended to over-react to situations	0 3	1	2
7	I experienced trembling (eg, in the hands)	0 3	1	2
8	I felt that I was using a lot of nervous energy	0 3	1	2
9	I was worried about situations in which I might panic and make a fool of myself	0 3	1	2
10	I felt that I had nothing to look forward to	0 3	1	2
11	I found myself getting agitated	0 3	1	2
12	I found it difficult to relax	0 3	1	2
13	I felt down-hearted and blue	0 3	1	2
14	I was intolerant of anything that kept me from getting on with	0 3	1	2

	what I was doing			
15	I felt I was close to panic	03	1	2
16	I was unable to become enthusiastic about anything	03	1	2
17	I felt I wasn't worth much as a person	03	1	2
18	I felt that I was rather touchy	03	1	2
19	I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)	03	1	2
20	I felt scared without any good reason	03	1	2
21	I felt that life was meaningless	03	1	2

Appendix F

Warwick Edinburgh Mental Wellbeing Scale (WEMWBS; Tennant et al., 2007)

Below are some statements about feelings and thoughts.

Please tick (√) the box that best describes your experience of each over the **last 2 weeks.**

STATEMENTS	None of the Time	Rarely	Some of the time	Often	All of the time
I've been feeling optimistic about the Future	1	2	3	4	5
I've been feeling useful	1	2	3	4	5
I've been feeling relaxed	1	2	3	4	5
I've been feeling interested in other People	1	2	3	4	5
I've had energy to spare	1	2	3	4	5
I've been dealing with problems well	1	2	3	4	5
I've been thinking clearly	1	2	3	4	5
I've been feeling good about myself	1	2	3	4	5
I've been feeling close to other People	1	2	3	4	5
I've been feeling confident	1	2	3	4	5
I've been able to make up my own mind about things	1	2	3	4	5
I've been feeling loved	1	2	3	4	5
I've been interested in new things	1	2	3	4	5
I've been feeling cheerful	1	2	3	4	5

Appendix G

Parenting Sense of Competency Scale (PSCS; Gibaud-Wallston & Wandersman, 1978)

Please rate the extent to which you agree or disagree with each of the following statements.

Strongly Disagree	Somewhat Disagree	Disagree	Agree	Somewhat Agree	Strongly Agree
1	2	3	4	5	6

1. The problems of taking care of a child are easy to solve once you know how your actions affect your child, an understanding I have acquired. 1 2 3 4 5 6
2. Even though being a parent could be rewarding, I am frustrated now while my child is at his / her present age. 1 2 3 4 5 6
3. I go to bed the same way I wake up in the morning, feeling I have not accomplished a whole lot. 1 2 3 4 5 6
4. I do not know why it is, but sometimes when I'm supposed to be in control, I feel more like the one being manipulated. 1 2 3 4 5 6
5. My mother was better prepared to be a good mother than I am. 1 2 3 4 5 6
6. I would make a fine model for a new mother to follow in order to learn what she would need to know in order to be a good parent. 1 2 3 4 5 6
7. Being a parent is manageable, and any problems are easily solved. 1 2 3 4 5 6
8. A difficult problem in being a parent is not knowing whether you're doing a good job or a bad one. 1 2 3 4 5 6
9. Sometimes I feel like I'm not getting anything done. 1 2 3 4 5
10. I meet by own personal expectations for expertise in caring for my child. 1 2 3 4 5 6
11. If anyone can find the answer to what is troubling my child, I am the one. 1 2 3 4 5 6
12. My talents and interests are in other areas, not being a parent. 1 2 3 4 5 6
13. Considering how long I've been a mother, I feel thoroughly familiar with this role. 1 2 3 4 5 6
14. If being a mother of a child were only more interesting, I would be motivated to do a better job as a parent. 1 2 3 4 5 6
15. I honestly believe I have all the skills necessary to be a good mother to my child. 1 2 3 4 5 6
16. Being a parent makes me tense and anxious. 1 2 3 4 5 6

Appendix H

Maternal Postnatal Attachment Scale (Condon & Corkindale, 1998)

These questions are about your thoughts and feelings about your baby. Please tick one box only in answer to each question.

PM1 When I am caring for the baby, I get feelings of annoyance or irritation:

□ Very frequently

□ Frequently

□ Occasionally

□ Very rarely

□ Never

PM2 When I am caring for the baby I get feelings that the child is deliberately being difficult or trying to upset me:

□ Very frequently

□ Frequently

□ Occasionally

□ Very rarely

□ Never

PM3 Over the last two weeks I would describe my feelings for the baby as:

□ Dislike

□ No strong feelings towards the baby

□ Slight affection

□ Moderate affection

□ Intense affection

PM4 Regarding my overall level of interaction with the baby I:

□ Feel very guilty that I am not more involved

□ Feel moderately guilty that I am not more involved

□ Feel slightly guilty that I am not more involved

□ I don’t have any guilty feelings regarding this

PM5 When I interact with the baby I feel:

□ Very incompetent and lacking in confidence

□ Moderately incompetent and lacking in confidence

□ Moderately competent and confident

□ Very competent and confident

PM6 When I am with the baby I feel tense and anxious:

□ Very frequently

□ Frequently

□ Occasionally

□ Almost never

PM7 When I am with the baby and other people are present, I feel proud of the baby:

□ Very frequently

□ Frequently

□ Occasionally

□ Almost never

PM8 I try to involve myself as much as I possibly can PLAYING with the baby:

□ This is true

□ This is untrue

PM9 When I have to leave the baby:

□ I usually feel rather sad (or it's difficult to leave)

□ I often feel rather sad (or it's difficult to leave)

□ I have mixed feelings of both sadness and relief

□ I often feel rather relieved (and it's easy to leave)

□ I usually feel rather relieved (and it's easy to leave)

PM10 When I am with the baby:

□ I always get a lot of enjoyment/satisfaction

□ I frequently get a lot of enjoyment/satisfaction

□ I occasionally get a lot of enjoyment/satisfaction

□ I very rarely get a lot of enjoyment/satisfaction

PM11 When I am not with the baby, I find myself thinking about the baby:

□ Almost all the time

□ Very frequently

□ Frequently

□ Occasionally

□ Not at all

PM12 When I am with the baby:

□ I usually try to prolong the time I spend with him/her

□ I usually try to shorten the time I spend with him/her

PM13 When I have been away from the baby for a while and I am about to be with him/her again, I usually feel:

□ Intense pleasure at the idea

□ Moderate pleasure at the idea

□ Mild pleasure at the idea

□ No feelings at all about the idea

□ Negative feelings about the idea

PM14 I now think of the baby as:

□ Very much my own baby

□ A bit like my own baby

□ Not yet really my own baby

PM15 Regarding the things that we have had to give up because of the baby:

□ I find that I resent it quite a lot

□ I find that I resent it a moderate amount

□ I find that I resent it a bit

□ I don't resent it at all

PM16 Over the past three months, I have felt that I do not have enough time for myself or to pursue my own interests:

□ Almost all the time

□ Very frequently

□ Occasionally

□ Not at all

PM17 Taking care of this baby is a heavy burden of responsibility. I believe this is:

□ Very much so

□ Somewhat so

□ Slightly so

□ Not at all

PM18 I trust my own judgement in deciding what the baby needs:

□ Almost never

□ Occasionally

□ Most of the time

□ Almost all the time

PM19 Usually when I am with the baby:

□ I am very impatient

□ I am a bit impatient

□ I am moderately patient

□ I am extremely patient

Appendix I

Short Version of the Social Provisions Scale (Russell & Cutrona, 1984)

As Presented in Cutrona & Troutman, 1986.

“Each item was rated on a 7-point scale (from "Not at all true" to "Completely true"). Items included in the short version were:

I can always depend on my family to help me if I really need it.

I have friends who enjoy the same activities I do.

I don't think people at work, school, or in groups I belong to know and value me.

There is a trustworthy person I could turn to for advice if I were having problems.

There is no one who really relies on me for their well-being.”

