

**GENERAL PRACTITIONERS' BELIEFS ABOUT OBESITY
AND THEIR DECISION TO TREAT**

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ABSTRACT

The current study explored the relationships between GPs' beliefs about the cause of obesity and treatment choices. Participants (n = 81) responded to two sets of materials; vignettes featuring obese patients in which the grade and cause of obesity were manipulated, and a survey of beliefs about the causes of obesity. Participants were asked to rate how likely it would be for the patient to receive each of six treatments. Group comparisons, correlational analyses and logistic regression methods were employed. The results revealed that, as obesity increased, participants were more likely to refer patients on for all of the interventions rather than to 'watch and wait' and provide advice directly. The grade of obesity explained the most variance in ratings of treatment choice, suggesting that GPs' decisions are in line with current guidelines (NICE, 2006). Participants were more likely to agree with statements supporting an internal locus of control in the cause of obesity (LoCI) than an external locus of control (LoCE). Participants' beliefs that obesity is caused by LoCE factors were associated with them being more likely to refer for both medical interventions (pharmacological/surgical) and behavioural-based treatments (nurse/dietician/clinical psychology). Participants' beliefs that obesity is caused by LoCI factors were associated with GPs being more likely to 'watch and wait'. Previous research suggests that patients are more likely to believe obesity is out of their control (Ogden et al, 2001). The current study therefore suggests that GPs are more likely to work directly with patients who have different beliefs about the cause of obesity to their own. The implications of this finding for future research and practice are discussed.

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ABBREVIATIONS

GP: General Practitioner

CCG: Clinical Commissioning Group

NHS: National Health Service

UK: United Kingdom

NICE: National Institute of Health and Clinical Excellence

RCP: Royal College of Physicians

LoC: Locus of Control

LoCI: Internal Locus of Control

LoCE: External Locus of Control

WHO: World Health Organisation

BMI: Body Mass Index

USA: United States of America

NHNES: National Health Nutrition Examination Surveys

HRQoL: Health Related Quality of Life

RCT: Randomised Controlled Trial

PCT: Primary Care Trust

ANOVA: Analysis of Variance

INTRODUCTION

This thesis explores General Practitioners' (GPs') beliefs about obesity. It is written at a time of high media interest both in how GPs' roles are changing, and in the ways they are working to manage the rise of obesity levels in the population. In April 2013, those GPs who are members of the Clinical Commissioning Groups (CCGs) took control of 60% of the £100 billion budget set aside for the National Health Service (NHS) in the United Kingdom (UK) (Health and Social Care Act, 2012). In theory, the role of the GP in the NHS was extended from involvement in the provision of services to the commissioning of services. Thus the way GPs form opinions and make decisions is of increasing interest. This thesis is designed to take a closer look at the beliefs GPs have about obesity and the relationship between these beliefs and the treatment choices that are made for obese patients.

The response of the NHS to obesity has recently been described as 'patchy' by the Royal College of Physicians (RCP, 2013), and this criticism carries with it an urgency given the rising prevalence of obesity and the associated costs and consequences on health problems. In the Health Survey for England (Joint Health Surveys Unit, 2011), the prevalence of obesity in the adult population was 24% for men and 26% for women. Obesity impacts upon the economy both through increased pressures on the NHS, and as a contributory factor in the causes of unemployment (Finkelstein, Ruhm, and Kosal, 2005). Recent data suggest that obesity alone costs the NHS for England and Wales £5 billion annually (Department of Health, 2013). The increased likelihood of illnesses that occur with obesity, such as diabetes and hypertension, serve to increase this financial impact on the NHS (Department of Health, 2009). Furthermore, rates of obesity are forecast to double by 2050, suggesting that one in two people will be obese by that period (Butland, Jebb, Kopelman, McPherson, Thomas et al, 2007). Simulation models for the UK predict that 11 million more people will be obese by 2030 than the current 15 to 16 million people (Wang, McPherson, Marsh, Gortmaker and Brown, 2011).

Recent government strategies and initiatives to tackle obesity have placed more responsibility on health care professionals to find solutions (Boseley, 2011;

Department of Health, 2010a; Marmot, 2010). This is evident from the guidelines published by the National Institute for Health and Clinical Excellence (NICE, 2006) which recommend clinical advice be given to all obese patients that is based around diet, exercise, and recommended levels of weight loss. Recent government recommendations ask for all health professionals to introduce conversations around healthy lifestyles at every point of contact (Campbell, 2012).

Health professionals from across different disciplines are being encouraged to work together to provide help for those obese patients (Rutter, 2011). This includes the need for multidisciplinary teams to be available across the NHS in the UK for severe and complex obesity (RCP, 2013). However, GPs remain the focus of this thesis as they have a high frequency contact with patients in the NHS and are the primary decision-makers regarding patient treatment.

Research indicating poor outcomes for obesity management, and the lack of consistent findings around predictors of outcomes in that management, mean that GPs must rely on their clinical judgements when making decisions (e.g. Epstein and Ogden, 2005; Foster, Wadden, Makris, Davidson, Sanderson et al., 2003; Mercer and Tessier, 2001). Research examining the clinical judgements of GPs about obesity indicates that these judgements are influenced by GPs' assumptions, beliefs and stereotypes. These judgements are similar to those held by other healthcare professionals and the general population (c.f. Brownell, Puhl, Schwartz and Rudd, 2005). This suggests that the roles of healthcare professionals may be compromised in their attempt to provide care for obese patients free from bias and negative attitudes.

The study in this thesis builds on previous research that showed how GPs' judgements about obesity, although similar to the general population, are often different from those of the obese patients they are treating (Ogden, Bandara, Cohen, Farmer, Hardie et al, 2001). Ogden and colleagues demonstrated that GPs attribute the primary cause of obesity to being in the patient's control, whilst obese patients attribute the primary cause of obesity to being outside of their control. The present study is designed to explore this specific type of belief held about obesity; the belief about the locus of the patient's control in the cause of obesity (LoC) (Weiner, 1985).

There is currently no established literature that examines a relationship between beliefs about obesity held by GPs and the type of treatment that GPs provide for their obese patients, however there is a broad evidence base examining GP beliefs about the causes and consequences of, and solutions to, obesity (Puhl and Heuer, 2009). In the context of the enacting into law of the Health and Social Care Act 2012, it is timely to ask how the models of obesity held by GPs relate to the choices made in clinical situations.

LITERATURE REVIEW

This literature review explores how obesity is managed by GPs, and how their beliefs about obesity affects the decisions they make. The first part explores scientific understandings of how obesity is caused and maintained and examines the ways in which obesity is managed. There is then more detail about how GPs manage obesity and a brief exploration of the evidence base for those interventions and the current guidance for their use in the NHS. This is followed by a focus on the stereotypes and attitudes people hold about obesity with a critical appraisal of the literature base which demonstrates the extent to which health care professionals and GPs share these ways of thinking with the general population. This review specifically examines the way people and healthcare professionals make causal attributions in their thinking about obesity. In particular, this explores whether people attribute obesity to either being within the LoC of the obese individual (i.e. internally attributed, herein referred to as LoCI) or outside the LoC of the obese individual (i.e. externally attributed, herein referred to as LoCE). Finally, there is an exploration about how healthcare professionals' stereotypes, attitudes and attributions influence the decisions that they make, exploring how beliefs held by GPs about LoC might influence their treatment choices for their obese patients and the literature base around how GPs use treatment guidelines.

The Classification, Causes and Consequences of Obesity

Obesity is defined as having a Body Mass Index (BMI) of 30 kg/m² or higher (Calle, Thun, Petrelli, Rodriguez and Heath, 1999), with the grade of obesity increasing from I to III as the BMI of an individual rises (World Health Organisation, 2000). This classification system is illustrated in Table 1. The classification table also features the associated health risks with each grade of obesity. The link to health risks is important to keep in mind. Without the focus on improving people's health, obesity research has been criticised as a moral or ideological rather than scientific endeavor (Gard and Wright, 2005).

Table 1: Classification of overweight in adults by the World Health Organisation (2000)

Classification	BMI (kg/m²)	Associated health risks
Underweight	<18.5	Low (but risk of other clinical problems increased)
Normal range	18.5 – 24.9	Average
Pre-obese	25.0 – 29.9	Increased
Obese class I	30.0 – 34.9	Moderately increased
Obese class II	35.0 – 39.9	Severely increased
Obese class III	>40	Very severely increased

The health risks of obesity range from the physical (tiredness, breathlessness, back pain) and metabolic (non-insulin-dependent diabetes mellitus, heart disease, stroke) to the surgical (sleep apnoea, chest infections, hernias) and endocrine (infertility, oestrogen-dependent cancers, miscarriages). The impact on the quality of life of obese people is also felt socially (isolation, discrimination, unemployment) and psychologically (low self-esteem, distorted body image, depression) (c.f. Lean, 2010; Hill, 2010).

In terms of the causes of obesity, the evidence is not clear and there exists a broad research base that identifies diet and exercise, genetics, and socio-cultural and environmental factors as potential primary causes (Harnack and Schmitz, 2010). These factors are described in the literature in evolutionary terms; we are living in an environment in which food is more readily available and in which we no longer need to work as hard to access that food, because of transportation and labour-saving devices (Chambers and Wakley, 2002). An energy imbalance is therefore more likely to occur, resulting in obesity (Astrup, Hill and Rössner, 2004).

It is this energy imbalance that leads to the accumulation of body fat. The energy imbalance occurs when energy intake is greater than energy expenditure (e.g. through exercise), meaning that the energy remains stored in the body. How that energy is stored in the body depends on the type of energy taken in (e.g. proteins, fats or carbohydrates) and how the individual body processes that energy (Schoeller,

2009). The variance between people can therefore be understood in terms of energy balances that are within the control of the person (e.g. their diet and exercise) and those that are outside the control of the person (e.g. their genetic, hormonal, metabolic make-up), and the interaction between the two.

At an international conference on obesity, 52 of the 80 ‘obesity experts’ attending a satellite meeting during the event were presented with Likert scales to survey their views on the cause of obesity (Bray, York and DeLany, 1992). On average, genetic causes of obesity were rated more highly than all others. Female participants were more likely to rate physical inactivity, carbohydrate craving and repeated dieting as more causative than male participants. Compared to their fellow attendees from the USA and the rest of Europe, participants from the UK rated metabolic defects and depression as less causative of obesity.

Although individual obesity can be explained by genetics and metabolism, there is no evidence to suggest there have been genetic or metabolic changes in the population to explain the rise in obesity (Astrup, Hill and Rössner, 2004). The focus of current research then is on the changes to the amount of energy people intake and expend. Surveillance data from the United States of America (USA) conducted by governmental departments as part of the National Health Nutrition Examination Surveys (NHNES) indicate that energy intake increased significantly between 1971 and 2000 for both men (2450 to 2618 kcal/day) and women (1542 to 1877 kcal/day) (Wright, Kennedy Stephenson, Wang, McDowell and Johnson, 2004). However this is not supported by two earlier surveillance surveys in the USA (Arnett, McGovern, Jacobs, Shahar, Duval et al, 2002; Nicklas, Elkasabany, Srinivasan and Berenson, 2001).

The NHNES study is confounded by a change in methodology that occurred mid-way through the survey in 1988 when data were gathered from participants across all seven days of the week, rather than just the weekdays as was collected from 1971 -1988. Evidence suggesting that energy intake increases at the weekend (Beaton, Milner, Corey, McGuire, Cousins et al, 1979) and the fact that the recorded increase in energy intake occurred after 1988 in the NHNES study, would suggest that there has not been a significant change in energy intake in the USA, as the

earlier studies suggest (Arnett al, 2002; Nicklas et al, 2001). However, the surveillance studies rely on an assumed accuracy of self-reporting and do not take into account how changes in attitudes to portion size, alongside a growing awareness and labeling of calorie content on foods may have had an impact on the reports.

Energy expenditure studies are similarly inconclusive due to the nature of the self-report methodologies and the way that data was collected. The focus has been on the amount of leisure-time exercise recorded by the individual rather than taking into account the changes in general energy levels due to the changes in environment; for example, changes in the way people commute to work may mean that less energy is expended, but this is not recorded in the data cited here (c.f. Harnack and Schmitz, 2010).

A review of the European data on energy intake and energy expenditure shows a wide range across the population, however these self-report studies have the same methodological problems as described above (Livingstone, 2001). The author of the review states that no conclusions can be made about the changes in energy intake and expenditure being a cause of the rise in levels of obesity.

The way in which environments can be obesogenic, facilitating the increase in obesity in a population, has been the focus of much recent research. Across the USA, this includes increases in the availability of food, particularly fats and sugars (Buzby, Wells, Axtman, and Mickey, 2009), and increased densities of fast-food services (Wang and Beydoun, 2008). This also includes an increase in sedentary leisure activities, for example viewing the television and surfing the internet (Nielsen Media Research, 2000) and increased uses of private transport and decreased frequencies of walking (Frank, Engelke, and Hourigan, 2002). Other research examines the influence of the individual's socio-economic position on these factors (c.f. Ball and Crawford, 2010), with evidence showing that the wider the gap between rich and poor in society, the higher the rates of obesity and its co-morbid health conditions across society (Wilkinson and Pickett, 2009).

Taken together, energy intake, energy expenditure, environmental and socio-cultural and economic factors have an impact on the development and maintenance

of obesity, however the relative strength of each factor is unclear due mainly to the way data have been collected.

The Management of Obesity

Intervention is available in many different forms, from more expensive and invasive methods such as bariatric surgery and pharmacological interventions to behavioural-based treatments including dietary advice and psychological interventions (Leverence, Williams, Sussman and Crabtree, 2007). All interventions differ in terms of how they help patients manage and maintain weight loss.

Guidelines on managing obesity

NICE guidelines for managing obesity (NICE, 2006) recommend that managers and health professionals prioritise management of obesity at both strategic and delivery levels. The guidelines specifically state that successfully addressing the problem of obesity cannot be done solely through primary care management and that interventions must be thought about in connection with the environment that the person is in.

The onus is on everyone in primary care settings to ensure healthcare professionals have specific training around health promotion and behaviour change, and that they have access to multidisciplinary teams, to provide interventions to manage obesity (NICE, 2006).

NICE (2006) guidance recommends that these decisions should be guided by the BMI of the patient and, for patients with a BMI below 35kg/m², their waist circumference. Table 2 overleaf is based on the visual illustration of this in the NICE (2006) guidance. The BMI classifications are those from the WHO (2000) shown in Table 1. Guidance for waist circumference is more variable; males are classified as obese if their waist circumference is 40 inches or greater, and females if their waist circumference is 35 inches or greater. A combination of the two factors is recommended as a classification tool (NICE, 2006).

Table 2: NICE (2006) guidance on the recommended specialist interventions for obese patients based on their BMI.

BMI Classification	BMI (kg/m ²)	Waist circumference			Comorbidities present
		Low	High	Very High	
Overweight	25 - 29.9				
Obesity I	30 - 34.9				
Obesity II	35 - 39.9				
Obesity III	>40				

	General advice on health weight and lifestyle
	Diet and physical activity
	Diet and physical activity; consider drugs
	Diet and physical activity; consider drugs; consider surgery

The NICE (2006) guidelines place a high degree of responsibility on healthcare professionals and GPs to address obesity; the guidance addresses this using the following three forms of intervention:

Behavioural interventions

NICE (2006) guidance recommends the provision of behavioural interventions to increase physical activity, decrease inactivity, improve eating behaviour and quality of diet, and to reduce energy intake.