Appendix J

Maternal Stroking questions as seen in Sharp et al., 2012

The Parent-Infant Caregiving Touch Scale (Subset of Items)

1. How often do you stroke your baby's face?
☐ Never
☐ Rarely
☐ Sometimes
☐ Often
☐ A lot

2. How often do you stroke your baby's back?
☐ Never
☐ Rarely
☐ Sometimes
☐ Often
☐ A lot

3. How often do you stroke your baby's tummy?
☐ Never
☐ Rarely
☐ Sometimes
☐ Often
☐ A lot

4. How often do you stroke your baby's arms and legs?
☐ Never
☐ Rarely
☐ Sometimes
☐ Often
☐ A lot

Appendix K

Idiographic Feeding Method Question

How do you feed your baby? (We're interested in their milk feeds only, not solids)

- ☐ Formula feed
- ☐ Breastfeed
- ☐ Both formula feed and breastfeed

Appendix L

Experiences in Close Relationships Scale-12

(ECR-12; Lafontaine et al., 2016)

Experiences in Close Relationship Scale-Short Form (ECR-S)

Instruction: The following statements concern how you feel in romantic relationships. We are interested in how you generally experience relationships, not just in what is happening in a current relationship. Respond to each statement by indicating how much you agree or disagree with it. Mark your answer using the following rating scale:

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

1. It helps to turn to my romantic partner in times of need.

2. I need a lot of reassurance that I am loved by my partner.

3. I want to get close to my partner, but I keep pulling back.

4. I find that my partner(s) don't want to get as close as I would like.

5. I turn to my partner for many things, including comfort and reassurance.

6. My desire to be very close sometimes scares people away.

7. I try to avoid getting too close to my partner.

8. I do not often worry about being abandoned.

9. I usually discuss my problems and concerns with my partner.

10. I get frustrated if romantic partners are not available when I need them.

11. I am nervous when partners get too close to me.

12. I worry that romantic partners won't care about me as much as I care about them.

Appendix M

Infant Behaviour Questionnaire-Revised Very Short Form

(IBQ-R VSF; Putnam, et al., 2014)

INSTRUCTIONS:
Please read carefully before starting:

As you read each description of the baby's behavior below, please indicate how often the baby did this during the LAST WEEK (the past seven days) by circling one of the numbers in the left column. These numbers indicate how often you observed the behavior described during the last week.

1	2	3	4	5	6	7	NA
Never	**Very Rarely**	**Less Than Half the Time**	**About Half the Time**	**More Than Half the Time**	**Almost Always**	**Always**	**Does Not Apply**

The "Does Not Apply" (X) column is used when you did not see the baby in the situation described during the last week. For example, if the situation mentions the baby having to wait for food or liquids and there was no time during the last week when the baby had to wait, circle the (X) column. "Does Not Apply" is different from "Never" (1). "Never" is used when you saw the baby in the situation but the baby never engaged in the behavior listed during the last week. For example, if the baby did have to wait for food or liquids at least once but never cried loudly while waiting, circle the (1) column.

Please be sure to circle a number for <u>every</u> item.

1. When being dressed or undressed during the last week, how often did the baby squirm
and/or try to roll away?

1 2 3 4 5 6 7 NA

2. When tossed around playfully how often did the baby laugh?

1 2 3 4 5 6 7 NA

3. When tired, how often did your baby show distress?

1 2 3 4 5 6 7 NA

4. When introduced to an unfamiliar adult, how often did the baby cling to a parent?

1 2 3 4 5 6 7 NA

5. How often during the last week did the baby enjoy being read to?

1 2 3 4 5 6 7 NA

6. How often during the last week did the baby play with one toy or object for 5-10
minutes?

1 2 3 4 5 6 7 NA

7. How often during the week did your baby move quickly toward new objects?

1 2 3 4 5 6 7 NA

8. When put into the bath water, how often did the baby laugh?

1 2 3 4 5 6 7 NA

9. When it was time for bed or a nap and your baby did not want to go, how often did
s/he whimper or sob?

1 2 3 4 5 6 7 NA

10. After sleeping, how often did the baby cry if someone doesn't come within a few
minutes?

1 2 3 4 5 6 7 NA

11. In the last week, while being fed in your lap, how often did the baby seem eager to
get away as soon as the feeding was over?

1 2 3 4 5 6 7 NA

12. When singing or talking to your baby, how often did s/he soothe immediately?

1 2 3 4 5 6 7 NA

13. When placed on his/her back, how often did the baby squirm and/or turn body?

1 2 3 4 5 6 7 NA

14. During a peekaboo game, how often did the baby laugh?

1 2 3 4 5 6 7 NA

15. How often does the infant look up from playing when the telephone rings?

1 2 3 4 5 6 7 NA

16. How often did the baby seem angry (crying and fussing) when you left her/him in the crib?

1 2 3 4 5 6 7 NA

17. How often during the last week did the baby startle at a sudden change in body position (e.g., when moved suddenly)?

1 2 3 4 5 6 7 NA

18. How often during the last week did the baby enjoy hearing the sound of words, as in nursery rhymes?

1 2 3 4 5 6 7 NA

19. How often during the last week did the baby look at pictures in books and/or magazines for 5 minutes or longer at a time?

1 2 3 4 5 6 7 NA

20. When visiting a new place, how often did your baby get excited about exploring new surroundings?

1 2 3 4 5 6 7 NA

21. How often during the last week did the baby smile or laugh when given a toy?

1 2 3 4 5 6 7 NA

22. At the end of an exciting day, how often did your baby become tearful?

1 2 3 4 5 6 7 NA

23. How often during the last week did the baby protest being placed in a confining place (infant seat, play pen, car seat, etc.)?

1 2 3 4 5 6 7 NA

24. When being held, in the last week, did your baby seem to enjoy him/herself?

1 2 3 4 5 6 7 NA

25. When showing the baby something to look at, how often did s/he soothe immediately?

1 2 3 4 5 6 7 NA

26. When hair was washed, how often did the baby vocalize?

1 2 3 4 5 6 7 NA

27. How often did your baby notice the sound of an airplane passing overhead?

1 2 3 4 5 6 7 NA

28. When introduced to an unfamiliar adult, how often did the baby refuse to go to the unfamiliar person?

1 2 3 4 5 6 7 NA

29. When you were busy with another activity, and your baby was not able to get your attention, how often did s/he cry?

1 2 3 4 5 6 7 NA

30. How often during the last week did the baby enjoy gentle rhythmic activities, such as rocking or swaying?

1 2 3 4 5 6 7 NA

31. How often during the last week did the baby stare at a mobile, crib bumper or picture for 5 minutes or longer?

1 2 3 4 5 6 7 NA

32. When the baby wanted something, how often did s/he become upset when s/he could not get what s/he wanted?

1 2 3 4 5 6 7 NA

33. When in the presence of several unfamiliar adults, how often did the baby cling to a parent?

1 2 3 4 5 6 7 NA

34. When rocked or hugged, in the last week, did your baby seem to enjoy him/herself?

1 2 3 4 5 6 7 NA

35. When patting or gently rubbing some part of the baby's body, how often did s/he

soothe immediately?

1 2 3 4 5 6 7 NA

36. How often did your baby make talking sounds when riding in a car?

1 2 3 4 5 6 7 NA

37. When placed in an infant seat or car seat, how often did the baby squirm and turn
body?

1 2 3 4 5 6 7 NA

Appendix N

Idiographic Measure of Infant Illness or Discomfort

'How many days out of the past 7 has your baby suffered from digestive discomfort? (1,2,3,4,5,6, or 7)'

'How many days out of the past 7 has your baby been unwell (for example with a cold)?'

“How many days out of the past 7 has your baby been experiencing any other kind of discomfort?’

Appendix O

Demographic Questions (Including Perceived Current Mental Health)

Ethnicity question wording is as recommended by the Office of National Statistics: https://www.ons.gov.uk/methodology/classificationsandstandards/measuringequality/ethnicgroupnationalidentityandreligion

Age:

- ☐ Under 18
- ☐ 18-25
- ☐ 26-35
- ☐ 36-45
- ☐ 46-55
- ☐ Over 55

What is your ethnic group? (These options are recommended by

Choose one option that best describes your ethnic group or background

White

- ☐ English/Welsh/Scottish/Northern Irish/British
- ☐ Irish
- ☐ Gypsy or Irish Traveller
- ☐ Any other White background, please describe:

Mixed/Multiple ethnic groups

- ☐ White and Black Caribbean
- ☐ White and Black African
- ☐ White and Asian
- ☐ Any other Mixed/Multiple ethnic background, please describe:

Asian/Asian British

- ☐ Indian
- ☐ Pakistani
- ☐ Bangladeshi
- ☐ Chinese
- ☐ Any other Asian background, please describe:

Black/ African/Caribbean/Black British

- ☐ African
- ☐ Caribbean
- ☐ Any other Black/African/Caribbean background, please describe:

Other ethnic group

- ☐ Arab
- ☐ Any other ethnic group, please describe:

Is your child your….?