Behavioural and psychological interventions can be provided by GPs, nurses, dieticians, clinical psychologists and other healthcare professionals. These may include self-monitoring, goal setting, guidance on nutrition, exercise planning, stimulus control, problem solving, cognitive restructuring, and relapse prevention (Berkel, Walker, Poston, Reeves and Foreyt, 2005).

Attempts to help obese patients make changes are often complicated by their environments, which often facilitate energy intake (e.g. fast availability of high-calorie foods) and discourage energy expenditure (e.g. access to transport) (Sumithran, Prendegast, Delbridge, Purcell, Shulkes et al, 2011). Providing advice to obese patients is also complicated by how ready they are to change their

behaviour (c. f. Prochaska and Velicer, 1997). When making changes to health behaviours, this model of change by Prochaska and Velicer (1997) suggests that periods of pre-contemplation, contemplation and preparation are required before action is taken.

Motivational interviewing (MI) techniques are one way of working with patients to help them achieve change (Miller and Rollnick, 2002). This approach is designed to express empathy with the patient, develop discrepancy between their current behaviours and their goals, avoid challenging their resistance to change and support their self-efficacy in making the changes when they are ready. MI is being employed by a growing number of healthcare professionals in health services, and has been shown to yield moderate effects, similar to other active treatments for helping people make changes to diet and to increase their level of exercise (e.g., Burke, Arkowitz and Menchola, 2003).

Pharmacological interventions

NICE (2006) recommends pharmacological treatment with Orlistat for patients with a BMI above 35 kg/m² or for patients with a BMI above 25 kg/m² with co-morbidities. This is begun only after discussions with the patient about potential benefits and limitations, and information must always be provided on diet, physical activity and behavioural strategies (NICE, 2006).

Orlistat is currently the only pharmacological intervention approved by NICE (2006) to be safe and effective. Orlistat reduces the absorption of fat by the body by blocking the action of gastric and pancreatic lipases.

In a recent review of the literature, Orlistat was shown to be effective at helping obese individuals to lose 5 to 10% of their body weight in a three month period (Ara, Blake, Gray, Hernández, and Crowther, 2012). Side effects of Orlistat include fatty or oily stools and other gastrointestinal symptoms (NHS Choices, 2012).

Surgical interventions

NICE (2006) recommend bariatric surgery for patients with a BMI over 40kg/m² (or 35kg/m² when the patient has co-morbidities that could be improved with weight loss, such as hypertension and diabetes). It is only recommended after all non-surgical interventions have been tried and failed. The patient must be receiving intense management from a specialist obesity service, be healthy enough to cope with surgery and to be able to commit to long-term follow-ups (NICE, 2006).

The two most common forms of bariatric surgery are gastric bands and gastric bypasses (Franco, Ruiz, Palermo and Gagner, 2011). The gastric band is designed to reduce the size of the stomach, having the effect of making the individual feel satiated after eating less. The gastric bypass procedure changes the route of the digestion away from most of the stomach. This reduces the amount of food that is digested and, like the gastric band, satiates the individual on less food. This also decreases the nutritional intake available to the patient.

In a recent review of the literature (Franco et al, 2011), the gastric bypass was shown to be more effective in achieving weight loss than the gastric band. One year post-surgery, the percentage of excess weight loss for patients who underwent a gastric bypass ranged from 51.3 to 64.3 percent. This is compared to a range of 34.7 to 41.4 percent for patients with a gastric band. However the gastric band was shown to lead to fewer post-surgery health complications such as internal bleeding, deep vein thrombosis and pulmonary embolisms (Franco et al, 2011).

Both forms of bariatric surgery carry these serious risks of complications (NHS Choices, 2012). Risk of fatality shortly after surgery is also high. 1 in 2000 patients are at risk of death shortly after gastric band surgery, and 1 in 100 patients are at risk of death shortly after gastric bypass surgery. For both surgeries, risk of fatality increases when the patient has co-morbidities or has a BMI over 50 kg/m².

There is growing evidence that a new procedure, the laparoscopic sleeve gastrectomy, is nearly as effective as the gastric bypass, and without the same risks (Jackson and Hutter, 2012). The sleeve gastrectomy is a procedure in which 25% of

the stomach is removed, permanently reducing its size. However, all surgical procedures lack good follow-up study data (Franco et al, 2011).

Patient Experience of Obesity Management

Due to the structure of the NHS in the UK, obese patients are unable to access state-funded specialist interventions without initial consultations in their GP practice. At the time of writing, there was no UK research identified that examines the frequency and use of GP consultations made by obese patients. Research from Germany, however, indicates that obese patients are more frequent attendees of GP consultations than non-obese patients (Von Lengerke and John, 2007). This research used self-report telephone surveys with patients to identify frequency of GP use in an eight-week period, and conducted a logistic regression analysis to examine the relationship between GP contact and the patient's physical co-morbidities and health related quality of life (HRQoL). The research indicated that frequency of GP contact was mediated by physical co-morbidities and health related quality of life in severely obese patients (BMI greater than 35) but not moderately obese patients (BMI between 30 and 35).

There have been a number of studies, mostly in the USA, designed to explore obese patients' experience of their contact with GPs/family physicians and other healthcare professionals (c. f. Fabricatore, Wadden and Foster, 2005). The first study, undertaken in 1990 by Rand and MacGregor, surveyed 57 obese gastric bypass surgery candidates about their experience of discrimination in healthcare and other settings. Nearly 80% of those patients reported that they "usually" or "always" were treated disrespectfully by healthcare professionals.

When this survey was replicated with a focus specifically on experience of healthcare, obese patients reported that they generally experience their healthcare professionals to be helpful and non-stigmatising (Anderson and Wadden, 2004; Wadden, Anderson, Foster, Bennett, Steinberg and Sarwer, 2000). Wadden and colleagues (2000) analysed survey data from 259 obese women who were treated with behavioural modification or pharmacological interventions for obesity. They were asked how often they were "treated disrespectfully by members of the medical

profession”. Seventy-seven percent of patients reported that they were never or rarely treated in that way and only 8% reported being usually or always treated like that. However, patients were less satisfied with the treatment they received for their weight in comparison to the treatment they received for their general health. In a follow-up study that asked patients to rate their general physician’s expertise about obesity, patients were less satisfied with their doctor’s obesity-specific knowledge than with their knowledge about general medical care (Anderson and Wadden, 2004). Compared to the earlier study by Rand and MacGregor (1990) however, it is suggested by the authors that the experience of healthcare for obese patients has improved (Anderson and Wadden, 2004).

The Anderson and Wadden (2004) study also compared beliefs between obese patients who were candidates for bariatric surgery, and obese patients who were applicants to a randomised controlled trial (RCT) that was looking at the effects of behavioural modification and Sibutramine (a pharmacological treatment for obesity, discontinued in the UK) on weight loss. Patients were asked to rate their experience of the medical care they had received from “all of the doctors you have seen across your lifetime”. More surgery candidates reported being treated disrespectfully by the medical profession because of their weight (13.5%) than non-surgery candidates who were part of the RCT (6.6%).

The comparison with a RCT trial limits the generalizability of this study as patients’ care may have been unrepresentative given their involvement in the RCT. However, patients were encouraged to think about all of the care they have received in the past. It, of course, cannot be known how closely the participants adhered to this recommendation, and the care they received in the RCT may also have influenced their experience. Overall, this study supports the suggestion that some obese patients experience negative interactions with healthcare professionals in regard to their weight however this appears to have improved since the initial study by Rand and MacGregor (1990).

Understanding patient experience of weight bias in healthcare is not just a matter of perceiving negative attitudes. Malterud and Ulriksen (2010) carried out a focus group study in Norway to explore the experiences of obese patients with their

GP. Patients reported that they would prefer the GP to be proactive in introducing issues around weight rather than relying on the patient to begin the discussion. They reported that GPs would refrain from introducing the topic of obesity unless there were additional complications present such as hypertension or diabetes. These patients' experiences of GP consultations about obesity indicate that patients are often left feeling responsible for gathering information on their options regarding access to further treatment. They also described feeling more vulnerable, reinforcing their beliefs about their own failure, if the GP did not demonstrate a considerate attitude towards them.

The patients' perceptions of negative attitudes and of being stereotyped because of their obesity can be thought about in the context of the Oppression Model (Thesen, 2005). This states that a health service fails to meet the needs of the patient by labelling them according to a stereotype and not responding to them as an individual. This is described by Thesen as a form of unconscious oppression. As GPs' responsibilities develop, from providing care to making choices about the allocation of funding for care, there are more situations in which this unwitting oppression of the patient may take place. A form of this unconscious oppression is seen in the negative attitudes and stereotypes held about obesity by healthcare professionals.

General Practitioners' Beliefs About Obesity

Attitudes and stereotypes

Negative attitudes and stereotypes about obese people have been documented in many and different employment, healthcare and educational settings (see Brownell et al, 2005, for an overview). In these situations, the consequences for the obese individuals are discrimination, reduced self-esteem, and reduced self-efficacy, which in turn increase levels of inequality (Puhl and Brownell, 2001).

Early research to explore healthcare professionals' beliefs about obesity was conducted using a semantic differential procedure with medical doctors in the USA. (Maddox and Lieberman, 1989). Participants were asked to rate adjectives on a seven point scale to describe themselves, competent doctors, patients in general, and an obese patient. Participants were more likely to rate obese patients as ugly, weak-

willed and awkward. However, recruitment for the study was complicated as 23 of the 100 participants opted out of this section of the study. Those participants criticised the way that the study forced a categorisation of patients, with a loss of emphasis on the particularities of the individual.

In a larger study, also conducted into the USA, 400 family physicians were asked to identify the medical conditions and social characteristics of patients that evoked a negative response (Klein, Najman, Kohrman and Munro, 1982). Obesity was the fourth most identified condition and evoked the fourth most negative responses after alcoholism, drug addiction and mental illness. The participants reported an association between obesity and poor hygiene, dishonesty and hostility.

In a study conducted in the north of England, a postal survey was used to examine the attitudes of GPs and clinical psychologists towards moderately and extremely obese people (Harvey and Hill, 2001). Participants rated their attitudes towards obese people as well as to smokers using an adjusted version of the Attitudes Towards Obese Persons scale (Allison, Basile and Yuker, 1991). The results indicated that for the majority of attitudes assessed, both GPs and clinical psychologists held a significantly more negative view of people with extreme obesity than moderate obesity. When compared to cigarette smokers, obese people were rated lower on items of self-esteem. For example, obese people were rated as less happy, more self-conscious and less self-confident than smokers. However, smokers were viewed as having more social difficulties than obese patients. Smokers were rated as having a lesser chance of getting married and an increased chance of discomfort in social situations compared to obese people. The authors noted that the attitudes towards obese people were not as negative as anticipated.

Five thousand primary care physicians in the USA were sent surveys of attitudes about obesity (Foster et al, 2003). Participants were asked to rate nine adjectives on a 7 point Likert scale, where adjectives were paired with their opposite at the other end of the scale (e.g. 'weak-willed' and 'strong-willed'). Over 50% of participants rated obese people highly on the adjectives awkward, ugly, unattractive and noncompliant. Thirty to 45% of participants rated obese people as weak-willed, sloppy or lazy. Nine percent rated obese people as unpleasant and 3% rated obese

people as dishonest. The response rate for that study was low (13%) however the attitudes elicited towards obese people were more negative than in the earlier study by Harvey and Hill (2001). The differences could be explained by the variation in methodology. Whilst the earlier study asked participants to rate obese patients on positive attributes (e.g. 'are usually tidy'), the later study used paired opposites ('sloppy' and 'neat'). However both studies demonstrate that negative attitudes towards obese patients are held by GPs and primary care physicians.

Research has shown these attitudes to be consistent across different healthcare professionals. As well as the study described above that recruited clinical psychologists as participants (Harvey and Hill, 2001), there are surveys conducted in the USA of medical students (Blumberg and Mellis, 1985) and nurses (Bagley, Conklin, Isherwood, Pechiulis and Watson, 1989). In these studies, both using semantic differentiation methods, medical student participants perceived obese people to be unpleasant, worthless and bad; and the nurses perceived obese patients as repulsive, and as people that they would rather not touch.

Studies have also been carried out using methods to identify implicit attitudes towards obesity. Implicit attitudes are those held by individuals that are not necessarily accessible consciously but can have an influence on individuals' behaviour without their awareness, and can be accessed through priming paradigms. An Implicit Association Test was carried out to identify such attitudes among 84 healthcare specialists attending an education meeting on obesity sponsored by a pharmaceutical company in the USA (Teachman and Brownell, 2001). Participants were asked to classify words according to four categories. The categories were developed by pairing 'fat people' and 'thin people' with positive or negative descriptors ('good', 'bad', 'lazy', 'motivated'). The dependent variable was the time taken for the participant to classify words in each category. The results showed that participants were faster at classifying words when 'fat people' was paired to negative rather than positive descriptors. Negative attributes, such as 'bad' and 'lazy' were therefore more active when prompted by the words 'fat people' as opposed to 'thin people', suggesting that negative attitudes towards people experiencing obesity also exist at a level outside of conscious awareness. However,

the healthcare specialists in the study showed significantly less difference between conditions than seen in the general population, when the study was repeated later with the general population using the same principles of design (Teachman, Gapinski, Brownell, Rawlings and Jeyaram, 2003).

A later study provided corroborating results with 389 health specialists at an international obesity conference (Schwartz, Chambliss, Brownell, Blair and Billington, 2003). This study added two more descriptors to those used by Teachman and Brownell (2001); 'smart – stupid' and 'valuable –worthless'. The results showed that when 'fat people' were paired with 'stupid' and 'worthless', significantly more words were classified using the Implicit Association Test. The study also examined differences in response times across different participant characteristics. This showed that implicit negative bias to the term 'fat people' was more likely when the participant was female, had a lower BMI, and did not work directly with obese patients.

Another methodology to explore implicit attitudes towards obesity is to present vignettes to participants depicting patients with different characteristics. A study in the USA used this method with a group of 122 primary care physicians, asking them to evaluate medical charts of patients presenting with chronic headaches (Hebl and Xu, 2001). A between subjects design was employed, with fictional patients varying according to their gender and level of obesity (BMI of 23, 30 or 36 kg/m²). Participants were then asked to report the medical procedures and tests they would provide, as well as report the amount of time they would spend with the patient, and rate their attitudes towards them. The results showed that participants were more likely to provide medical procedures if the patient had a higher BMI. For example, more participants reported cholesterol level checks, consultations about diet and nutrition, and referrals to psychology if the patient had a BMI of 36 kg/m² than one of 23 kg/m².

Attitudes to the patient were more negative when the BMI was higher. Participants were significantly less likely to view the patient as being self-disciplined and as someone who would adhere to their advice if their BMI was higher (Hebl and Xu, 2001). Participants also rated patients with higher BMI as

more annoying, and as instilling less patience in them as physicians. In a link with practice, participants also reported that they would spend significantly less time with a patient with a 36 kg/m² BMI (22.4 ± 8.3 minutes) as opposed to a patient with a 23 kg/m² BMI (31.1 ± 9.4 minutes).