- ☐ Firstborn
- ☐ Second born
- ☐ Third born
- ☐ Fourth born
- ☐ Fifth born +

Would you like to provide any further information?

……
……..……
…….

Have you attended any antenatal sling workshops during this pregnancy or any previous pregnancies?

- ☐ Yes
- ☐ No

Marital Status

- ☐ Single
- ☐ Married
- ☐ Co-habiting
- ☐ In a relationship, but not co-habiting
- ☐ Separated/Divorced
- ☐ Widowed

Overall, how would you rate your mental health currently?

- ☐ Good
- ☐ Somewhat Good
- ☐ Average
- ☐ Somewhat Poor
- ☐ Poor

Is there a history of mental health difficulties in your family?

- ☐ Yes
- ☐ No
- ☐ Don’t Know

Have you ever been diagnosed with a mental health difficulty, either recently or in the past?

- ☐ Yes, prior to my pregnancy
- ☐ Yes, during my pregnancy
- ☐ No

If yes, would you mind saying what it is?

Are you currently accessing support for any mental health difficulties? (e.g. medication, therapy, support groups etc.).

- ☐ Yes
- ☐ No

If yes, would you mind saying what support you are accessing?

Your employment status (excluding maternity leave):

- ☐ Employed full-time
- ☐ Employed part-time
- ☐ Unemployed
- ☐ Student
- ☐ Other

Your partner's employment status:

- ☐ N/A
- ☐ Employed full-time
- ☐ Employed part-time
- ☐ Unemployed
- ☐ Student
- ☐ Other

Household Income (Annually):

- ☐ Less than £10,000
- ☐ £10,000-£19,999
- ☐ £20,000-£29,999
- ☐ £30,000-£39,999
- ☐ £40,000-£49,999
- ☐ £50,000-£59,999
- ☐ £60,000 or over.

What is the highest level of education that you have attained?

- ☐ High School
- ☐ Apprenticeship
- ☐ College Qualification (NVQ, BTEC, Diploma etc.)
- ☐ University - Undergraduate (BA, BSc etc.)
- ☐ University - Postgraduate (Masters -MA, MPhil, MSc, etc; Doctoral - PhD, DPhil, Doctorate etc.)

- ☐ Professional or other Vocational Qualification (e.g. nursing, accountancy, teaching).

What is your Postcode?

…….

Appendix P

Qualitative Questions

We'd like to know how you have found taking part in this study (the way it was organised, the questionnaires we asked you to complete, your contact with the research team), and how you have found the sling loan and associated support (the services provided by Sheffield Sling Surgery & Library). There are separate questions on each below. Please feel free to say as little or as much as you'd like to.

1. Participation in the Study

How have you found this experience of participating in this study?

Is there anything that you particularly enjoyed/liked about this experience?

Is there anything that you would have wanted to be different?

2. Sling Use

Your first visit:

How was the experience of learning to use a sling when you first visited the Sling Library?

Is there anything that you particularly enjoyed/liked about this experience?

Is there anything that you would have wanted to be different?

Using the sling:

How did you get on with the sling after your initial visit?

Is there anything that you particularly enjoyed/liked about using the sling?

Is there anything that you would have wanted to be different?

Subsequent contact/support with the Sling Library:

What have you liked most about any of the sling surgery services you have used?

Are there any aspects of the sling library services you would want to change or improve?

Appendix Q

Participant Information Sheet

22/01/19 Version 2

Sling Provision and Maternal Wellbeing Study

Participant Information Sheet

1. Research Project Title:

Evaluating the Impact of Sling Provision and Training upon Maternal Wellbeing and Parenting: A Randomised Feasibility Trial

You are being invited to take part in a research project. Before you decide whether or not to participate, it is important for you to understand why the research is being done and what it will involve.

Please take time to read the following information carefully and discuss it with others if you wish. Please feel free to contact myself or another member of the research team if there is anything that is not clear or if you would like more information. Contact details may be found further down on this information sheet.

Please take time to decide whether or not you wish to take part. Thank you for taking the time to look at this information sheet.

2. What is the purpose of this study?

The months after childbirth are a physically and emotionally challenging time, and parenting a new-born can be hard. New mothers often feel low, tired, isolated, or anxious in this period. We want to see whether baby slings can help new mothers to cope with the challenges that having a new baby brings.

A baby sling is a piece of cloth that supports an infant or other small child from a carer's body. There are many different types of slings (stretchy wrap, ring, pouch, structured carrier etc.).

Sling libraries loan out slings and carriers and offer advice and information on sling use. Sheffield Sling Surgery is one of the largest sling libraries in the UK.

This study aims to work in collaboration with Sheffield Sling Surgery, to explore whether the provision of a sling, and also the provision of training in the safe use of a sling and how to access peer support from other sling users, may have an impact on the mental health, wellbeing or parenting experiences of women who have recently given birth.

Your involvement, which would be as part of our data collection, should be for around 12 weeks.

This research is being undertaken as part of completion of the Principal Investigator's Doctorate in Clinical Psychology.

3. Why am I being invited to take part?

You have been invited to take part in this study because you have not previously used a sling, and you are due to give birth between late February 2019 and late July 2019. You have been sent this information sheet because you have got in touch in response to an advert. Altogether, we would like around 60 mothers to participate in this study.

4. Do I have to take part?

It is up to you to decide whether or not to take part in this study. If you do decide to take part you will be given this information sheet to keep and be asked to complete a consent form. You can still withdraw from the study in the future without any negative consequences. You do not have to give a reason. If you wish to withdraw from the research, please contact Helen Wigglesworth (Principal Investigator; hmwigglesworth1@sheffield.ac.uk) or Dr. Abigail Millings (Project Supervisor; a.millings@sheffield.ac.uk).

5. What will happen to me if I take part? What do I have to do?

If you agree to take part in the study, please complete the following consent form and participant details form. You will be able to keep a copy of this information sheet and consent form.

Once your baby is born, you will be sent a text or an email asking you to complete a series of online questionnaires. We estimate that altogether these questionnaires should take around 45 minutes to complete. Once you have completed these questionnaires, you may be asked to attend a session at the Sheffield Sling Surgery either as soon as possible, or in 12 weeks' time.

When you attend your session at the Sling Surgery (whether immediately or in 12 weeks' time), you will be offered training and support around how to safely use a baby sling. You will be shown two different types of sling and will be able to hire one sling for free for either 12 weeks (if attending this session immediately) or 4 weeks (if attending after 12 weeks). You will be encouraged to use this sling regularly and sent an email containing information including reminders around safe sling use, and access to the local sling using community. You will be asked to return this sling to the Sheffield Sling Surgery after 4 or 12 weeks, but will be able to re-hire it, or hire another, with the usual hire charges now applying after this time.

You will be asked to complete further online questionnaires 6 weeks and 12 weeks after completing your first set of questionnaires. You will be send text or email

reminders at each of these time points, asking you to complete these questionnaires and sending you a webpage link to do so.

6. What are the possible disadvantages and risks of taking part?

The only disadvantage anticipated for taking part in this study is the time that it may take for you to complete these online questionnaires. Otherwise it is not anticipated that participating in this study will cause you any disadvantage or discomfort.

The potential physical and/or psychological harm or distress will be the same as any experienced in everyday life.

7. What are the possible benefits of taking part?

Direct benefits of this study include free sling hire where normally a charge would apply. While there may be no other immediate benefits for those participating in this study, it is hoped that this work will help improve our understanding of the impact of sling use upon maternal mental health, wellbeing and parenting, and will inform future studies on this topic.

8. Will my taking part in this project be kept confidential?

Yes. All of the information that we collect about you during the course of the research will be kept strictly confidential and will only be accessible to members of the research team. You will not be able to be identified in any reports or publications.

9. What is the legal basis for processing my personal data?

According to data protection legislation (General Data Protection Regulation; applicable in the UK and EU from 25 May 2018), we are required to inform you that the legal basis we are applying in order to process your personal data is that 'processing is necessary for the performance of a task carried out in the public interest' (Article 6(1)(e)). Further information can be found in the University's Privacy Notice https://www.sheffield.ac.uk/govern/data-protection/privacy/general.