To interpret this evidence base, it is important to explore what is being assessed as an ‘attitude’. Attitude is not a clearly defined concept, however two major attempts to describe its meaning refer to it being a “neural state of readiness” (Allport, 1935) that has a link to behavior, providing “a tendency to respond favourably or unfavourably to the object or situation” (Rokeach, 1948) (both quotes cited in Hayes, 2000; p538). The link between attitudes and behavior is not consistent in the literature however. A meta-analysis and review of attitude-behaviour research by Glasman and Albarracin (2006) demonstrates that the attitude-behaviour link is highly variable with mean correlations ranging from -.20 to .73 across different situations. Attitudes are more likely to predict behaviour if the attitude is accessible, stable, has arisen from direct experience with the object of the attitude, is based on behaviour-relevant information, on less complex information, and if the individual possessing the attitude is confident of their attitude (Ajzen, 2000).

Attributions

One particular form of attitude is beginning to be understood as a key component in people’s beliefs about obesity, and that is the way in which the cause of obesity is attributed. With experts in the field describing dispositional as well as environmental and genetic causes as important factors (Bray, York and DeLany, 1992; Chambers and Wakley 2002, Astrup et al. 2004), assessing the attributions that people make about locus of control in the cause of obesity (hereafter denoted as LoC) is one step towards understanding their attitudes. It is the attribution of LoC that forms the central part of current models of stigma around obesity (Crandall and Martinez, 1996; Puhl and Brownell, 2001). These models identify individualism as a narrative that attributes people’s success and failures to their own abilities and responsibilities. If weight is seen within the control of the obese person, they are seen as a failure within a society that embraces thinness. It follows that it is also seen

as a failure to have gained weight and thus to be associated with laziness, poor self-discipline, passivity and lack of control (Puhl and Brownell, 2001).

Before exploring the way that beliefs about the cause of obesity relate to negative attitudes to obese people, it is important first to look at the evidence base concerning the beliefs healthcare professionals have about the causes of obesity, especially given, as described earlier, the lack of consensus in the evidence base around what the causes of obesity are. Using similar materials to the survey of ‘obesity experts’ described earlier (Bray, York and DeLany, 1992), the survey described earlier of a group of 204 GPs and 51 clinical psychologists in the north of England showed that both those groups of professionals perceived the primary cause of obesity to be physical inactivity (Harvey and Hill, 2001). In that study, in addition to what was discussed earlier, participants were also asked to rate causative factors in cigarette smoking. In comparison to smoking, participants rated depression, genetic factors and mood changes as significant causes of obesity. There were also significant differences across the two professions of participants. GPs were more likely than clinical psychologists to give high ratings to lack of will power, personality and genetic factors as causal in obesity. There was considerable variability in their responses in terms of whether the participants thought that obesity was within or outside an individual’s control.

In another survey from the north of England, 298 district nurses, 119 health visitors and 147 practice nurses were asked about their beliefs about the causes of obesity (Brown, Stride, Psarou, Brewins and Thompson, 2007). When participants were asked to rate different causes, the most highly rated were personal choices about food and physical activity (68.9%). Very few participants rated medical or environmental factors as causative factors of obesity (4.6% and 8.7% respectively). More participants agreed than disagreed with lack of will power around food as a cause (34.7% against 25.4%). This study suggests that healthcare professionals tend to view obesity as within the control of the individual.

A survey of 620 GPs in the USA (termed primary care physicians in the study) also rated lack of physical activity highest as a cause of obesity; significantly more important than the other causes (Foster et al, 2003). There were other findings,

however these were not statistically significant; over-eating and having a high fat diet were rated highly, whilst causes that fell outside of an individual's control such as metabolic defects and endocrine disorders were rated the least highly.

The survey was repeated as part of a broader study of 67 GPs (primary care physicians) also in the USA (Epling, Morley and Ploutz-Snyder, 2011). In this study, participants were also asked open-ended questions to collect qualitative data on their beliefs about the cause of obesity. Identified by 30 participants, the most common response to a question on the cause of obesity was an obesogenic environment, however 16 participants identified that the patients are to blame for their obesity through over-eating, restaurant eating and laziness.

A cross-sectional survey design was used in a study to compare the beliefs about the causes and consequences of obesity between a sample of 89 GPs and 599 patients from England (Ogden et al, 2001). Participants were asked to rate how much they agreed with eleven different causes of obesity. The results demonstrated a potential misunderstanding between GPs and their patients. GPs were more likely than patients to agree with statements that attributed the cause of obesity internally, to the disposition of the patient to overeat. The patients were more likely than the GPs to attribute externally, identifying gland/hormone problems, slow metabolism and stress as major contributory factors to obesity.

Ogden and colleagues (2001) conclude by suggesting these differences in beliefs about the cause of obesity between doctor and patient could lead to a conflict in the way that treatment is provided. They offer this as explanation for the lack of effectiveness in current obesity management interventions, depicting a scenario in which either the patient or the GP does not feel optimistic about a treatment that is chosen. A criticism of this conclusion is that, taking the results as a whole, both GPs and patients were more likely to attribute the cause of obesity internally than externally. This suggests there may be more agreement between GPs and obese patients than is indicated in this study. Furthermore, the study does not look at how different beliefs about the cause of obesity relate to different beliefs about the solutions to obesity.

Relationship between attributions and attitudes

The connection between LoC attribution and negative attitudes about obesity is illustrated in a study in which 64 high-school female student participants were presented with a photograph of a normal or overweight woman (DeJong, 1980). Half of the participants were told that the overweight woman's obesity was caused by a thyroid condition. Participants then were asked to rate the woman in the photograph on seven traits; three of the traits related to self-control. The woman was rated as being more likeable, less self-indulgent and less self-disciplined if their obesity was explained by a thyroid condition.

A similar study asked 149 university students to judge a vignette describing an obese person on a number of traits (Weiner, Perry and Magnusson, 1988). The person was either described as having an internal LoC cause of obesity (excessive eating without exercise) or an external LoC cause of obesity (glandular dysfunction). Participants attributed greater responsibility to individuals with an internal LoC and rated them as evoking more anger and as less likely to receive help from them. Both these studies demonstrate that the LoC of obesity is an important and influential factor in the way individuals react to obese people, however neither of these studies was carried out in a healthcare environment (DeJong, 1980; Weiner, Perry and Magnusson, 1988).

Weiner (1985) developed a model of how attributional models influence understanding of behaviour. This begins with the fundamental causal distinction made in attribution theory (Heider, 1958) which suggests that beliefs about the cause of behaviour can be classed into two sets of conditions: factors within the person (dispositional), and factors within the environment (situational). Weiner referred to this dimension as 'locus of causality'. Weiner then extended the theory with the dimensions of stability and controllability. The importance of stability bears similarity to attitudinal research which states that attitude has a greater influence on behaviour if it is stable (Glasman & Albarracin, 2006). This relates to whether the causal factors of behaviour are due to stable factors such as ability, or variable factors such as mood and effort. The dimension of controllability relates to the level of volitional control that the person has over their behaviour (Weiner, 1985).

Attributions, then, can be seen as both independent variables and dependent variables (Weiner, 2006). In the case of the Fundamental Attribution Error (Ross, 1977), where the individual over-estimates the dispositional cause of others' behaviours and over-estimates the situational cause of those same behaviours in themselves, the attribution is measured as a dependent variable. This would also be the case for surveys of beliefs, where the attributions of individuals are being measured. These attributions can be manipulated, however, by presenting different information to the individual. For example, if vignettes are used to depict an illness as having a particular cause, the attribution becomes an independent variable. The question then changes from what determines the attribution to what the attributions effect (Weiner, 2006).

Weiner, Perry and Magnusson (1988) applied this attributional analysis to examine how ten different experiences or conditions that are described as social stigmas (e.g. Cancer, AIDS, child abuse, obesity) are perceived in a population of 59 students in the USA. Participants were asked to rate how strongly they agreed or disagreed with thirteen statements relating to the controllability, stability and LoC in the cause of the stigmas. Obesity, as a behavioural stigma, was reported by participants to be more in the control of the individual than other physical stigmas, such as blindness, heart disease and cancer.

Ogden and Flanagan (2008) conducted research into the attributions and beliefs held by GPs in the UK about the causes of and solutions to obesity. Similar to their research described earlier (Ogden et al, 2001), they compared GPs' beliefs and attributions about the causes of and solutions to obesity with those held by the general population, using a cross-sectional survey design. However, in the 2008 study, they asked GPs and the general public to rate the extent of their agreement with the usefulness, effectiveness and validity of various specific approaches to treating obesity: medication, surgery, counselling, policy, GP support or a support group. Participants were also asked to rate the extent of their agreement with a number of different possible causes of obesity, which were clustered into biological, behavioural, structural/environmental, psychological and social causes. This

allowed the researchers to examine the relationship between participant beliefs about the causes of obesity with different approaches to treatment.

The statistically significant findings among the GP data were three-fold. Firstly, that increased levels of belief in a biological cause, and decreased levels in a social cause accounted for 11.7% of the variance in the belief that medication is an effective solution to obesity. Secondly, increased levels of belief in a structural or environmental cause of obesity accounted for 3% of the variance in the belief that policy change is an effective solution to obesity. Finally, increased levels of belief in a behavioural cause of obesity accounted for 3% of the variance in the belief that attending a support group is an effective solution to obesity.

Although the variances accounted were relatively small, the findings suggest there is a relationship between beliefs about the cause of obesity and the effectiveness of solutions to obesity, in which the causes maps logically onto the solutions. The more strongly GPs rated their belief in a biological reason for obesity, the more strongly they rated their belief in the effectiveness of medication as a treatment. Similarly, the less strongly they rated beliefs in social causes for obesity, the more strongly they rated belief in medication as an effective intervention.

Both studies (Ogden et al, 2001; Ogden and Flanagan, 2008) addressed the differences between the beliefs held about obese people by GPs and the general population. Potential differences between GP and patient causal attributions of obesity may have implications for their relationships. Such differences may function as a barrier within patient consultations.

The model of patient consultation described by Pendleton, Schofield, Tate and Havelock (1984) is highly regarded by the medical profession. Here, the GP seeks to engage the patient by reaching an agreement on an understanding of the health problem and how it is to be managed. The philosophy of this model is also written into the NICE guidelines for obesity (2006), stating that “the choice of any intervention for weight management must be made through negotiation between the person and their health professional”. Whether or not a GP shares their patients’

beliefs about the causes and solutions to obesity is relevant when predicting how successful that consultation will be.

The conflict in belief is predicted to play a role in the poor outcome rates for primary care interventions for obesity (Ogden et al, 2001). It is therefore important that we gain a greater understanding of the beliefs held by GPs about obesity and an understanding of how these beliefs relate to their practice with obese patients.

GPs' Beliefs about Interventions for Obesity

The beliefs that GPs have about interventions for obesity is important when trying to understand how those treatments can best be delivered. In the NHS, access to care is complicated by the fact that until recently, obesity was not recognised as a diagnosable disease, nor was it part of the curriculum for medical students in the USA or UK (Hill, 2009; Banasiak and Murr, 2001).

GPs have described feeling less rewarded by their work with obese patients and not hopeful of change (Campbell, Engel, Timperio, Cooper and Crawford, 2000). This result came from a survey of 752 GPs in Australia which asked their views on a range of issues including their patients' ability to lose weight, when GPs should provide interventions, and the role of the GP in weight management. Participants responded to a 12-item survey about these issues using Likert scale ratings. Whilst almost 90% of participants agreed that they should help people to maintain a healthy weight, or to lose weight if their patient was above the healthy BMI upper limit of 25 kg/m², fewer than half of the participants agreed that weight loss counselling can be rewarding. It is a complicated picture as, whilst half of the participants agreed that only a small percentage of people who are overweight can reduce their weight and maintain that loss, 70% of participants reported that they were sufficiently prepared to treat overweight patients, and 58% of participants reported that they were sufficiently prepared to treat obesity. The implication here is that GPs feel confident in their ability to implement their knowledge and skills to treat obesity but they lack confidence in the effectiveness of those treatments to help obese patients lose weight. The authors recommend providing GPs with improved

knowledge and skills, however this may not have an impact on GPs' beliefs about the effectiveness of the treatment.

In the same study, more than half of the GPs rated assessment of patients' dietary and physical activity as 'very important' and 75% rated the giving of advice to patients about diet and exercise as 'very important' (Campbell et al, 2000). This study did not, however, ask GPs about specific interventions.

Part of an earlier study described above, failed to find any significant differences between the ratings of seven different treatments of obesity (Bray, York and DeLany, 1992). In this study, participants were asked to rate their agreement with the effectiveness of behavioural modification, exercise, surgery, drugs, diet, a low carbohydrate diet, and a low fat diet as interventions for obesity. For participants from the UK, specifically, a low fat diet was identified as the significantly most effective intervention. The implications of this study are limited by the difficulties of defining behavioural modification and the overlap with the other items on the survey (particularly exercise and diet). Significant differences were found across gender, with women rating exercise as more effective than men (Bray, York and DeLany, 1992).

A survey of 620 primary care physicians from the USA used a more detailed questionnaire to survey views about obesity (Foster et al, 2003). This study also asked participants to rate their agreement or disagreement with a range of items using Likert scales, however the items were more detailed than in previous studies (e.g. Campbell et al, 2000). For example, participants agreed strongly with the statement 'I believe it's necessary to educate obese patients on the health risks of obesity' and 'I feel competent in prescribing weight loss programs for obese patients' but disagreed with the statement 'I am usually successful in helping obese patients to lose weight' (Foster et al, 2003). Fourteen percent of the participants surveyed believed they had been successful in helping an obese patient to lose weight. Although being successful in helping their patients to lose weight was not defined, the results suggest that whilst they felt sufficiently trained, participants also felt pessimistic about the outcomes of interventions for obesity.

Similar results were gathered when this questionnaire was sent out as part of a broader study of 67 US primary care physicians (Epling, Morley and Ploutz-Snyder, 2011). In this study, participants were asked open-ended questions to collect qualitative data on the problems they perceived with interventions for obesity. The most common response (40/67 respondents) was that better interventions were needed as there was poor access to interventions such as bariatric surgery. Common frustrations were also identified, such as “inadequate time for management of obesity” (28/67) and that managing obesity is “futile” (8/67).

In a study of 600 GPs in France, 57% of participants reported that they felt that obesity management interventions were ineffective (Bocquier, Verger, Basdevant, Andreotti, Baretge et al, 2005). Forty-two percent of 607 GPs in France agreed that they were not sufficiently prepared to treat obese patients (Thaun and Avignon, 2005). Similar findings were found in a study of 510 family physicians in the USA in which 72% reported that their medical training had left them unprepared to treat obesity (Fogelman, Vinker, Lachter, Biderman, Itzhak and Kitai, 2002).

The research exploring GPs’ beliefs about interventions for obesity lacks consistency. GPs appear to vary in terms of their confidence when it comes to successfully treating obese and overweight patients, however there is stronger consensus amongst GPs that the interventions themselves have low effectiveness.

Making Treatment Choices

A recent systematic review has shown there is a lack of evidence examining the link between beliefs and practice or, specifically, attitudes and behaviours, in the health professionals working with obese patients (Puhl and Heuer, 2009). The review identifies that health-care professionals hold stereotypes and negative attitudes about obese patients and that there is some evidence that obese patients perceive biased treatment in their healthcare. However, there is a lack of research examining the way that weight bias affects obesity management and use of healthcare services by obese patients (Puhl and Heuer, 2009).

In real-life scenarios with obese patients, the treatment choices made by GPs involve considering many factors, including level of BMI, co-morbidities and

health-related quality of life. Croskerry (2002) described the process of making a treatment choice as “flesh and blood decision making” (p1185, 2002). Groopman (2008) reviewed the literature around this type of decision-making, and examined how evidence-based practice and experience of the individual patient is processed by GPs when developing decisions about choice of intervention. Groopman was critical of how cognitive errors in the decision-making process can lead to inappropriate decisions. He argued that the outcome of a decision for a patient “pivots on clinical facts and the dimension of character – [the patient’s] and their doctors” (p18, 2008). Decisions made by GPs therefore take into account clinical evidence and characteristics of the patient but are also skewed by the GPs’ preconceived beliefs. This is particularly pertinent in obesity considering the lack of consistent evidence on the cause and treatment of obesity, as described earlier.

Clinical decision-making requires a hypothetico-deductive style of reasoning (see Newell and Simon, 1972) in which the GP uses their prior experience and understanding of the patient’s current problem to break down that problem into its elemental parts. Heuristics can then be applied in order to find a solution that can be tested in practice. The beliefs held by the GP play an influential part in the generation of such heuristics. These may include the GPs’ own beliefs about the nature of clinical problems, for example whether obesity is caused by factors in or out of the patient’s control (Ogden et al, 2001).

This understanding of decision-making, recognising healthcare professionals’ cognitive limitations in naturalistic environments with shifting goals breaks from the ‘classical’ decision-making paradigms developed in the 1950s (c. f. Shaban, 2005). Chapman and Sonnenberg (2000) produced a figure to illustrate these different influences on medical decision-making from across the literature, which demonstrates how the decision-maker is not acting in a world of clear choice and certainty (See Figure 1 below). This figure shows how biases can appear in two places during the decision-making process; first at the early stage in which the clinician recalls their expert opinion, and secondly at the moment when the probabilities, utilities and alternatives are being taken into account to make the

decision itself. This is the moment where stereotypes, beliefs and attributions impact on GPs' decisions about treatment for obese patients.

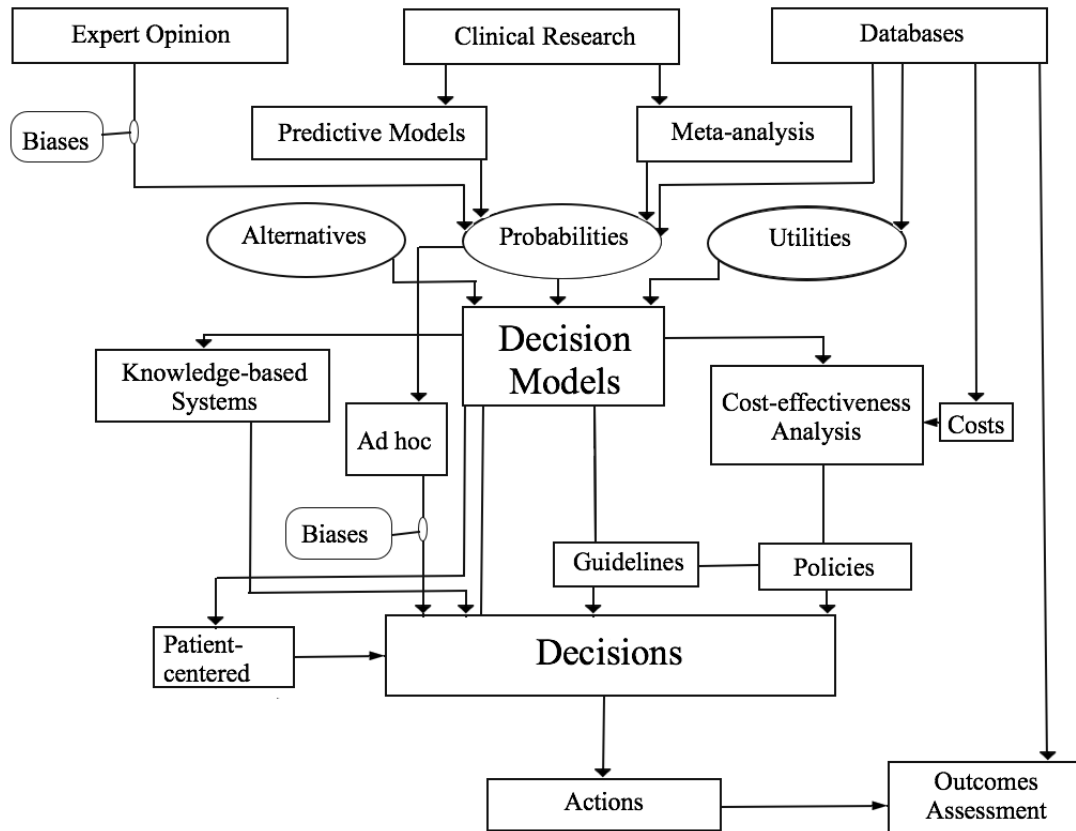


Figure 1: Overall scheme of medical decision-making. Replicated from Chapman and Sonnenberg (2000).

There may also be a conflict between GPs' attributions of the cause of obesity and the growing focus on environmental change interventions in governmental documentation (see Department of Health, 2004). Whilst there has so far been no research examining GPs' implementations of NICE guidelines (2006) on managing obesity, it is known that clinicians often respond with resistance to national standard setting, even though they tend to report favourable attitudes towards the guidelines in early self-report surveys (Grol, 1990). It is uncertain how much this discrepancy is related to GPs' actual beliefs about guidelines rather than the time pressure and service demands which can make implementation of national standards difficult (Grol, 1990).

British studies, which are now relatively dated, have shown that GPs show high levels of adherence to national guidelines in consultation (e.g., Siriwardena, 1995). However, a questionnaire study of English GPs indicated that this adherence is variable (Watkins, Harvey, Langley, Gray and Faulkner, 1999). This study used the characteristics of their 391 participants to identify how their experience and demographics predicted adherence to guidelines. GPs' adherence to guidelines was predicted by the following variables: years of practice, female gender, non-fundholding status and being a 'limited' computer user. As this research is fifteen years old, their computer use may be not as relevant in today's GP environment where computer use is an inevitability. The current changes in the way GPs act as fundholders and commissioners also has implications for the relevance of these findings. However, the study still highlights the importance of considering the attitudes of GPs towards guidelines and interventions when attempting to determine levels of adherence to them.

Grol and Grimshaw (2003) recommended that in order for guidelines to be successful, there needs to be a joint agreement between GPs, multidisciplinary team practices, hospital culture and attitudes in the wider environment. They suggested that in order to create a climate in which GPs work to guidelines, time must be spent introducing GPs to the evidence-base of the policy, developing an understanding of the barriers and facilitators to changing practice, and helping to negotiate the obstacles to the successful dissemination and implementation of strategies (Grol and Grimshaw, 2003). However, the authors did not suggest how this might be funded in practice.

Summary

Obesity is a common concern amongst healthcare professionals, and GPs recognise the provision of weight management interventions as being important for those with a BMI above the healthy range. GPs are, however, pessimistic about the effectiveness of these interventions and tend to view obesity as being caused by factors in the control of the patient. Some patients experience this as difficult and report finding health professionals unhelpful, which may in turn relate to healthcare

professionals' lack of optimism about treating them. When healthcare professionals do treat obese patients, their decisions may be influenced by their own beliefs; one area where this has been examined is in their beliefs about the cause of obesity. However, looking at beliefs of causality can be confounded by real life variables such as finances, resources and changes in policy. Looking at fictional scenarios might buffer against some of those influences and facilitate a clearer and closer examination of the relationship between belief and treatment choice.

The aims of this study are to explore GP beliefs about LoC in the cause of obesity and whether these beliefs predict the decisions GPs may make in response to fictional scenarios. In order to achieve this, a factorial survey approach was employed, featuring vignettes of obese patients for whom the cause and level of obesity were manipulated.

Research Aims

The aim of the proposed research study is two-fold: firstly, to identify the attributions of the locus of control in the cause of obesity among GPs; secondly, to explore whether there is an association between these beliefs and the treatment choices made for obese patients in fictional vignettes.

Research Question

The research question for the current study is: “Are GPs’ attributional models of locus of control in the cause of obesity associated with their judgements about treatment choices for their patients?”

Drawing on literature on the differences between attributional models of obesity held by GPs and those held by their patients (Ogden et al, 2001) and research on negative beliefs held by GPs towards their obese patients (Puhl and Heuer, 2009), this study extends the research in the area, to examine the association between these attributional models and the choices GPs make about treatment. This builds on recent research which demonstrates an association between behavioural, and therefore LoCI, causes of obesity and behavioural based treatments for obesity; and

an association between biological, and therefore LoCE, causes of obesity and medical interventions for obesity (Ogden and Flanagan, 2008).

Research Hypotheses

Hypothesis A

There will be a difference between participants' ratings of survey items that attribute causality of obesity to patient disposition (LoCI) and ratings that attribute causality to environmental factors (LoCE).

Hypothesis B

There will be a relationship between participants' ratings of LoCI items and their ratings of each of four behavioural based treatments for obesity (referral to dietician, clinical psychology, nurse-led interventions, GP to wait and watch).

Hypothesis C

There will be a relationship between participants' ratings of LoCE items with their ratings of both medical interventions for obesity (pharmacological treatment and surgery).

METHODOLOGICAL CONSIDERATIONS

Previous research examining GPs' beliefs about obesity has not attempted to examine how their beliefs are associated with treatment choices (Puhl and Heuer, 2009). A factorial survey design is used to explore this relationship in the current study. This design consists of a combination of vignettes and surveys that examine specific human judgments (c. f. Wallander, 2009). Hebl and Xu (2001) employed a factorial survey design using vignettes to explore the difference in how primary care physicians respond to patients with different BMI levels. The factorial survey design was the choice for the current study as, like the Hebl and Xu (2001) study, it allowed both the presentation of different fictional obese patients to participants, and manipulation of information about BMI and cause of obesity.

The factorial survey design is preferential to an in-vivo design in which GPs record their real-life treatment choices with their obese patients. This design would rely on contacting enough GPs to track the decisions made regarding their obese patients. Firstly, it would be difficult to provide an accurate assessment of each patient's cause of obesity. Secondly, the ethics would need to be considered if details of patients' obesity were recorded. Thirdly, recruitment may be difficult as competing demands on GP time are already known to influence poor response rates to research amongst the profession (Kaner, Haighton, and McAvoy, 1998). The high-level of involvement required from GPs in that design would likely reduce the response rate considerably.

Using a factorial survey design overcomes the problem around defining each patient's LoC in the cause of obesity, and in capturing GP responses to obese patients with varied causes and levels of obesity. It provides the opportunity to present vignettes wherein these factors can be manipulated systematically, thus building on earlier work in which GPs were surveyed about their beliefs regarding the causes, consequences and treatment of obesity (Ogden et al, 2001; Ogden and Flanagan, 2008).

Factorial surveys use fictionalised accounts, vignettes, or factorial objects to present information about a hypothetical scenario. This design allows one to study

judgements and decision-making, usually through Likert ratings of items, based on the vignette (Rossi and Nock, 1982). The main asset of fictional vignettes for the present study is that they can be experimentally manipulated. For example, one study used this technique to demonstrate how apparent evidence for popular support of the death penalty in the USA can be challenged (Boots, Cochran and Heide, 2003). This research found that by presenting realistic homicide scenarios to 872 participants recruited from a jury service pool, in which the circumstances of the crime and characteristics of the offender were described in detail, participants were less likely to favour a death sentence for a fictional offender in the vignette, compared with a recent national poll conducted at the time (Gallup Poll Online, 2002). The poll cited national opinion to be 68% in favour of the death penalty, however the study demonstrated that support for a death penalty significantly reduced when, for example the fictional offender was described as older (ages of offenders ranged from eleven to twenty-five) or as having a “severe mental illness”.

Even though both scenarios used in the vignette presented to all participants involved the offender committing murder, the study found only 18.7% of vignettes yielded participant responses supporting a death penalty (Boots, Cochran and Heide, 2003). Although there is a categorical difference between an individual supporting the implementation of a death penalty in principle and the support of a death penalty in a particular case, the way that the study invited jury members to respond to “death-worthy” cases offered external validity to the study that was not built into the broader national poll (Gallup Poll Online, 2002).

Wallander (2009) has argued that factorial surveys are less open to bias from social desirability than responses to conventional surveys and questionnaires. The multiple factors in factorial surveys are thought to decrease participants’ awareness of the influence of the factors on their decision-making. This is the case even when only two factors are manipulated, as participants respond to a vignette as a whole, rather than to each factor in turn. In designs where participants are presented with direct questions about beliefs pertaining to one factor alone, it is easier for participants to assess what the socially desirable response would be (Alexander and Becker, 1978).

In the factorial survey, a participant may believe they are responding in a way that is socially desirable, but when their responses are compared across different vignettes, small changes in judgement can be detected in association with changes in the independent variables within the vignettes. A further advantage is that the independent variables can be combined in more complex and systematic ways than is possible in the real world (see Alexander and Becker, 1978).

There is a growing evidence-base on good practice for vignette design and analysis in factorial surveys (Wallander et al, 2009; Hughes and Huby, 2004; Ludwick and Zeller, 2001; Hox, Kreft and Hermkens, 1991). The fundamental feature of vignettes is the combination of the dimensions (e.g. for the present study: locus of control and BMI) with levels of the dimensions (e.g. for the present study: internal or external locus of control and the BMI level). If a vignette design consisted of four dimensions, all with two levels, there would be a 'vignette universe' of $2 \times 2 \times 2 \times 2$ possible combinations of factors; i.e. 16 different possible vignettes. Participants would then be given a sample of these vignettes, either through a systematic or random sampling process (see Killian and Ganong, 2002).

Recent developments in methodological design have resulted in the evolution of factorial surveys in order to help researchers understand more complex problems. *Multiple segment factorial vignettes* (see Ganong and Coleman, 2006) use a continual story paradigm to detect social judgements. With this design, there is a sequential manipulation of factors throughout the story. Participants are presented with a vignette, asked for their responses, and are then presented with a continuation of the story, in which certain factors have been altered, and participants are asked for further responses. The process of manipulating changes to a developing story enables the researcher to determine how social judgements change as new, supporting or contradictory information is brought to the participants' attention.

This style of survey is similar to that of the *expanded vignette approach* (Finch, 1987), in which participants are asked for their responses at various stages within a continual story. However, in this case the story is always a consistent one in which no contradictory information is added to the story as it progresses.

A disadvantage with both of these approaches is the length of the resulting vignette and the implications this may have for decreasing the response rate (see Lawrie, Martin, McNeill, Drife, Chrystie et al, 1998) and for increasing respondent fatigue (Batista-Foguet, Saris, and Tort-Martorell, 1990). Hence, it is important to keep the number of dimensions featured in the vignette to a minimum.

Given the recognised pressure on GP time and availability to participate in research (Kaner, Haighton, and McAvoy, 1999), it was important to find a balance between brevity and complexity. The traditional *factorial survey*, as described by Rossi and Nock (1982), met this for the purposes of the current study.