As we will be collecting some data that is defined in the legislation as more sensitive (information about ethnicity and health), we also need to let you know that we are applying the following condition in law: that the use of your data is "necessary for scientific or historical research purposes".

10. What will happen to the data collected, and the results of the research project?

Any data collected from you (by you filling the questionnaires or giving contact details or other information to the Sling Surgery) will generally be anonymised. This data will be stored securely and will only be available to members of the research

team including staff from the Sheffield Sling Surgery. Sling Surgery staff will have access to your contact details and sling hire information.

It will not be possible to anonymise your contact details or information about the date which you first completed these online questionnaires, as this information will be needed in order to send you texts or emails reminding you to complete the online questionnaires at the right time, or to return your sling at the end of your allotted period of free hire. However this information will be stored securely and securely destroyed once it is no longer necessary for completion of the doctoral thesis or publication of the project (see below).

As the study is part of my doctoral course in Clinical Psychology, it will be submitted to the University for marking. It may be that in the future the findings of this study are published in a relevant journal or presented at a conference. A brief report of the findings will be sent to interested participants. Participants will not be identified within any of these publications.

Due to the nature of this research it is very likely that other researchers may find the data collected to be useful in answering future research questions. Thus anonymous data from this study may be made available to other researchers after this current research is completed.

11. Who is organising and funding the research?

The University of Sheffield is organising and funding the research. This is in collaboration with Sheffield Sling Surgery who are providing the sling hire and training services free of charge.

12. Who is the Data Controller?

The University of Sheffield will act as the Data Controller for this study. This means that the University is responsible for looking after your information and using it properly.

13. Who has ethically reviewed the project?

This project has been ethically approved via the University of Sheffield's Ethics Review Procedure, as administered by the Department of Clinical Psychology. The University's Research Ethics Committee monitors the application and delivery of the University's Ethics Review Procedure across the University.

14. What if something goes wrong and I wish to complain about the research?

If you have a concern about any aspect of this study, please do not hesitate to contact either myself or my project supervisor (please see below):

Principal Investigator:	**Project Supervisor:**
Helen Wigglesworth, Trainee Clinical Psychologist hmwigglesworth1@sheffield.ac.uk Clinical Psychology Unit, Department of Psychology, University of Sheffield, Floor F, Cathedral Court, 1 Vicar Lane, Sheffield, S1 2LT	Dr Abigail Millings a.millings@sheffield.ac.uk Lecturer in Psychology, Postgraduate Tutor, and PG Careers Contact, Department of Psychology, University of Sheffield, Floor D, Cathedral Court, 1 Vicar Lane, Sheffield, S1 2LT Tel: 01142226525

Should you feel that your complaint has not been handled to your satisfaction, or if you wish to contact a person external to the project, please do not hesitate to contact our Head of Department:

Professor Glenn Waller,

g.waller@sheffield.ac.uk

Head of Psychology Department

Department of Psychology
University of Sheffield
Floor D, Cathedral Court
1 Vicar Lane
Sheffield
S1 2LT

The Head of Department will then be able to escalate the complaint through the appropriate channels.

If your complaint relates to how your personal data has been handled, then further information about raising this type of complaint may be found in the University's Privacy Notice: https://www.sheffield.ac.uk/govern/data-protection/privacy/general.

15. Contact for further information

For further information please do not hesitate to contact a member of the project team (please see above).

You will be given a copy of the information sheet and of your consent form, to keep.

Thank you for taking the time to read this information sheet.

Appendix R

Participant Consent Form

Sling Provision and Maternal Wellbeing Study Participant Consent Form

Please tick the appropriate boxes	Yes	No
Taking Part in the Project		
I have read and understood the project information sheet dated 22/01/19 or the project has been fully explained to me. (If you will answer No to this question please do not proceed with this consent form until you are fully aware of what your participation in the project will mean.)	☐	☐
I have been given the opportunity to ask questions about the project.	☐	☐
I understand that taking part in the project may include: Completing a number of questionnaires over the course of around 12 weeks. Attending one session at the Sheffield Sling Surgery, when my infant is either between 0 and 6 weeks old or between 12 and 18 weeks old. Use of a baby sling. Being contacted by the Sling Surgery and research project staff via email and/or text.	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐
I agree to take part in the project.	☐	☐
I understand that my taking part is voluntary and that I can withdraw from the study at any time; I do not have to give any reasons for why I no longer want to take part and there will be no adverse consequences if I choose to withdraw.	☐	☐
How my information will be used during and after the project		
I understand my personal details such as name, phone number, address and email address etc. will not be revealed to people outside the project.	☐	☐
I understand and agree that my words may be quoted in publications, reports, web pages, and other research outputs. I understand that I will not be named in these outputs unless I specifically request this.	☐	☐
I understand and agree that any data that is collected during the study will only be shared with members of the research team.	☐	☐
I understand and agree that other authorised researchers may use my data in publications, reports, web pages, and other research outputs, only if they agree to preserve the confidentiality of the information as requested in this form.	☐	☐
So that the information you provide can be used legally by the researchers		
I agree to assign the copyright I hold in any materials generated as part of this project to The University of Sheffield.	☐	☐

Name of participant [Typed in qualtrics]		Date
Name of Researcher: Helen Wigglesworth	[Electronic signature here]	Date: 16/02/2019

For further information, please do not hesitate to contact us:

Principal Investigator:
Helen Wigglesworth, Trainee Clinical Psychologist

hmwigglesworth1@sheffield.ac.uk
Clinical Psychology Unit
Department of Psychology
University of Sheffield
Floor F, Cathedral Court
1 Vicar Lane
Sheffield, S1 2LT

Project Supervisor:
Dr Abigail Millings

a.millings@sheffield.ac.uk
Lecturer in Psychology, Postgraduate Tutor, and PG Careers Contact
Department of Psychology
University of Sheffield
Floor D, Cathedral Court
1 Vicar Lane
Sheffield
S1 2LT

Tel: 01142226525

In the event of a complaint, if you wish to contact a person external to the project, please contact:

Professor Glenn Waller,
g.waller@sheffield.ac.uk
Head of Psychology Department
Department of Psychology
University of Sheffield
Floor D, Cathedral Court
1 Vicar Lane
Sheffield
S1 2LT

This consent form has been approved by the University of Sheffield Research Ethics Committee, reference 024147.

Appendix S

Participant Debrief Sheet

21/02/19 Version 1

Sling Provision and Maternal Wellbeing Study

Participant Debrief Sheet

Research Project Title:

Evaluating the Impact of Sling Provision and Training upon Maternal Wellbeing and Parenting: A Randomised Feasibility Trial

Researcher:

Helen Wigglesworth, Trainee Clinical Psychologist

Thank you for taking part in this study.

What were the aims of this study?

This study aimed to investigate whether the provision of a sling, and also the provision of training in the safe use of a sling and how to access peer support from other sling users, may have an impact on the mental health, wellbeing or parenting experiences of women who have recently given birth.

We also examined whether differences in aspects of personality relevant to close relationships, "attachment style", played a part in the impact of sling use on mental health, wellbeing, or parenting experience.

This was a feasibility study. This means that the main aim of this study was to see whether a study like this is even possible to conduct, as the effect of sling-use on maternal mental health is a new area of research.

How was this done?

To do this, you were randomly allocated to one of two groups. If you were in the intervention group, you will have been given a baby sling at the beginning of the study, when your baby was 0-6 weeks old. You will have been asked to complete questionnaires three times; at the start of the study, after 6 weeks and after 12 weeks. These questionnaires included measures of postnatal depression, wellbeing, parental attachment style, and various aspects of the parenting experience (e.g. caregiving experience, sense of competency, social support).

If you were in the control group, you will have completed the same questionnaires, at the same times, but will have not been given a baby sling until after you had completed the final questionnaire at 12 weeks. This is so that we can look at whether there are any differences in the questionnaire scores between the two groups, and whether these differences change over time.

Talking about our mood, wellbeing or experiences of parenting so far can be an emotional process. If you experienced any difficult feelings while completing these questionnaires, and feel that you require support, please contact your GP or health visitor.

What will happen to the data collected?

Any questionnaire data collected from you has been anonymised. This data is stored securely and is only available to members of the research team, including staff from the Sheffield Sling Surgery. Sheffield Sling Surgery will retain your contact details until after you have returned the sling you received under a free hire arrangement as part of this project, at which point, you can request that this information be destroyed. The University of Sheffield will destroy your contact details after sending you this debriefing sheet. Your contact details are not linked in any way to the questionnaire data you have provided, so you cannot be identified within the aggregated set of responses.