Constructing the Factorial Survey for the Current Study

In order to construct a vignette that can be used to answer the research question, attention was paid to the *dimensions* of the vignette and the *levels* of those dimensions. Dimension refers to the variable that is being manipulated, and the level to the way in which the variable is manipulated. In the present study, the dimensions are *level of obesity* and *cause of obesity* and the levels are two of the grades of obesity (Obesity II, i.e. BMI of 35 kg/m²; Obesity III, i.e. BMI 45 kg/m²; NICE, 2006), and LoC (internal or external; Heider, 1958).

Jasso (2006) writes that dimensions should be based on “prior theory and research, extra-theoretical reasoning, and conventional wisdom” (p.342, 2006) and the levels of each dimension should be numerous enough to reflect the variation in the potential judgements of respondents. Diversity of opinion is also captured in the way the Likert scales are used to measure participant responses to the vignette. The scale must be broad enough to capture sufficient variance in participant attitudes (Ludwick and Zeller, 2001).

Hughes and Huby (2004) advise keeping the vignettes relevant and realistic in order to engage participants. However the most common advice from the literature is to keep the vignette short (see Lawrie et al, 1998).

In terms of reducing social desirability, manipulating perspectives can be helpful (Constant, Keisler and Sprull, 1994). If the participant is asked to think about what they would do as a GP in a scenario with an obese patient, they may be

concerned about their own practice being judged. If instead, they are asked to comment on what a fictional person would do in a scenario, the constraint of this fear is reduced.

Finally, the literature acknowledges the potential ambiguity in the language of the vignettes. Creating a vignette requires the researcher to draw on their skills as a storyteller to direct the participant to the important information, however the science behind this is not clear (see McKeganey, Abel, Taylor, Frischer, Goldberg and Green, 1995; Finch, 1987). This has been considered in the creation of the factorial survey and in the interpretation of the results.

METHOD

Aims

There were two aims of the study. The first aim was to identify the attributional models held by GPs about the causes of obesity, specifically focused on locus of control (LoC). The second aim was to examine the association between GPs' beliefs about LoC and their judgements relating to a series of treatment choices for obese patients.

These were achieved by asking GP participants to respond to two sets of materials: firstly, a survey in which participants were asked to rate their agreement with a series of statements about the causes of obesity; and secondly, a factorial survey consisting of four fictional vignettes featuring obese patients, in response to which the participant was asked to rate the likelihood of six treatment choices being made.

This study builds on the results from Ogden and Flanagan (2008), which examined how GPs' beliefs about the effectiveness of different solutions to obesity are related to their beliefs about different causes of obesity. Ogden and Flanagan's (2008) results demonstrated that beliefs about cause predicted beliefs about solution; for example, belief in a biological cause of obesity predicted a belief that medication is an effective solution for obesity.

Design

The study was conducted using a 2 x 2 factorial survey design (Rossi and Nock, 1982) featuring fictional vignettes about GPs meeting new obese patients for the first time as part of a new patient health check. The vignettes were constructed around two dimensions (level of BMI and LoC) each with two levels (35 kg/m² and 45 kg/m²; internal LoC and external LoC).

Participants were asked to read four different vignettes in which the level and cause of obesity were manipulated. Participants then rated how likely they thought

it was that the fictional GP would opt to treat the patient in the scenario with each of six different treatment options.

In the second stage of the study, participants were asked to complete a sixteen-item survey designed to examine beliefs about the causes of obesity.

Materials

Vignettes

Vignettes are a practical way of assessing the association between beliefs and practice (c.f. Wallander, 2009). In this study, they were used to explore the association between GPs' beliefs about the cause of obesity and treatment choices.

All four vignettes describe a fictional forty-five year-old patient meeting with a fictional GP for a new patient health check. Previous research demonstrates that asking a participant to take the view of a third person minimises socially desirable responses (Constant, Kiesler, and Sproull, 1994).

All details of the patient were matched across the vignettes with the exception of the patient's grade of obesity and the indicated cause of their obesity. Two fictional patients were listed as having Grade II obesity (35kg/m²), and the other two patients as having Grade III obesity (45kg/m²). BMI was included as NICE (2006) guidance recommends the use of obesity grade when making decisions about obesity management. For two of the patients, diet and lack of exercise (internal LoC) were identified as contributing to their obesity. For the other two patients, medication for an over-active thyroid (external LoC) was identified as contributing to their obesity (c. f. Appendix K for the full set of vignettes).

Below and overleaf are two examples of the vignettes from the study. The first describes a patient, Alex, with Grade II obesity who is portrayed as having an internal locus of control (LoCI). The second vignette describes a patient, Pat, with Grade III obesity, who is portrayed as having an external locus of control (LoCE).

“Alex, aged 45 with a BMI of 35kg/m², presents at the GP’s clinic as a new patient for a general check-up after moving to the area. Alex finds it hard to adhere to a diet and does not do regular exercise. Alex has been told that this lifestyle has caused the obesity”.

“Pat, aged 45 with a BMI of 45kg/m², presents at the GP’s clinic as a new patient for a general check-up after moving to the area. Pat has recently had an operation to treat an over-active thyroid, which is currently being managed well by medication. Pat has been told that the medication has caused the obesity”.

The vignettes were kept short to increase response rate (Hox, Kraft and Hermkens, 1991). The order of presentation of the vignettes was counter-balanced in order to minimise demand biases. The balanced Latin Square in Figure 2 below shows the order of vignettes (1, 2, 3, 4) for each survey (A, B, C, D) in the counter-balanced design. Table 3 overleaf shows the arrangement of independent variables in each condition. This is an incomplete counter-balanced design in order to avoid the creation of 24 conditions and the subsequent impact on recruitment. The balanced Latin Square was created so that each independent variable (Obesity Grade II/III and LoCI/LoCE) appears in each position twice. This means that each vignette appears in two positions across the different surveys and therefore appears twice in those positions.

A	1, 2, 3, 4
B	1, 3, 2, 4
C	4, 2, 3, 1
D	4, 3, 2, 1

Figure 2: The order of vignettes (1-4) for each survey (A-D).

Table 3: The arrangement of independent variables in each vignette.

Vignette	Classification of Obesity	Cause of Obesity
1	Grade II	External
2	Grade II	Internal
3	Grade III	External
4	Grade III	Internal

Treatment choice ratings

Each vignette was followed by a list of six treatment options. The treatment options were based on the NICE (2006) guidance for the treatment of obesity:

1. Pharmacological treatment with Orlistat.
2. Referral for bariatric surgery.
3. Referral to a nurse-led behavioural intervention.
4. Referral to a dietician to collaborate.
5. Referral to clinical psychology.
6. The GP will ‘watch and wait’ and provide behavioural, dietary and lifestyle advice to the patient.

Participants were instructed to “*please consider how likely you think it is that the GP in the vignette will make each of the following choices,*” and were informed that all of the six options were “*equally available for the GP in the vignette to consider*”. Before each vignette, participants were reminded “*there are no right or wrong answers,*” to “*use [their] own judgement*” and that “*the questionnaire is completely anonymous so please be as honest as possible*”. Participants then rated each treatment on a Likert scale, from 1 (very unlikely) to 5 (very likely) in response to the question, “*How likely is it that the fictional GP would choose this treatment?*” (c.f. Appendix L for original surveys).

Survey

The survey was based on previous research materials (c.f. Ogden et al, 2001; Ogden and Flanagan, 2008) and additional studies examining the causes of obesity (c.f. Harnack and Schmitz, 2010). The survey (see Appendix L) comprised sixteen statements referring to beliefs about obesity; eight relating to LoCI (individuals eating too much, lacking restraint, eating calorie-dense foods, not doing enough exercise, eating out frequently, eating too many unhealthy foods, sedentary lifestyle, lack of control) and eight relating to an external LoCE (an individual's genetics, slow metabolism, low availability of health foods, general medical reasons, hormones, difficult life events, the food industry, side effects of medication).

Each item was rated in response to the question, "*To what extent do you agree or disagree that each of the following is the main cause of obesity?*" This was rated on a 5-point Likert scale, from 1 (disagree strongly) to 5 (agree strongly).

Piloting

The materials were presented to a group of GPs before the recruitment stage of the study. The pilot group consisted of GPs in Walkey House Medical Centre and Stannington Medical Centre, Sheffield. Advice was also sought from Dr. Robbie Foy, GP at Craven Road Medical Practice, Leeds and Professor of Primary Care at the University of Leeds.

GPs were asked to give their views on the materials. Two made comments that had an impact on the procedure and interpretation of the results. One GP suggested that letters to GPs should be disseminated on yellow paper, and that enough letters be printed for all GPs in the practice. Both of these suggestions were incorporated in the research design. The second GP commented that there may be variation between GPs in their views on the effectiveness of interventions for obesity management depending on the period in which the GP trained; i.e. GPs who trained longer ago would be more likely to believe treatments to be ineffective and therefore be less likely to refer patients for interventions or prescribe pharmacological treatments. Both GPs agreed the most important suggestion was to keep the survey short.

Recruitment

The University of Leeds Institute of Health Sciences holds a database of GP surgeries in the West Yorkshire area, based on public access information available on the NHS choices website (<http://www.nhs.uk/Services>). These GP surgeries comprised the total number of NHS GP surgeries in Leeds, and Bradford and Airedale Primary Care Trusts (PCTs) as existed at the time of recruitment. The database includes 224 surgeries, with an estimated total of 1159 GPs. The PCTs are local to the University of Leeds and were selected for recruitment as GPs at those practices have previously shown interest, and participated in, projects with the University of Leeds.

I made contact with practice managers from each of the GP practices by telephone, provided a brief outline of the study and asked if I might send recruitment letters to be distributed to GPs. I sent a letter confirming the agreement, along with the appropriate number of information packs for the GPs, to each practice manager who gave in principle agreement to receive and distribute such information. Copies of the letter and reminder letters to the practice manager and letters to the participants are attached (see Appendix C, D, E, F, G and H).

The recruitment letter explained the purpose of the research project, the procedure, and issues of anonymity and confidentiality. It directed participants to the Bristol Online Survey website, on which the patient vignettes and obesity survey were held. Participants were informed of the option of being entered into a prize draw for £100 in Amazon vouchers upon completion of the survey. The letter also notified participants that they could opt in to receive certificates of completion and/or summaries of the conclusions of the research. Further participant information, including statements of consent, were presented to participants when they accessed the Bristol Online Survey (see Appendix I).

Of the 224 practices contacted, 217 practices agreed to distribute recruitment letters. All letters were distributed between November 2012 and January 2013. GP practices were randomly allocated to one of the four surveys in the counter-balanced design. Fifty-one practices, with an estimated 280 GPs, were sent survey A (vignettes in the order 1,2,3,4). Fifty-three practices, with an estimated 286 GPs,

were sent survey B (1,3,2,4). Sixty practices, with an estimated 305 GPs, were sent survey C (4,2,3,1). Fifty-three practices, with an estimated 288 GPs, were sent survey D (4,3,2,1). As all participants responded to all four vignettes, there was no need to randomly or systematically sample the vignette universe (Killian and Ganong, 2002).

In February 2013, all 217 practices that had previously agreed to distribute the recruitment letters were sent a reminder letter. This letter explained that the survey would no longer be accessible after 28th February 2013. A final reminder was sent at the start of the last week in February 2013.

The prize draw was conducted on 1st March 2013 and the successful participant was notified by e-mail. Certificate of completions and executive summaries of the results were sent to participants by e-mail in August 2013.

Power and Sample Size

Statistical power was considered in the planning stage of recruitment. Previous research recommends a method of considering not just the number of participants but also the number of vignettes judged by each respondent (see Wallander, 2009). If participants were to sample more vignettes, the study would require fewer participants to reach statistical power. However, this runs the risk of increasing bias due to respondent fatigue.

A power calculation using GPower 3.1 (Faul and Erffelder, 1992; available at <http://www.psych.uni-duesseldorf.de/abteilungen/aap/gpower3/download-and-register>) for all intended statistical tests (related t-tests, ANOVAs, correlation, and regression analyses) determined the required sample size.

Previous studies that have examined the correlation between behaviours and beliefs do not have a consistent effect size across the literature, as this is dependent on the specific behaviour and specific belief (Ajzen, 2000). Data from the study by Ogden and Flanagan (2008), which examined how beliefs about the cause of obesity predicts the belief about solutions to obesity, were consulted to provide an estimate of the effect size. Those authors reported partial regression coefficients as B values ranging from .19 to .35 (Ogden and Flanagan, 2008).

A medium effect size (.30) was therefore used in the power calculation for all analyses. Alpha and power were set to the recommended levels of .05 (Howell, 1997) and .80 (Cohen, 1992) respectively. This calculation indicated that to answer the aims of the study required 72 participants.

Analysis

GPs' beliefs about obesity

Participants' responses to the survey data were initially explored using descriptive statistics to identify the range and central tendency of responses for the sixteen statements. LoCI and LoCE sub-scores were created by summing the responses to the respective sets of eight statements. A related t-test was performed to examine the difference between the responses to LoCI statements compared with LoCE statements in order to identify if participants were more likely to hold LoCI beliefs as compared to LoCE beliefs. Correlational analyses were carried out to explore the relationship between each item and the sub-score. It was therefore possible to explore whether GPs were more likely to rate causes of obesity as LoCI or LoCE.

Relationship between GPs' beliefs about obesity and their rating of treatment choice.

Participants' responses to the vignettes were analysed to detect the differences between participants' rating of treatment choices across the four different scenarios. A series of 2 x 2 repeated measures ANOVA were used to explore the main effects of BMI and LoC for each of the six treatment choices.

Correlational analyses were carried out to explore the relationship between participants' beliefs about the cause of obesity with the participants' responses to treatment choices. Point biserial correlation analyses were carried out to explore the relationship between participant's responses to treatment choices and the fictional patient's LoC (internal/external) and also with the fictional patient's grade of obesity (Grade II / Grade III). Where significant correlations emerged, forward stepwise logistic regression analyses were undertaken to explore the extent to which locus of

control, obesity grade and participant belief predicted the ratings for the treatment choices.

Ethical Approval

Ethical approval for this study was granted by the University of Leeds on 27th September 2012 and subsequently by both the Leeds Research and Development Ethics Committee and the Airedale and Bradford Research and Development Ethics Committee on October 25th 2012. A copy of the approval letter can be found in Appendix A and B. Copies of the information sheet and consent form given to participants can be found in Appendix I and Appendix J respectively.

RESULTS

Participants

An estimated 1,159 GPs from 217 general practices in the West Yorkshire region received recruitment letters for the study. This is an estimate as not all practice managers were able to confirm the exact number of GPs to whom the letters were distributed. Eighty-one GPs completed the online survey, representing a response rate of 6.9%.

Survey of Beliefs

Participants' ratings of the sixteen statements comprising the survey of beliefs were coded from 1 (disagree strongly) to 5 (agree strongly). Two sub-scores, LoCI and LoCE, were computed for each participant by calculating the mean rating across the eight internal and eight external causes of obesity respectively. Those scores are shown in Table 4.

Table 4: Frequency of scores for the LoCI and LoCE subscales.

Survey Response	LoCI (<i>n</i> = 81)	LoCE (<i>n</i> = 81)
Agree strongly	29	0
Agree	50	14
Neither agree or disagree	2	51
Disagree	0	16
Disagree strongly	0	0

On average, participants were more likely to agree strongly with LoCI statements ($M = 4.33$, $SE = .029$), than LoCE statements ($M = 2.98$, $SE = .034$). This difference was significant ($t(81) = -31.50$ $p = 0.0001$). Normal distribution was assumed for both internal factors (Kolomogrov-Smirnov test; $D(81) = 0.12$, non-significant) and external factors (Kolomogrov-Smirnov test; $D(81) = 0.58$, non-significant). Data from both internal and external factors were non-significantly skewed towards

higher scores (-0.07 and -0.11 respectively) and were non-significantly platykurtic (-0.54 and -0.40 respectively).

Table 5 shows the mean responses for each LoCI and LoCE item. As the responses to the survey produce ordinal data, the responses to each item were correlated with their respective sub-score using Spearman's Rho.

Table 5: Participant responses to survey on causes of obesity.

	Rating (n=81) Mean ± SD	Correlation with subscore (rs statistic)	P- value
LoCI Items			
Sedentary lifestyle	4.64 ± 0.53	0.63	0.01
Individuals eating too much	4.62 ± 0.58	0.55	0.01
Eating too many unhealthy foods	4.52 ± 0.57	0.69	0.01
Eating calorie-dense foods	4.42 ± 0.59	0.51	0.01
Not doing enough exercise	4.42 ± 0.79	0.54	0.01
Lacking restraint	3.99 ± 0.80	0.64	0.01
Lack of control	3.96 ± 0.77	0.65	0.01
Eating out frequently	3.25 ± 0.89	0.46	0.01
LoCE Items			
The food industry	4.00 ± 0.89	0.27	0.01
Difficult life events	3.72 ± 0.86	0.47	0.01
An individual's genetics	3.09 ± 1.03	0.45	0.01
Side effects of medication	2.98 ± 0.99	0.75	0.01
General medical reasons	2.65 ± 1.04	0.66	0.01
Slow metabolism	2.35 ± 1.03	0.69	0.01
Low availability of health foods	2.30 ± 1.08	0.36	0.01
Hormones	2.12 ± 0.94	0.72	0.01

Having a sedentary lifestyle (Mean = 4.64 ± 0.53) was the highest rating of all the LoCI and LoCE items. The food industry (Mean = 4 ± 0.89) was the most highly rated of the LoCE items. LoCI items were rated overall more highly than LoCE

items (LoCI items range on the mean from 3.25 to 4.64; LoCE items range on the mean from 2.12 to 4.00).

Examination of Table 5 confirms that all item responses correlated positively and significantly with their respective sub-score. The strength of correlation varied from 0.27 for the food industry, to $r_s = 0.75$, for the side effects of medication.

Vignettes

Table 6 shows the mean responses to the vignettes grouped according to patient BMI. This compares the means of responses to vignettes A and B (35 kg/m²) with the responses to vignettes C and D (45 kg/m²).

Table 6: Means and standard deviations of participant ratings of treatment choices ($n = 81$).

Treatment Choice	BMI		<i>F</i>	<i>p</i> -value
	35 kg/m ²	45 kg/m ²		
Watch & Wait	4.30 ± 0.78	3.62 ± 1.25	34.55	0.0001
Nurse-led	3.54 ± 1.28	3.83 ± 1.17	4.35	0.038
Dietician	3.09 ± 1.19	3.62 ± 1.13	17.05	0.0001
Pharmacological	2.16 ± 1.10	2.76 ± 1.26	20.71	0.0001
Psychology	1.68 ± 0.79	2.08 ± 1.83	6.57	0.011
Surgery	1.27 ± 0.52	2.28 ± 1.17	102.29	0.0001

The choice to watch and wait is rated highly across both BMI conditions; and is the most highly rated choice for patients with a BMI of 35 kg/m². Referral to psychology or for surgery are the lowest rated choices across both BMI conditions.

A series of one-way ANOVAs indicated that there was a significant effect of BMI on participants' rating of different treatment choices. Participants rated all treatment choices, apart from watch and wait, as more likely for the higher BMI of 45 kg/m². Participants rated watch and wait as more likely for the lower BMI of 35 kg/m², ($F(1, 81) = 34.55, p < 0.0001$).

Figure 3 illustrates the effect of BMI on the rating of treatment choices by participants. The graph compares the percentage of participants that rate either

‘likely’ or ‘highly likely’ for patients with a BMI of 35 kg/m² (vignettes A and B), and with a BMI of 45 kg/m² (vignettes C and D).

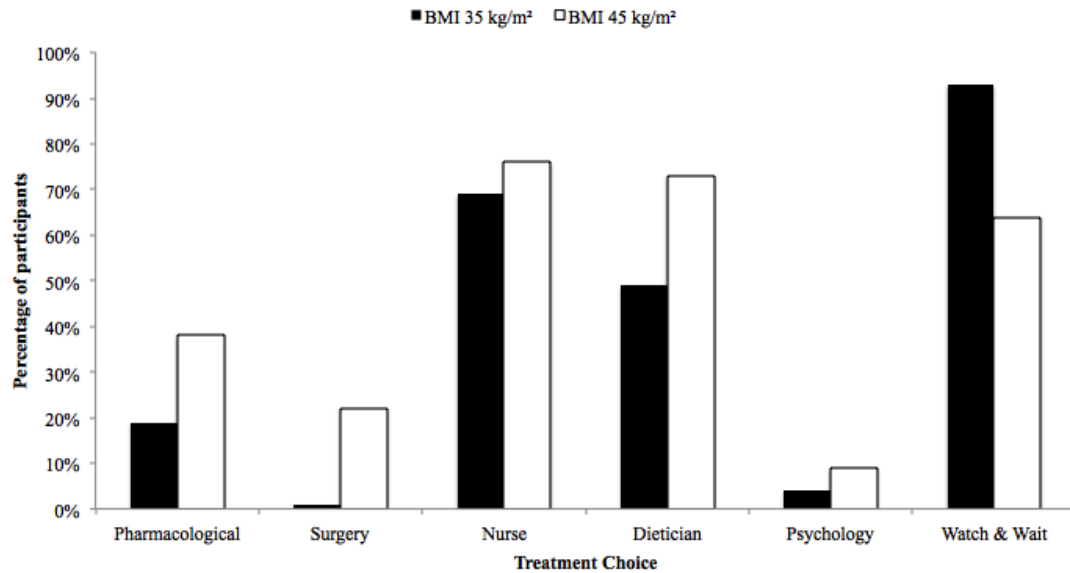


Figure 3: Percentage of participants that rated each treatment choice as ‘highly likely’ or ‘likely’.

This demonstrates the difference between participants’ rating of treatment choices when the BMI in the vignette is manipulated.

A point-biserial correlation analysis was then conducted to examine the association between BMI and participant response to treatment choices. The results are shown in Table 7.

Table 7: Two-tailed point-biserial correlations between BMI and the rating of treatment choices ($n = 81$).

Treatment Choice	Correlation with	
	BMI (r_s statistic)	P - value
Pharmacological	0.24	0.01
Surgery	0.49	0.01
Nurse-led	0.11	0.05
Dietician	0.24	0.01
Psychology	0.16	0.01
Watch & Wait	-0.27	0.01

There were significant relationships between the BMI and rating of all treatment choices. Examination of the data indicates that the strongest relationship was between surgery and BMI of 45 kg/m² ($r_s=0.49$, $p=0.01$). All the other correlations were positive except for ‘watch and wait’; this relationship was stronger when BMI was lower ($r_s = -0.27$, $p=0.01$).

Table 8: Means and standard deviations of participant ratings of treatment choices according to LoC ($n = 81$).

Treatment Choice	LoC			
	LoCE	LoCI	<i>F</i> - statistic	<i>p</i> -value
Watch & Wait	4.04 ± 1.06	3.87 ± 1.12	2.03	0.16
Nurse-led	3.62 ± 1.23	3.75 ± 1.23	0.81	0.37
Dietician	3.28 ± 1.19	3.42 ± 1.18	1.06	0.30
Pharmacological	2.38 ± 1.20	2.54 ± 1.24	1.30	0.26
Psychology	1.84 ± 1.76	1.92 ± 0.98	0.26	0.61
Surgery	1.71 ± 1.01	1.84 ± 1.06	1.26	0.26

Table 8 shows the mean responses to the vignettes grouped by LoC. This compares the means of responses to vignettes A and C (LoCE) with vignettes B and D (LoCI). ‘Watch and wait’ is the most highly rated treatment choice, and surgery is the lowest rated treatment choice across both conditions of LoC.

A series of one-way ANOVAs indicated that there was no significant effect of LoC on participant ratings of any of the treatment choices. Participants rated all LoCI treatment choices, apart from watch and wait, more highly than the LoCE choices, however the differences were non-significant. Participants rated watch and wait as more likely for LoCE than LoCI, ($F(1, 81) = 2.03$, $p<0.16$).

Exploring the Relationship between Survey and Vignettes

Each of the participants' LoCI and LoCE scores were correlated with the ratings on the survey. Significant results are shown in Table 9.

Table 9: Two-tailed correlations between participants' sub-scores from the survey of beliefs and their likelihood rating of each treatment option ($n = 81$).

Treatment choice	LoCE		LoCI	
	<i>rs</i>	<i>p-value</i>	<i>rs</i>	<i>p-value</i>
Psychology	0.35	0.01	-0.01	NS
Nurse-led	0.32	0.01	0.13	0.05
Pharmacological	0.26	0.01	-0.13	0.05
Watch and wait	-0.15	0.01	0.13	0.01
Dietician	0.15	0.05	-0.05	NS
Bariatric surgery	0.15	0.01	-0.03	NS

The results show that the most significant relationship is between the referral to clinical psychology and the high ratings of LoCE factors. 'Watch and wait' is the only treatment option that has a significant negative correlation with the rating of LoCE factors. Whilst both 'watch and wait' and nurse-led behavioural interventions are significantly related with high ratings of LoCI factors, the correlations are not as strong as those between psychology, nurse-led behavioural interventions, and pharmacological treatment with LoCE factors.

Spearman's rho analysis (Kinnear and Gray, 2004) revealed that participants' LoCE sub-score was positively correlated with the likelihood of the choice to refer to clinical psychology, a nurse-led behavioural intervention, offer pharmacological intervention, refer to a dietician and refer to bariatric surgery.

There was a negative correlation between participants' LoCI sub-score and the likelihood of the choice to offer pharmacological treatment and a positive correlation between the LoCI sub-score and the choice to refer to a nurse-led behavioural intervention. There was a negative correlation between the LoCE sub-score and the reported likelihood of the GP's choice to watch and wait, and a

positive correlation between the LoCI sub-score and increased likelihood on the same choice to watch and wait.

The variation in strength of correlation between survey items and the survey sub-scores means that it is more meaningful to consider each item separately when exploring the relationship between participant ratings of survey items and their ratings of treatment choices. Spearman's rho analysis (Kinnear and Gray, 2004) was used to identify correlations between the survey items and the treatment choices (see Table 10).

Variables eliciting significant correlations were then entered into a forward stepwise logistic regression in the order of correlation, for each of the six treatment choices (Hosmer and Lemeshow, 1989). Forward stepwise regression is used for analysis in which there is no strong evidence in the literature to predict a one-tailed hypothesis. As the hypothesis is two-tailed, variables have to be input in order of correlation size to ratings of likelihood on treatment choices in order to build up the regression model based on the strongest associations from the data.

The data meet the necessary assumption for this analysis to take place (Field, 2005): all predictor variables are categorical or ordinal (LoC and BMI of the patient in the vignette, and LoCI and LoCE scores on the survey of beliefs) and the outcome variables (ratings of treatment choice) are quantitative, continuous and unbounded.

The predictors all have variation in value, however there is no perfect multicollinearity between two or more predictors. The strongest correlation between predictors is a significant positive relationship between the belief that obesity is caused by not doing enough exercise and that it is caused by a sedentary lifestyle ($r_s = 0.73$, $p < 0.01$ (two tailed)).

Table 10: Correlation co-efficients (*rs*) between survey items and treatment choice.

Survey Item Rating of Likelihood		Treatment Choice					
		Pharmaco- logical	Surgery	Nurse- led	Dietician	Psycho- logist	Watch & wait
LoCI	Individuals eating too much	-0.13*	-0.01	0.05	-0.08	-0.08	0.15**
	Lacking restraint	-0.16**	0.00	0.00	-0.11	0.04	0.12**
	Eating calorie-dense foods	0.05	-0.04	-0.00	0.02	-0.15**	0.16**
	Not doing enough exercise	-0.14**	-0.07	0.16**	-0.04	-0.01	0.13**
	Eating out frequently	0.07	0.02	0.12*	-0.06	0.03	-0.03
	Eating too many unhealthy foods	-0.07	0.00	0.01	-0.04	-0.02	-0.01
	Sedentary lifestyle	-0.10	-0.02	-0.15**	-0.01	0.06	0.07
	Lack of control	-0.15**	-0.09	0.06	-0.08	-0.01	0.13
	LoCE	An individual's genetics	0.10	0.09	-0.04	-0.03	0.05
Slow metabolism		0.22**	0.12	0.12*	0.17**	0.28**	-0.17**
Low availability of healthy foods		0.19**	0.14*	0.14*	0.04	0.21**	-0.19**
General medical reasons		0.02	0.09	0.24**	0.25**	0.28**	-0.00
Hormones		0.21**	0.13*	0.10	0.12*	0.38**	-0.17**
Difficult life events		0.13*	-0.05	0.34**	-0.08	0.04	0.02
The food industry		-0.00	0.03	0.09	0.02	-0.02	0.02
Side effects of medication		0.21**	0.12	0.34**	0.13*	0.34**	-0.16*

Note. *p=0.05, **p=0.01

The Durbin-Watson test identified that all regression analyses in this study had uncorrelated residuals, and the residuals at each level of the predictor had the same variance. The Durbin-Watson is reported for each regression analysis below. It is assumed that all data has normally distributed errors, that the outcome variables are independent and a scatterplot of each regression analysis identifies that the predictors and outcome variables have linearity.

Medical interventions

The following analyses relate to the two choices that are classified as medical interventions; the pharmacological intervention with Orlistat and the referral for bariatric surgery.

Predictors of likelihood of pharmacological intervention with Orlistat

Table 11 shows the significant correlations between participant ratings of the choice of Orlistat, and their ratings in the survey of beliefs.

Table 11: Two-tailed correlations between participant ratings on survey of beliefs and rating of likelihood of offering pharmacological treatment with Orlistat ($n = 81$).

Cause of Obesity	<i>rs</i>	<i>P</i>
LoCE		
Metabolism	0.22	0.01
Side-effects of medication	0.21	0.01
Hormones	0.21	0.01
Low availability of healthy foods	0.19	0.01
LoCI		
Eating too much	-0.13	0.05
Not doing enough exercise	-0.14	0.01
Lack of control	-0.15	0.01
Lacking restraint	-0.16	0.01

The likelihood of prescribing Orlistat was positively correlated with LoCE items; i.e. that obesity is mainly caused by the metabolism, low availability of healthy foods, hormones, difficult life events, and by the side effects of medication.

The likelihood of prescribing Orlistat was negatively correlated with LoCI survey responses, indicating the belief that obesity is caused by factors pertaining to an internal locus of control; i.e., that obesity is mainly caused by individuals eating too much, lacking restraint, not doing enough exercise and having a lack of control. There were no other statistically significant correlations.