What will happen to the results of the research?

As the study is part of my doctoral course in Clinical Psychology, it will be submitted to the University for marking. It may be that in the future the findings of this study are published in a relevant journal or presented at a conference. Participants will not be identifiable within any of these publications.

A brief report of the findings will be sent to interested participants. To register your interest, please email me (Helen Wigglesworth, Principal Investigator) using the following email address:

Hmwigglesworth1@sheffield.ac.uk

Due to the nature of this research it is very likely that other researchers may find the data collected to be useful in answering future research questions. Thus anonymous data from this study may be made available to other researchers after this current research is completed.

Who has ethically reviewed the project?

This project has been ethically approved via the University of Sheffield's Ethics Review Procedure, as administered by the Department of Clinical Psychology. The University's Research Ethics Committee monitors the application and delivery of the University's Ethics Review Procedure across the University.

What if I have any questions or concerns, or want to withdraw my data?

If you have any questions, concerns, or complaints about any aspect of this study, please do not hesitate to contact either myself or my project supervisor (please see below):

Principal Investigator:	**Project Supervisor:**
Helen Wigglesworth, Trainee Clinical Psychologist hmwigglesworth1@sheffield.ac.uk Clinical Psychology Unit,	Dr Abigail Millings a.millings@sheffield.ac.uk Lecturer in Psychology, Postgraduate Tutor, and PG

Department of Psychology, University of Sheffield, Floor F, Cathedral Court, 1 Vicar Lane, Sheffield, S1 2LT	Careers Contact, Department of Psychology, University of Sheffield, Floor D, Cathedral Court, 1 Vicar Lane, Sheffield, S1 2LT Tel: 01142226525

If you have made a complaint, but feel that your complaint has not been handled to your satisfaction, or that you wish to contact a person external to the project, please do not hesitate to contact our Head of Department:

Professor Glenn Waller,

g.waller@sheffield.ac.uk

Head of Psychology Department

Department of Psychology
University of Sheffield
Floor D, Cathedral Court
1 Vicar Lane
Sheffield
S1 2LT

The Head of Department will then be able to escalate the complaint through the appropriate channels.

If your complaint relates to how your personal data has been handled, then further information about raising this type of complaint may be found in the University's Privacy Notice: https://www.sheffield.ac.uk/govern/data-protection/privacy/general.

Thank you again for your willingness to participate in this study. It is much appreciated. And thank you for taking the time to read this debrief sheet.

Appendix T

Drop-In Session Checklist

Checklist to be used by sling library staff when providing sling training and information to study participants. This is based on the sling library's current session procedures.

Session Checklist

1. Greet and state your name
2. State whether you are a peer supporter or a consultant
3. Ask the reason for the person wanting a sling and what has brought the person to the sling surgery.
4. Ask whether there are any special circumstances that it would be helpful to be aware of (e.g. physical disability (parent or infant), dyspraxia, a particular budget).
5. Ask how old the baby is.
6. Check the parent's body shape.
7. Select one or two possible slings to offer (from stretchy or close caboo types, or one type of buckle carrier).
8. Demonstrate sling use, using a demo doll.
9. Ask the parent to practice wearing the sling using a demo doll.
10. Offer the parent the opportunity to practice wearing the sling with their baby.
11. While the parent is practicing with either their baby or the demo doll, offer sling safety instructions (as stated in the safety information leaflet).
12. If the parent chooses to hire the sling, direct them to the shop so that they can complete the relevant paperwork.

Appendix U

Information Provided to Participants following their Sling Training

Appendix U.1: Sling safety leaflet

BABIES NEED TO BE CARRIED AND *thrive* WHEN THEY ARE CARRIED

CARRYING IS GOOD FOR YOUR BABY

Promotes close bonding and attachment - vital to physical and emotional health.

Reduces crying, colic and eases the discomfort of reflux.

Assists with breathing, heart rate and temperature regulation.

Gives a greater sense of security and confidence, helping baby to feel safe and calm.

Assists with breastfeeding.

Reduces "flat head syndrome."

CARRYING IS GOOD FOR YOUR FAMILY

Assists with bonding and can help parents feel more confident.

Promotes and prolongs breastfeeding relationship.

Can reduce post-natal depression.

Allows greater freedom out and about and makes it much easier to access shops and public transport.

Allows you to get on with your daily tasks hands-free whilst keeping your little one happy and safe.

Allows you to spend time with your other children while keeping baby close.

FAMILIES *flourish* WHEN THEIR CHILDREN ARE KEPT **CLOSE**

If you would like further advice on how to carry well and carry safely, visit ***www.slingpages.co.uk*** to find your local sling library or consultant.

The **T.I.C.K.S.** Rule for Safe Babywearing

Keep your baby close and keep your baby safe. When you are wearing a sling or carrier, don't forget the **T.I.C.K.S.**

- ✓ **T**IGHT
- ✓ **I**N VIEW AT ALL TIMES
- ✓ **C**LOSE ENOUGH TO KISS
- ✓ **K**EEP CHIN OFF CHEST
- ✓ **S**UPPORTED BACK

TIGHT - Slings and carriers should be tight enough to hug your baby close to you as this will be most comfortable for you both. Any slack/loose fabric will allow your baby to slump down in the carrier which can hinder their breathing and pull on your back.

IN VIEW AT ALL TIMES - You should always be able to see your baby's face by simply glancing down. The fabric of a sling or carrier should not close around them so you have to open it to check on them. In a cradle position your baby should be face upwards not be turned in towards your body.

CLOSE ENOUGH TO KISS - Your baby's head should be as close to your chin as is comfortable. By tipping your head forward you should be able to kiss your baby on the head or forehead.

KEEP CHIN OFF THE CHEST - A baby should never be curled so their chin is forced onto their chest as this can restrict their breathing. Ensure there is always a space of at least a finger width under your baby's chin.

SUPPORTED BACK - In an upright carry, a baby should be held comfortably close to the wearer so their back is supported in its natural position and their tummy and chest are against you. If a sling is too loose they can slump which can partially close their airway. (This can be tested by placing a hand on your baby's back and pressing gently – they should not uncurl or move closer to you) A baby in a cradle carry in a pouch or ring sling should be positioned carefully with their bottom in the deepest part so the sling does not fold them in half pressing their chin to their chest.

www.babyslingsafety.co.uk. Thanks to UK Sling Consortium.

For further reading please visit:
www.sheffieldslingsurgery.co.uk/babywearing-safety/

Sheffield Sling Surgery

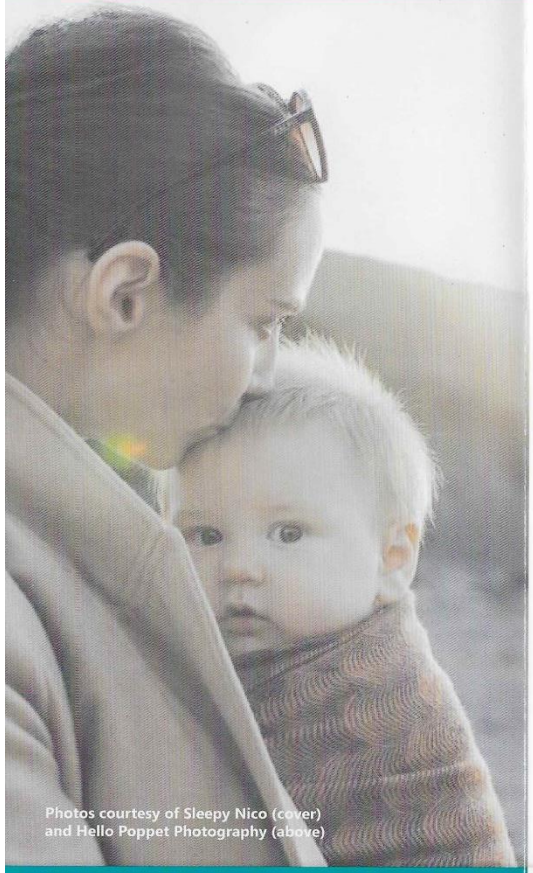
A GUIDE TO SLING USE

CARRY WELL & CARRY SAFELY

sling·spot

This guide will help you use your sling safely and keep your child secure. Your child's safety is ultimately your responsibility, so please use common sense and your own best judgement.