The Durbin-Watson statistic was computed to evaluate the independence of each significant correlation, including that between BMI and rating of the choice to prescribe Orlistat. The Durbin-Watson of 1.36 was considered acceptable.

These significant correlations were entered, in order of size of correlation, into a forward stepwise logistic regression (see Table 12). The analysis revealed that BMI 45 kg/m² was the strongest predictor for ratings of Orlistat choice as more likely, but this only accounted for 6% of variance ($p < 0.0001$). As the model was extended, 17% of variance was accounted for when participants also agreed that metabolism, side-effects of medication and low availability of healthy foods were causes of obesity and disagreed that patients lacking restraint was a cause of obesity.

Predictors of likelihood of referral for bariatric surgery

Table 13 shows the significant correlations between participant ratings of the choice of bariatric surgery and their ratings in the survey of beliefs.

The likelihood of referring for bariatric surgery was positively correlated with LocE items; i.e. that obesity is mainly caused by the low availability of healthy foods and by hormones. There were no other statistically significant correlations.

The Durbin-Watson statistic was computed to evaluate the independence of each significant correlation, including that between BMI and rating of the choice to refer for bariatric surgery. The Durbin-Watson of 1.47 was considered acceptable.

Table 12: Logistic regression to explore the relationship between predictor variables and participant rating of treatment choice to prescribe Orlistat ($n = 81$).

	R^2	ΔR^2	B	SE B	β	p - value
Step 1	0.06	0.06				
Constant			2.16	0.93		
BMI			0.60	0.13	0.25	0.00
Step 2	0.11	0.05				
Constant			1.54	0.17		
BMI			0.60	0.13	0.25	0.00
Metabolism			0.27	0.06	0.22	0.00
Step 3	0.13	0.02				
Constant			1.15	0.22		
BMI			0.60	0.13	0.25	0.00
Metabolism			0.19	0.07	0.16	0.01
Side-effects of medication			0.20	0.07	0.16	0.01
Step 4	0.15	0.02				
Constant			0.84	0.24		
BMI			0.60	0.13	0.25	0.00
Metabolism			0.20	0.07	0.17	0.00
Side-effects of medication			0.15	0.07	0.12	0.04
Low availability of healthy foods			0.18	0.06	0.16	0.00
Step 5	0.17	0.01				
Constant			1.56	0.43		
BMI			0.60	0.13	0.25	0.00
Metabolism			0.19	0.07	0.16	0.01
Side-effects of medication			0.16	0.07	0.13	0.03
Low availability of healthy foods			0.15	0.06	0.13	0.01
Lacking restraint			-0.16	0.08	-0.11	0.04

Table 13: Two-tailed correlations between participants' ratings on survey of beliefs and rating of likelihood of referring for bariatric surgery ($n = 81$).

Cause of Obesity	<i>R_s</i>	<i>p</i>
LoCE		
Low availability of healthy foods	0.138	0.05
Hormones	0.133	0.05
LoCI		
No significant correlations		

These significant correlations were entered, in order of size of correlation, into a forward stepwise logistic regression (see Table 14). This revealed that BMI of 45 kg/m² was the strongest predictor for participants for ratings of referral to bariatric surgery, accounting for 24.1% of variance ($p < 0.0001$). As the model was extended, 38% of variance was accounted for when participants also agreed that low availability of health foods, and hormones were causes of obesity.

Table 14: Logistic regression to explore the relationship between predictor variables and participant rating of treatment choice to refer for bariatric surgery ($n = 81$).

	<i>R²</i>	ΔR^2	<i>B</i>	<i>SE</i> <i>B</i>	β	<i>p</i> - value
Step 1	0.24	0.24				
Constant			1.27	0.07		
BMI			1.02	0.10	0.49	0.00
Step 2	0.27	0.03				
Constant			0.90	0.13		
BMI			1.02	0.10	0.49	0.00
Low availability of healthy foods			0.16	0.05	0.16	0.00
Step 3	0.38	0.01				
Constant			0.68	0.16		
BMI			1.02	0.10	0.49	0.00
Low availability of healthy foods			0.15	0.05	0.15	0.00
Hormones			0.12	0.05	0.11	0.03

Behavioural-based treatments

The following analyses relate to the four choices that are classified as behavioural-based treatments; the referral to a nurse-led behavioural intervention, a dietician, clinical psychology and the choice of the GP to watch and wait.

Predictors of likelihood of referral to a nurse-led behavioural intervention

Table 15 overleaf shows the significant correlations between participant ratings of the choice of referral to a nurse-led behavioural intervention and their ratings in the survey of beliefs.

Table 15: Two-tailed correlations between participants' ratings on survey of beliefs and rating of likelihood of the GP in the vignette referring to a nurse-led behavioural intervention ($n = 81$).

Cause of Obesity	<i>rs</i>	<i>p</i>
LoCE		
Side-effects of medication	0.342	0.01
Difficult life events	0.340	0.01
General medical reasons	0.239	0.01
Low availability of healthy foods	0.135	0.05
Metabolism	0.122	0.05
LoCI		
Not doing enough exercise	0.162	0.01
Sedentary lifestyle	0.152	0.01
Eating out frequently	0.123	0.05

The likelihood of referring for a nurse-led behavioural intervention was positively correlated with LoCE items; i.e. that obesity is mainly caused by the metabolism, low availability of healthy foods, general medical reasons, difficult life events, and by the side effects of medication.

There was also a positive correlation between the likelihood of referring to a nurse-led behavioural intervention and survey responses indicating a belief that obesity is caused by factors pertaining to an internal locus of control; these were that obesity is mainly caused by individuals not doing enough exercise, eating out

frequently and having a sedentary lifestyle. There were no other statistically significant correlations.

The Durbin-Watson statistic was computed to evaluate the independence of each significant correlation, including that between BMI and rating of the choice to refer for a nurse-led behavioural intervention. The Durbin-Watson of 1.27 was considered acceptable.

These significant correlations were entered, in order of size of correlation into a forward stepwise logistic regression. This revealed that the belief that obesity is caused by side-effects of medication was the strongest predictor for the choice of referral to a nurse-led behavioural intervention, accounting for 12% of variance ($p < 0.0001$). As the model was extended, 19% of variance was accounted for when participants also agreed that not doing enough exercise was a cause of obesity and if the fictional patient had a BMI of 45 kg/m² (see Table 16).

Table 16: Logistic regression to explore the relationship between predictor variables and participant rating of treatment choice to refer for a nurse-led behavioural intervention ($n = 81$).

	R^2	ΔR^2	B	SE B	β	p - value
Step 1	0.12	0.12				
Constant			2.39	0.21		
Side-effects of medication			0.44	0.07	0.35	0.00
Step 2	0.18	0.06				
Constant			0.72	0.40		
Side-effects of medication			0.44	0.06	0.35	0.00
Not doing enough exercise			0.38	0.08	0.24	0.00
Step 3	0.19	0.01				
Constant			0.58	0.41		
Side-effects of medication			0.44	0.06	0.35	0.00

Not doing enough				
exercise	0.38	0.08	0.24	0.00
BMI	0.28	0.12	0.12	0.02

Predictors of likelihood of referral to a dietician

Table 17 shows the significant correlations between participant ratings of the choice of referral to a dietician and their ratings of the statements on the survey of beliefs.

Table 17: Two-tailed correlations between participants’ ratings on survey of beliefs and rating of likelihood of the GP in the vignette referring to a dietician (n = 81).

Cause of Obesity	<i>rs</i>	<i>P</i>
LoCE		
General medical reasons	0.248	0.01
Metabolism	0.173	0.01
Side-effects of medication	0.125	0.05
Hormones	0.119	0.05
LoCI		
No correlations		

The likelihood of referring to a dietician was positively correlated with LoCE items; i.e. that obesity is mainly caused by the metabolism, general medical reasons, hormones, and by the side effects of medication. There were no other statistically significant correlations.

The Durbin-Watson statistic was computed to evaluate the independence of each significant correlation, including that between BMI and rating of the choice to refer to a dietician. The Durbin-Watson of 1.44 was considered acceptable.

These significant correlations were entered, in order of size of correlation into a forward stepwise logistic regression. This revealed that the belief that obesity was caused mainly by general medical reasons was the strongest predictor for the choice of referral to a dietician, accounting for 6.8% of variance (p<0.0001). As the

model was extended, 12% of variance was accounted for when participants also agreed that general medical reasons were a cause of obesity (see Table 18).

Table 18: Logistic regression to explore the relationship between predictor variables and participant rating of treatment choice to refer to a dietician ($n = 81$).

	R^2	ΔR^2	B	SE B	β	p - value
Step 1	0.07	0.07				
Constant			2.56	0.18		
General medical reasons			0.30	0.06	0.26	0.00
Step 2	0.12	0.05				
Constant			2.29	0.18		
General medical reasons			0.30	0.06	0.26	0.00
BMI			0.53	0.12	0.22	0.00

Predictors of likelihood of referral to clinical psychology

Table 19 shows the significant correlations between participant ratings of the choice of referral to clinical psychology and their ratings of the statements on the survey of beliefs.

Table 19: Two-tailed correlations between participants' ratings on survey of beliefs and rating of likelihood of the GP in the vignette referring to clinical psychology ($n = 81$).

Cause of Obesity	rs	p
LoCE		
Hormones	0.375	0.01
Side-effects of medication	0.343	0.01
General medical reasons	0.278	0.01
Metabolism	0.277	0.01
Low availability of healthy foods	0.213	0.01
LoCI		
Eating calorie-dense foods	-0.147	0.01

The likelihood of referring to clinical psychology was positively correlated with LoCE items. That is, participants believed that obesity is caused mainly by the metabolism, the low availability of healthy foods, general medical reasons, hormones, and by the side effects of medication.

There was a negative correlation between the likelihood of referring to clinical psychology with one LoCI item. That is, participants believed that obesity is mainly caused by individuals eating calorie-dense foods. There were no other statistically significant correlations.

The Durbin-Watson statistic was computed to evaluate the independence of each significant correlation, including that between BMI and rating of the choice to refer to clinical psychology. The Durbin-Watson of 1.83 was considered acceptable.

These significant correlations were entered, in order of size of correlation into a forward stepwise logistic regression. This revealed that the belief that obesity was caused mainly by hormones was the strongest predictor for the choice of referral to clinical psychology, accounting for 2% of variance ($p=0.01$). As the model was extended, 4% of variance was accounted for when the patient had a BMI of 45 k/m². The results of the regression are shown in Table 20 below.

Table 20: Logistic regression to explore the relationship between predictor variables and participant rating of treatment choice to refer to clinical psychology ($n = 81$).

	R^2	ΔR^2	B	SE B	β	p - value
Step 1	0.02	0.02				
Constant			1.42	0.19		
Hormones			0.22	0.08	0.14	0.01
Step 2	0.04	0.02				
Constant			1.22	0.21		
Hormones			0.22	0.08	0.14	0.01
BMI			0.40	0.16	0.14	0.01

Predictors of likelihood that the GP will ‘watch and wait’

Table 21 shows the significant correlations between participant ratings of the choice of the GP to ‘watch and wait’ and their ratings of the statements on the survey of beliefs.

Table 21: Two-tailed correlations between participants’ ratings on survey of beliefs and rating of likelihood of the GP in the vignette providing behavioural, dietary and lifestyle advice to the patient ($n = 81$).

Cause of Obesity	<i>rs</i>	<i>p</i>
LoCE		
Side-effects of medication	-0.160	0.01
Hormones	-0.166	0.01
Metabolism	-0.171	0.01
Low availability of healthy foods	-0.186	0.01
LoCI		
Eating calorie-dense foods	0.161	0.05
Eating too much	0.149	0.01
Lack of control	0.129	0.05
Not doing enough exercise	0.127	0.05
Lacking restraint	0.121	0.05

Unlike all other treatment options, the likelihood of watch and wait was negatively correlated with LoCE items; i.e. that obesity is mainly caused by the metabolism, the low availability of healthy foods, hormones and by the side effects of medication.

There were positive correlations between the likelihood of watch and wait with LoCI items; i.e. that obesity is mainly caused by individuals eating too much, lacking restraint, eating calorie-dense foods, not doing enough exercise, and with a lack of control. There were no other statistically significant correlations.

The Durbin-Watson statistic was computed to evaluate the independence of each significant correlation, including that between BMI and rating of the choice for the GP to watch and wait. The Durbin-Watson of 1.58 was considered acceptable.

These significant correlations were entered, in order of size of correlation into a forward stepwise logistic regression. This revealed that a BMI of 35 kg/m²

Table 22: Logistic regression to explore the relationship between predictor variables and participant rating of treatment choice to watch and wait ($n = 81$).

	R^2	ΔR^2	B	SE B	β	p - value
Step 1	0.10	0.10				
Constant			4.30	0.08		
BMI			-0.68	0.12	-0.31	0.00
Step 2	0.12	0.03				
Constant			4.69	0.15		
BMI			-0.68	0.11	-0.31	0.00
Low availability of healthy foods			-0.17	0.05	-0.17	0.00
Step 3	0.16	0.03				
Constant			5.13	0.19		
BMI			-0.68	0.11	-0.31	0.00
Low availability of healthy foods			-0.16	0.05	-0.16	0.00
Metabolism			-0.19	0.06	-0.18	0.00
Step 4	0.17	0.02				
Constant			5.24	0.19		
BMI			-0.68	0.11	-0.31	0.00
Low availability of healthy foods			-0.15	0.05	-0.15	0.01
Metabolism			-0.07	0.07	-0.07	0.31
Hormones			-0.20	0.08	-0.17	0.01
Step 5	0.20	0.03				
Constant			3.80	0.48		
BMI			-0.68	0.11	-0.31	0.00
Low availability of healthy foods			-0.14	0.05	-0.14	0.01
Metabolism			-0.11	0.07	-0.11	0.12
Hormones			-0.14	0.08	-0.12	0.09
Eating calorie-dense foods			0.31	0.10	-0.17	0.00

was the strongest predictor rating the choice of the GP to watch and wait , accounting for 10% of variance ($p < 0.0001$). As the model was extended, 20% of the variance was explained when participants disagreed that low availability of healthy foods, metabolism, and hormones were causes of obesity and agreed that eating calorie-dense foods is a cause of obesity (see Table 22).

Summary of Results

Data analysis revealed a number of trends in the data that are relevant to the hypotheses.

Hypothesis A

Participants were more likely to agree with statements implying an internal LoC in the cause of obesity than those relating to an external LoC in the cause of obesity.

Hypotheses B and C

Correlational analyses revealed that participant responses to the vignettes had a significant relationship with the BMI of the patients depicted in the vignettes, and with their beliefs about LoC in the cause of obesity. There were no significant relationships between participant responses to the vignettes and the cause of obesity of the patients in the vignettes.

In particular, participant belief that obesity is caused by factors outside of the control of the individual was associated with participants reporting a greater likelihood of the GP in the vignette offering both medical interventions (pharmacological and surgical) and behavioural-based treatments (nurse-led, dietician and clinical psychology). However, an increased likelihood of the GP referring for nurse-led behavioural interventions was also associated with internality.

Participant ratings of agreement with LoCI survey items and disagreement with LoCE items were associated with participants reporting an increased likelihood that the GP in the vignette would choose to watch and wait.