Reduces Crying & Improves Sleeping



Photos courtesy of Sleepy Nico (cover) and Hello Poppet Photography (above)

Promotes Close Bonding & Attachment

SAFETY BASICS

OPEN AIRWAY · CHIN OFF CHEST · SUPPORT BACK · NO SLUMPING

A VERY YOUNG CHILD IS SAFEST CARRIED ON YOUR FRONT

This is to ensure you can see and sense them at all times. This will help you to be aware of any changes and to quickly respond.

YOUR CHILD MUST BE ABLE TO BREATHE SAFELY IN THE SLING

Their chest should be snugly resting against your body with no slumping. Their back should be supported in a gentle J shape (tucked pelvis, aligned spine and neck) to keep the airway open and the chin off the chest (a good guide is a space one finger-width or more).

Carrying your child can be a wonderful experience when done well and comfortably

M Shape (small baby) **J Shape** (small baby) **M Shape** (child) **J Shape** (child)

CARRY YOUR CHILD IN THE SPREAD-SQUAT/M-POSITION

A child whose bottom and legs are well supported from knee to knee in a "spread-squat" or "M position" is likely to be more comfortable. It is better for their growing hips, and more supportive for parents.

DON'T FORGET TO ALWAYS USE YOUR COMMON SENSE!

Ensure your child's temperature is appropriate; slings behave as extra layers and babies can overheat in too many clothes.

Make sure your sling or carrier is fit for use: of good quality, in good condition, adjusted appropriately and securely tied or fastened. Only use carriers that are appropriate for your baby's age and weight.

Be aware of any objects your child can reach, particularly anything hot or sharp, and exercise caution when near open flames.

Avoid strenuous or jolting activities when carrying that could cause damage to the baby's neck or spine. Equally, avoid lying down when carrying. Do not operate machinery, drive a vehicle or ride a bike when using a sling.

Always remain aware of and responsive to your baby's needs for safety and comfort as well as your own.

U.2. Anonymised examples of the emails that participants will receive when first hiring their sling from, or returning their sling to, the Sling Surgery as part of the study.

U.2a **Email Address Confirmation Email**.

Sheffield Sling Surgery

Hello, Jane

To fully activate your account with Sheffield Sling Surgery and Library, please click on the link below:

Confirm email address

Janedoe1@sheffield.ac.uk has an account with Sheffield Sling Surgery. Your username: JDoe123.

Many thanks

Rob and Rosie and the team

A note about privacy:

When you become a customer of the Sheffield Sling Surgery and Sling Spot we invite you to be a part of a community. We would like to reassure you that your privacy is important. We will never sell your data, all details about you are stored securely and we only send you information directly related to your purchase, hire, consult or workshop. More information regarding our privacy policy is available on the website at www.sheffieldslingsurgery.co.uk/privacy

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Sheffield Sling Surgery

The Snug, 71, Leadmill Road, Sheffield, S1 4SE, United Kingdom

Monday	10:00 - 14:00 (BST)
Tuesday	10:00 - 14:00 (BST)
Wednesday	10:00 - 14:00 (BST)
Thursday	10:00 - 14:00 (BST)
Friday	10:00 - 14:00 (BST)
Saturday	10:00 - 13:00 (BST)
Sunday	Closed

Please check our website or our Facebook page for our library drop in dates each week.

Our sister service, Sling Spot (next door to the Snug), is open every day for returns and fast track hires.

U.2b **Welcome Email**

Sheffield Sling Surgery

Hello Jane

Welcome to Sheffield Sling Surgery and Library! We are happy to be to helping you on your carrying journey, do get in touch if you have any questions.

Please keep this email for your records. Your account information is as follows:

Username: JDoe123

Your Email: Janedoe1@sheffield.ac.uk

Name: Jane Doe

Please confirm your email address

https://sheffieldslingsurgery.myturn.com/library/

Edit Your Account

Your password was automatically generated and is stored securely in our database. If you wish to access your account on the site itself, you can reset your password to one of your own choosing on the login page.

Thank you for registering.

Rob and Rosie and the team

A note about privacy: When you become a customer of the Sheffield Sling Surgery and Sling Spot we invite you to be a part of a community. We would like to reassure you that your privacy is important. We will never sell your data, all details about you are stored securely and we only send you information directly related to your purchase, hire, consult or workshop. More information regarding our privacy policy is available on the website at www.sheffieldslingsurgery.co.uk/privacy

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Sheffield Sling Surgery

The Snug, 71, Leadmill Road, Sheffield, S1 4SE, United Kingdom

U.2c **Hiring/Returning Email**

Sheffield Sling Surgery

Thank you for hiring (or returning) a carrier from the Sheffield Sling Surgery and Library! This is your receipt email for the transaction.

If you have returned today, many thanks. We hope to see you again soon!

If you hired today, please click on the blue underlined link to the carrier you have hired, it contains all the user information you may need. You may also find helpful links here http://www.sheffieldslingsurgery.co.uk/personal-support/using-your-carrier/

If you would like to return/swap your carrier, the upcoming Surgery drop ins can be found here

www.sheffieldslingsurgery.co.uk/calendar or
www.facebook.com/sheffieldslingsurgery/events

Alternatively you can bring it back to the Sling Spot shop (next door to the Snug, 73 Leadmill Road, S1 4SE) on the day it is due back if there is no library session that day.

If you are enjoying your carrier and would like your own, we stock most major brands at the Sling Spot and offer local discounts.

More information can be found on our website (www.sheffieldslingsurgery.co.uk)) and in the Virtual Sling Surgery, our online facebook support/chat group (www.facebook.com/groups/virtualslingsurgery) Please do join, it is a great way to keep up with local sling news and make friends.

28/07/2018

Transaction details (reference #XXXXXX)

Name: Jane Doe

Email: Janedoe1@Sheffield.ac.uk

Telephone: 07123456789

You have checked out this item.

Summary

Transactions

Checkout: (Close Caboo Anniversary Edition)

Due Dates

Item Due Date

Close Caboo Anniversary Edition

04/08/2018

View in browser

Thank you for using the Sheffield Sling Surgery and Library services.

We hope to see you again soon.

Rob and Rosie and the team

A note about privacy: When you become a customer of the Sheffield Sling Surgery and Sling Spot we invite you to be a part of a community. We would like to reassure you that your privacy is important. We will never sell your data, all details about you are stored securely and we only send you information directly related to your purchase, hire, consult or workshop. More information regarding our privacy policy is available on the website at www.sheffieldslingsurgery.co.uk/privacy

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Sunday	Closed

Please check our website or our Facebook page for our library drop in dates each week.

Our sister service, Sling Spot (next door to the Snug), is open every day for returns and fast track hires.

Appendix V

Ethical Approval Letter

The University Of Sheffield.

Downloaded: 15/03/2019
Approved: 27/02/2019

Helen Wigglesworth
Registration number: 170149444
Psychology
Programme: Clinical Psychology Doctorate

Dear Helen

PROJECT TITLE: Evaluating the Impact of Sling Provision and Training upon Maternal Wellbeing and Parenting: A Randomised Feasibility Trial
APPLICATION: Reference Number 024147

On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 27/02/2019 the above-named project was **approved** on ethics grounds, on the basis that you will adhere to the following documentation that you submitted for ethics review:

- University research ethics application form 024147 (dated 22/02/2019).
- Participant information sheet 1054925 version 2 (22/01/2019).
- Participant consent form 1054926 version 1 (06/01/2019).

If during the course of the project you need to deviate significantly from the above-approved documentation please inform me since written approval will be required.

Yours sincerely

Jilly Martin
Ethics Administrator
Psychology

Appendix W

EPDS: Postnatal Depression Threshold Letter

The EPDS is not a diagnostic tool, but it is a screening tool which is designed to identify women who may benefit from further assessment or follow-up care (Cox, Holden & Sagovsky, 1987).

According to the EPDS instructions, a score of 13 or higher on this measure indicates a high likelihood of depression. As such, it is recommended that the person access primary care services for further assessment.

This letter will be sent to women who achieve a score of 13 or more when completing the EPDS at any time point.

Dear **[insert name]**,

You recently completed a set of questionnaires as part of your participation in the Sling Provision and Maternal Wellbeing study.

On one of the questionnaires, the Edinburgh Postnatal Depression Scale, the score you have suggests that you may be feeling low, tired or worried, following the birth of your child. It may be that you are suffering from postnatal depression, which is very common among families and underdiagnosed. There is help available if you are feeling this way. We recommend that you contact your GP, midwife or health visitor, to talk about these experiences, and seek further support.

Whatever you decide to do, whether you contact your GP, midwife or health visitor, or not, this will not impact on your participation in this study.

If you feel that at this point you would like to withdraw from the study, please feel free to do so, but please let us know by emailing the address below.

Hmwigglesworth1@sheffield.ac.uk

Thank you and best wishes,

Helen Wigglesworth and Abi Millings.

Sling Use and Maternal Wellbeing Project,

University of Sheffield.

Appendix X

Six-step Thematic Analysis Procedure (Braun & Clarke, 2006)

Phase	Examples of procedure for each step
1. Familiarising oneself with the data	Transcribing data; reading and re-reading; noting down initial codes
2. Generating initial codes	Coding interesting features of the data in a systematic fashion across the data-set, collating data relevant to each code
3. Searching for the themes	Collating codes into potential themes, gathering all data relevant to each potential theme
4. Involved reviewing the themes	Checking if the themes work in relation to the coded extracts and the entire data-set; generate a thematic 'map'
5. Defining and naming themes	Ongoing analysis to refine the specifics of each theme; generation of clear names for each theme
6. Producing the report	Final opportunity for analysis selecting appropriate extracts; discussion of the analysis; relate back to research question or literature; produce report

Appendix Y

Model of Acceptability (Sekhon et al., 2017)

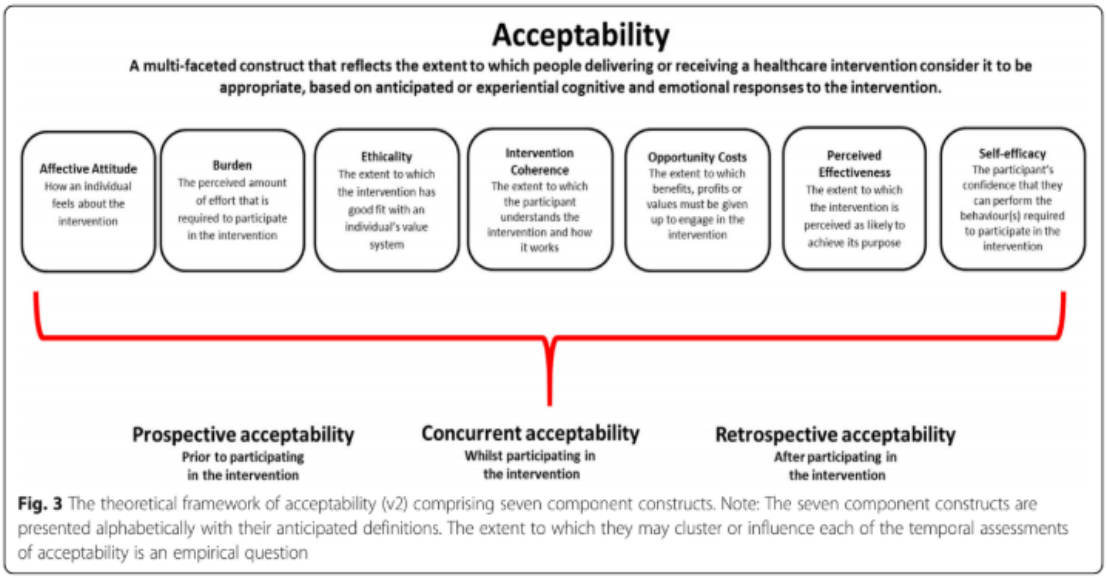

Fig. 3 The theoretical framework of acceptability (v2) comprising seven component constructs. Note: The seven component constructs are presented alphabetically with their anticipated definitions. The extent to which they may cluster or influence each of the temporal assessments of acceptability is an empirical question

Appendix Z

Tables Summarising and Comparing Demographic and Baseline Outcome Scores for Participants with No Missing Data vs. Participants with Any Missing Data.

Table 1

Comparison of Demographic Information for Participants With and Without Missing Data

Characteristics	Categories	Participants with No Missing Data (n = 50) n (%) or Mean (SD)	Participants with Data Missing (n = 11) n (%) or Mean (SD)	χ^2 or U	p
T1 Infant's age (weeks)		1.4 (1.1)	1.1 (1.0)	227.50	.310
Mother's age	Under 18	0	0	0.71	.871
	18-25	2 (4)	0		
	26-35	35 (70)	8 (72.7)		
	36-45	12 (24)	3 (27.3)		
	46-55	1 (2)	0		
	Over 55	0	0		
# Child	Firstborn (1)	42 (84)	8 (72.7)	6.52	.089
	Second born (2)	4 (8)	2 (18.2)		

	Third born (3)	4 (8)	1 (9.1)		
	Fourth born (4)	0	0		
	Fifth born + (5)	0	0		
Ethnicity[a]	White British	41 (82)	11 (100)	2.32	.985
	Asian/Asian British	2 (4)	0		
	Mixed Asian/White British	1 (2)	0		
	White European	3 (6)	0		
	White – Other	1 (2)	0		
	South American	1 (2)	0		
	Latin American	1 (2)	0		
Marital status	Single	2 (4)	0	2.07	.723
	Married	31 (62)	7 (63.6)		
	Co-habiting	15 (30)	3 (27.3)		
	In a relationship, not co-habiting	1 (2)	1 (9.1)		
	Separated/divorced	1 (2)	0		
	Widowed	0	0		
Employment	Employed full-time	34 (68)	8 (72.7)	1.97	.742
	Employed part-time	11 (22)	1 (9.1)		
	Unemployed	2 (4)	1 (9.1)		
	Student	1 (2)	0		
	Other	2 (4)	1 (9.1)		
Partner’s employment	Employed full-time	44 (88)	9 (81.8)	3.69	.450
	Employed part-time	1 (2)	1 (9.1)		
	Unemployed	1 (2)	1 (9.1)		
	Student	0	0		

	Other	3 (6)	0		
	N/A	1 (2)	0		
Education	High school	1 (2)	1 (9.1)	2.98	.561
	Apprenticeship	0	0		
	College Qualification	8 (16)	2 (18.2)		
	University- undergraduate degree	19 (38)	2 (18.2)		
	University – post-graduate degree	20 (40)	5 (45.5)		
	Professional or other vocational qualification	2 (4)	1 (9.1)		
Income	Less than £10,000	0	0	2.87	.720
	£10,000-£19,999	3 (6)	2 (18.9)		
	£20,000- £29,999	5 (10)	1 (9.1)		
	£30,000-£39,999	3 (6)	1 (9. 1)		
	£40,000-£49,999	9 (18)	1 (9. 1)		
	£50,000-£59,999	10 (20)	1 (9. 1)		
	£60,000 or over	20 (40)	5 (45.5)		
Postcode affluence	Affluent	19 (38)	2 (18.2)	1.57	.210
	Not affluent	31 (62)	9 (81.8)		
T1 Feeding method	Formula	2 (4)	0	0.46	.796
	Breastfeeding	35 (70)	8 (72.72)		
	Both formula and breastfeeding	13 (26)	3 (27.27)		
T1 Infant Illness/Discomfort Score		3.3 (4.1)	3.4 (4.1)	268.50	.902
T1 Stroking Score		12.5 (2.7)	12.7 (2.4)	263.00	.819

T1 Current mental health	Good	34 (68)	6 (54.6)	1.75	.625
	Somewhat good	10 (20)	4 (36.4)		
	Average	4 (8)	1 (9.1)		
	Somewhat poor	2 (4)	0		
	Poor	0	0		
T1 Diagnosis	Yes, prior to pregnancy	23 (46)	3 (27.3)	5.44	.066
	Yes, during pregnancy	0	1 (9.1)		
	No	27 (54)	7 (63.6)		
T1 Accessing mental health support	Yes	8 (16)	1 (9.1)	0.34	.559
	No	42 (84)	10 (90.91)		
T1 Family history of mental health	Yes	22 (44)	5 (45.5)	0.96	.618
	No	24 (48)	6 (54.6)		
	I don't know	4 (8)	0		

[a] *Note:* Only selected ethnicities are included in this table.

Table 2

Infant Temperament Scores: Mean and Comparison between Participants with and without Missing Data

	Participants with No Missing Data (n = 50)	Participants with Data Missing (n = 11)		
Infant Temperament (IBQ-R VSF) Subscale	Mean (SD)	Mean (SD)	*t*	*p*

Surgency	3.7 (1.0)	4.1 (0.8)	1.59	.643
Negative Affect	3.4 (0.9)	3.5 (0.9)	0.80	.741
Effortful Control	5.0 (0.7)	4.7 (0.7)	-1.30	.856

Appendix AA

Sling Use, Pram Use and Sling Library Use Frequency Graphs

for Participants' Partners

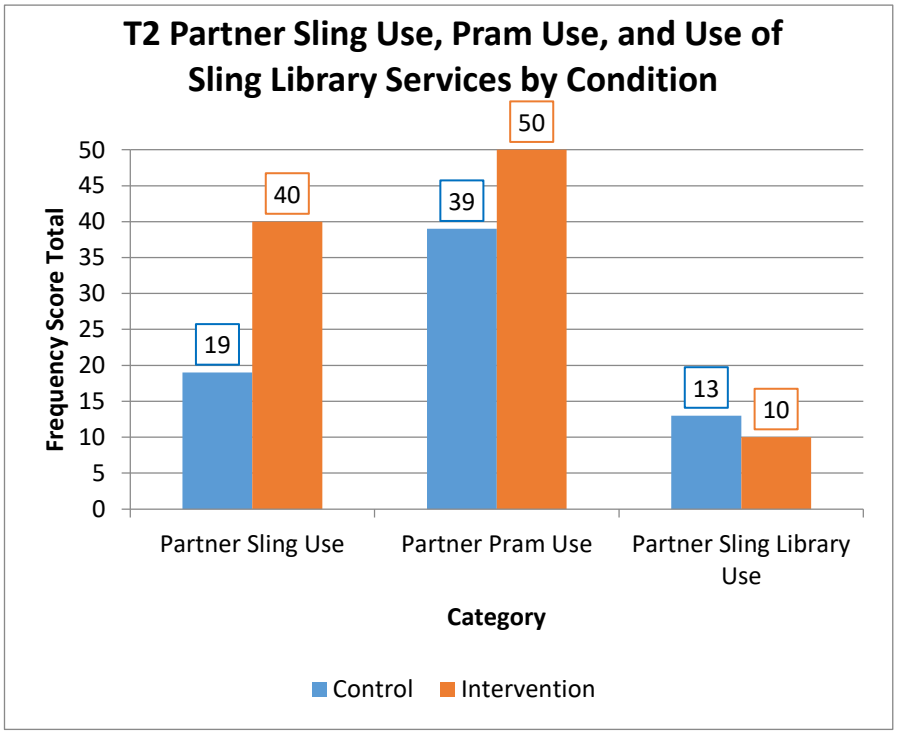

Figure 1. Graph depicting frequency totals for sling use, pram use and access to sling library services, for participants' partners, by condition, at T2.

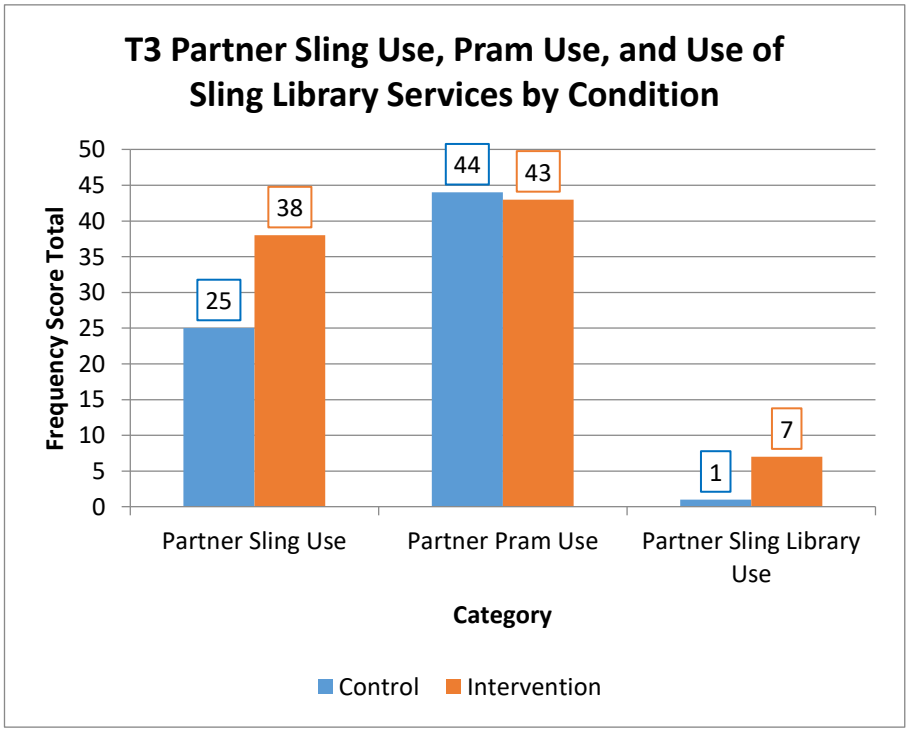

Figure 2. Graph depicting frequency totals for sling use, pram use and access to sling library services, for participants' partners, by condition, at T3.

Appendix AB

Example Statements for Each Theme in Accordance with

Sekhon's Model of Acceptability (Sekhon et al., 2017; Appendix Y)

Table 1.

Example statements for themes generated a-priori from Sekhon et al.'s model of acceptability (Sekhon et al., 2017)

Theme	Example
Burden	"The surveys were a bit long but it was worth it for the experience of going to the sling library and getting a sling for free." "The surveys are easy to complete." "Unfortunately [my diagnosis] has affected my consistency of sling use due to lower back/abdominal pain. I therefore feel that my answers may be slightly skewed regarding sling use." "It [the sling] was so easy to use so we started using it every day immediately."
Affective Attitude	"Really interesting, really enjoyed the use of the sling, especially when trying to do something or soothe baby to sleep." "Enjoyable, interesting answering the questionnaires."
Ethicality	"I enjoyed the thought that our responses might assist with research in some way."

	“Being able to contribute to something meaningful, and taking time to check in with my mental health.”
	“I have felt privileged to be part of this study. It has made me consider my own emotions in relation to motherhood…I have enjoyed the opportunity to think about my own mood and emotions and the bonding process between me and my son.”
	“Mildly distressing - it made me understand that I've been having difficulty in moderating my mood and has somewhat made me question whether my own mental health is having a detrimental impact on my baby.”
Intervention	“Some questions are worded a little confusing.”
Coherence	“I appreciated having the expert instruction; I wouldn't have felt confident wearing such a small baby otherwise.”
	“Learning how to carry our baby safely. I think for us the advice was key to us having a carrier that worked for what we needed. It felt like we were really listened to and we appreciated all the advice.”
Opportunity	“Great to get free sling hire for 3 months…”
Costs	“The sling library made all the difference this time and this study gave me access to their services when I might not usually have had the confidence to go there to seek advice. I am so so glad I took part.”
	“Having baby close but being able to do basic things such as walking the dog or hanging out washing.”
	“I can get so much done while baby wearing, it's so much easier to travel outside of the house with baby wearing rather than the pram and best of all: my baby loves being in it!”
	“The sling gave me freedom that a pram wouldn't have done.”

	"A greater choice of slings may have been better…"
Perceived Effectiveness	"…my baby loves it! It's her favourite place to be, she is instantly soothed and often naps while in the sling."
	"There is nothing that I dislike about the sling. My son loves to be close to me and the sling enables us to be close even when I need my hands. There have been times where he has been upset and I have put him in the sling and it has soothed him. It has enabled us to go for walks together in beautiful countryside."
	"I love the sense of closeness to my baby. After a somewhat turbulent start in hospital with lots of medical intervention, I feel I am able to bond more with my child."
	"We found the sling library a friendly and welcoming place. The lady who saw us helped us work out which sling or carrier was best for us at that point and was very patient teaching us how to use it correctly."
	"Being able to drop in (rather than make an appointment) to a friendly patient environment where I can also breast feed comfortably and meet other parents."
	"If I am honest it felt a bit rushed."
	"…a one to one would have been better. There were lots of people waiting for support during that clinic and I felt a bit "watched" by the others and felt like I needed to understand how to use the sling quickly because there were others waiting."
Self-efficacy	"I feel confident using a sling thanks to their [the sling library's] help."
	"[It] took time to build up confidence with sling and to use it without having buggy on hand."