Higher BMI was associated with an increased likelihood that the GP would offer all interventions except for watch and wait. Watch and wait was rated more likely for patients with the lower BMI.

Patient BMI explains the greatest variance in the results for participant ratings of three treatment options: prescribing Orlistat, referral for bariatric surgery, and watch and wait. BMI also explains some of the variance for the ratings of all other treatment options (ranging from 1% of the variance for referral to a nurse-led intervention, to 5% of the variance for referral to a dietician). Out of all the dependent variables, it is the BMI of the patient in the vignette that most predicts how participants rated the likelihood of treatment choices in the study.

DISCUSSION

Summary of Results in Relation to Hypotheses

This study proposed three hypotheses. Firstly, it was predicted that GPs were more likely to attribute the cause of obesity to factors in the control of the patient than to factors outside of the patient's control. The results supported this hypothesis. Participants were significantly more likely to agree with statements referring to LoCI than LoCE factors. This corresponds with the earlier studies using similar survey material which suggested that GPs believe obesity is caused by factors in the patient's control (Ogden et al, 2001; Ogden and Flanagan, 2008). The implications of this are explored further below.

The second hypothesis predicted that there would be a relationship between GPs' beliefs that obesity is in the control of the patient and their provision of behavioural-based treatments. This was explored by testing to see if there were significant relationships between participants' ratings of LoCI statements and their ratings of the four behavioural-based treatments for obesity (referral to a nurse-led behavioural intervention, dietician, clinical psychology, and for the GP to watch and wait).

The results provide partial support for this hypothesis; there were significant positive correlations between participants' agreement with LoCI statements and their higher ratings of likelihood of providing 'watch and wait' across all vignettes. However, this result only applied to ratings of that specific behavioural-based treatment and ratings of referral to a nurse-led behavioural intervention. Referral to dietician and referral to clinical psychology were positively correlated with participants' agreement with LoCE statements.

GPs were asked to consider a greater range of treatments than in previous research and the differences of ratings across different behavioural-based treatments have implications that are explored further below. One indication from the data is that GPs view input from dieticians and clinical psychologists as more helpful when obesity is something that is out of the patient's control. When GPs believe obesity is

mainly caused by factors in the patient's control, they are more likely to 'watch and wait' and offer advice to their patients.

The third hypothesis predicted that GPs' beliefs that obesity is outside the patient's control would relate to GPs providing medical interventions for obesity (pharmacological treatment with Orlistat and bariatric surgery). There is partial support for this hypothesis as there were significant positive correlations between participants' agreement with LoCE statements and the higher likelihood rating of both medical interventions (pharmacological treatment and bariatric surgery). However, there was also a negative correlation between participants' agreement with LoCI statements and the rating of pharmacological treatment. There was no significant relationship between participants' agreement with LoCI statements and the rating of bariatric surgery. These results are clearer to interpret than those for the second hypothesis, as both medical interventions are related to the belief that obesity is outside of the patient's control.

BMI was the predictor that explained the greatest amount of variance in the rating of treatment choices, and some of the variance for all treatment choices. This implies that GPs' treatment choices were associated more with their use of the NICE (2006) guidelines around BMI level than they were with their beliefs about the cause of obesity.

GPs' beliefs about obesity

GPs agreed more strongly with statements indicating LoCI causes of obesity. That is, they are more likely to think that obesity is caused by having a sedentary lifestyle or by individuals eating too much than because of general medical reasons, slow metabolism, low availability of healthy foods or an individual's hormones. This finding is consistent with previous research with healthcare professionals; GPs (Harvey and Hill, 2001; Foster et al, 2003), clinical psychologists (Harvey and Hill, 2001), and nurses (Brown et al, 2007).

This is consistent with broader psychological research about the way people make attributions about others. The Fundamental Attribution Error (Ross, 1977) predicts that while we tend to attribute explanations for our own behaviours to

situational or environmental factors, we tend to attribute others' behaviours to dispositional or internal factors.

These data suggest that GPs, as with the general population, are vulnerable to this attributional error and are more likely to have a belief that obesity is caused by LoCI than LoCE factors. The implications of this are difficult to analyse because the evidence base around the actual causes of obesity is so mixed (c. f. Harnack and Schmitz, 2010). Therefore, GP beliefs about the cause of obesity as being in the control of the patient may be more a reflection of the evidence rather than any underlying biases. Either way it poses a problem for the relationship between GPs and patients due to the possible discrepancies in the way each understands the cause of obesity (Ogden et al, 2001).

GPs' treatment choices

The greatest amount of variance in the ratings of medical interventions in the present study was explained by BMI (6% - pharmacological treatment; 24% - bariatric surgery). In both cases participants rated these treatment choices as more likely if the patient had the higher BMI of 45 kg/m².

This follows the NICE (2006) guidance that recommends decisions about treatments be based on the classification of a patient's obesity. The recommendation is that advice about diet and physical activity is offered in all cases but, as a patient presents with greater levels of overweight, pharmacological interventions are considered before bariatric interventions. The presence of co-morbidities that would be improved with weight loss, such as diabetes and hypertension, are also part of the guidance (NICE, 2006). These may increase the urgency of finding a solution to obesity for the patient because of the impact of the co-morbidities on their health status. The data demonstrates that GPs are more likely to refer patients on for further treatment when the patient has a higher BMI.

In the case of medical interventions, BMI explains a greater amount of variance for the choice of treatment than the cause of the patient's obesity. This suggests GPs are more influenced by the guidelines than their beliefs. This is consistent with earlier research that described high fidelity to guidelines by GPs in the UK (Grol, 1990).

The greatest amount of variance in rating ‘watch and wait’ was also explained by BMI (10%). Participants rated this choice as more likely if the patient had the lower BMI of 35 kg/m². The high ratings of the likelihood to ‘watch and wait’ are consistent with Department of Health policy to introduce conversations about health with all obese patients (Campbell, 2012). It also corresponds to the NICE (2006) guidance that recommends all obese patients receive information to help them increase their activity and manage their diet.

This builds a more complex picture of the association between beliefs about causes and solutions to obesity than was found in the study by Ogden and Flanagan (2008). By asking participants to consider specific treatment choices in the current study, and by asking about their beliefs about locus of control, the results provide interesting differences. If GPs believe obesity is outside of patients’ control, they view psychologists and dieticians as helpful. However, if they believe obesity is in the patients’ control, they are more likely to work directly with the patient rather than referring them on.

On the one hand, obesity may be more difficult to manage if it is thought to be outside of somebody’s control, as it is difficult to know how to encourage someone to make changes that are beyond their power. On the other, if a successful consultation is one in which GPs and patients reach a common understanding about the causes and solutions to their condition (Pendleton et al, 1984), GPs and patients are more likely to be in conflict if each believes obesity is caused by different factors.

This raises a number of questions. Firstly, do GPs believe that they lack the skills to work with obesity if they think it is outside a patient’s control? Secondly, are GPs more likely to persist in working with an obese patient if they think it is within the patient’s control? Thirdly do GPs have better outcomes with patients with whom their share beliefs about the cause of obesity?

It is then important to consider how GPs’ skills in working with patients with different causes of obesity can be improved by taking into account the GPs’ own beliefs about the cause of obesity. Whilst the data show that BMI level is instrumental in the decision to provide medical interventions in an appropriate way

that fits with NICE (2006) guidance, their decision to offer different behavioural interventions may be aided by helping GPs to offer interventions themselves to their obese patients.

Strengths and Limitations

Recruitment

During the course of recruitment, I received an e-mail from a GP, participating in the study, who commented that the results would be skewed as participants would respond to the vignettes depending on what was available in their locality. The GP told me there were no services in the locality that allowed for a referral to a clinical psychologist for weight management, but that they would refer to a clinical psychologist if that service were available. The GP concluded by saying, “in ‘real life’ GPs have to make use of what resources are available and that probably affects our choice of treatments as much as what we believe might help the patient”¹. Although the design of the study asked participants to consider services in which all were equally available, it is understandable that GPs may have taken their local resources into account.

Croskerry’s description of choices made by GPs as “flesh and blood decision making” (p1185, 2002) suggests that they would have to integrate their knowledge of the evidence base, the person’s wishes and the availability of resources into their decisions in order to achieve the most effective outcome. This would have been difficult for participants to disentangle when responding to the fictional patients because this study required participants to consider each fictional patient in isolation from these factors.

Lack of actual service availability may offer an explanation for the relatively low likelihood given to referral of patients to clinical psychology. The e-mail from the GP exemplifies that availability of different treatments for obesity is different around the country. This fits with the recent report by the Royal College of Physicians describing services for obesity in the UK as “patchy” (RCP, 2013).

¹ Private correspondence.

Sampling of participants may also have had an effect on the results. Approximately 1159 GPs were contacted for the study, and 6.9% participated. There may be similarities amongst the 81 GPs who responded that limit generalisation to the GPs who did not reply. For example, GPs may have been more likely to respond to the study if they had an interest in obesity management. During the recruitment phase, many practice managers commented that a particular GP in their practice had a specialist interest in obesity. It is possible that the GPs who chose to respond were more familiar with the evidence base and guidelines on obesity management. If this were the case it might also account for BMI being the most significant predictor of rating of treatment choices, due to its central relevance to NICE (2006) guidance.

GP recruitment is generally recognised as being difficult (Templeton, Deehan, Taylor, Drummond and Strang, 1997). The use of an incentive (prize draw), the initial contact by telephone and all postal correspondence being on yellow paper were all incorporated into the design to increase response rate. An alternative option was to visit five large general practices in the area, which would have increased response rate but decreased the diversity across different areas. Although it involved more time in the set-up to contact 217 general practices, this has produced more representative data.

Vignettes

The factorial survey design in this study allowed for an exploration of the association between GPs' beliefs and their ratings of the likelihood of different treatment choices. The importance of, and the problems with, directing the participant to the salient information in vignettes are described in the literature (McKeganey et al, 1995). The vignette universe was very controlled as only two variables were manipulated. This design allowed for an examination of specific variables however this was at a cost of understanding how the interaction of other variables impacted on the outcome. That is, conclusions can only be based on the variables that were manipulated in the scenarios.

The second and third hypotheses appear to be supported in the current design however ratings of treatment choice may be predicted by other factors: for example,

the locality of the GP participant, or other demographics; for example gender (Schwartz et al, 2003; Bray, York and Delany, 1992), level of experience (Foster et al, 2003) or the participant's own weight status (Zhu, Norman and While, 2011). The position of the GP within the practice where they work and their extent of time pressures could also be considered. Previous research examining the way GPs interpret guidelines has shown that time pressure has an influence on their decision-making (Grol, 1990). The challenge then is to think about how to extend the vignette universe with additional variables whilst keeping each vignette short and accessible. An additional problem with increasing the number of variables in the vignettes is the development of unrealistic scenarios in which variables are combined in a way that do not represent real-life scenarios (Alves and Rossi, 1978; Faia, 1980).

A strength of this study, therefore, is the simplification of the scenario which allowed for a clear manipulation of the independent variables. Participants were led to consider different ways of attributing the locus of control in the cause of each patient's obesity. Whilst participants may have tried to offer socially desirable responses, the additional variable of BMI allowed for small differences across the variables to be tested (Alexander and Becker, 1978).

The cost to this design is less external validity, as GPs rated fictional scenarios, and in real life GPs will use other variables as part of their decision-making process. For example, GPs would have access to information about the amount of effort patients had made in trying to lose weight when making decisions about referring them for surgery (c. f. NICE guidelines, 2006). A further example of this loss of external validity is evidenced in the correspondence from the GP quoted earlier, in which they state referral to clinical psychology would increase if the services were available locally. The factorial survey therefore presents fictional patients in isolation from the context.

It is also important to consider what kind of belief is being measured in response to the vignettes. The task was designed to have the effect of asking GPs about their opinions; i.e. establishing their normative beliefs, or what they think ought to happen with treatment choices. However, the personal correspondence

cited above suggested that some responses might represent GPs ‘positive beliefs’; i.e. what they thought would *actually* happen, because of difficulties with resources and how the health system works.

Although in real-life, GPs would not be rating all possible treatment options, the design in this study allowed for an analysis of associations between GP beliefs and their ratings across the full range of recommended treatments. These ratings across that range of treatments means that this study provided more data than if participants had simply chosen which treatment they had thought best for each patient. While this would have increased external validity, it would not have been possible to infer what GPs’ thoughts are about the interventions they did not choose.

Although a factorial survey cannot replicate the “flesh and blood” decision-making (Groopman, 2008), it provided insight into how BMI and LoC in the cause of obesity are associated with treatment choices.

Survey of Beliefs

Recent reviews about the cause of obesity suggest that obesity is caused by a range of biological, social, environmental and dispositional factors (Harnack and Schmitz, 2010). GPs in this study are likely to be aware of the evidence base for the cause of obesity and it is likely that this will have an influence on their beliefs. Any association between GPs’ beliefs about the cause of obesity and their treatment choices may relate to the evidence on which guidelines are based.

The focus of the survey, LoC in the cause of obesity, means that this study explored a specific belief. Previous research has shown that there are associations between a LoCI belief about obesity and negative stereotypes (Weiner, 1995). Participants may have responded in a way they saw as more socially acceptable due to the associations between believing obesity is caused by LoCI factors and the stereotypes about obese patients. However, the anonymity of the survey and the use of the Likert scale to rate LoCI and LoCE should have protected against this.

Statistical Analysis

There was a skewed but normal distribution in response to the survey of beliefs and therefore the comparisons could not be made between two different

groups of GP participants (those with LoCE and those with LoCI beliefs). This meant that significant associations and explanations of variances may have been over-estimated, as the differences between participant responses were relatively small.

The correlations between the response to the survey and the vignettes were all small although significant. The largest correlation was between increased likelihood of referral to clinical psychology and a stronger agreement about hormones as the cause of obesity ($rs = 0.375$ $p < 0.01$ (two-tailed)) however the majority of correlations had a rs of between 0.1 and 0.25. The association, therefore, between beliefs about LoC in the cause of obesity and treatment choice was relatively low.

A potential response bias may have had an impact here too since GPs who responded may have held a greater interest in obesity management and therefore familiarity about the evidence base and guidelines. With a larger pool of GPs, with a greater variation in knowledge and experience, it might have been possible to compare two groups of GPs according to their beliefs about LoC.

The existence of groups might have provided data that could be compared using ANOVA when analysing how beliefs about obesity explain the variance in the rating of treatment choices. Field (2005) describes how the ANOVA is more sensitive than regression analysis in determining the relative variance explained by the different factors. Significant results are more likely to be found in regression analysis if the variance in results is small or skewed. The results from the survey on LoC are skewed, as most GPs agreed more with LoCI statements. This has implications for the validity of the analysis and the likelihood of a Type 1 error particularly given the use of a two-tailed hypothesis: the data are likely to capture more associations between LoCI beliefs and treatment choice than is significant simply because there is a greater number of participants with LoCI beliefs than would be expected from a normal distribution. That said, the findings are consistent with earlier research looking at associations between beliefs about causes and solutions (Ogden et al, 2008), and the data illustrate the hypothesis that GPs are less likely to refer on obese patients if they believe obesity to be in the patients' control.

Implications for Further Research

A common theme in the literature is that GPs have mixed feelings on how prepared they are to treat obesity and do not believe that interventions for obesity are effective (Fogelman et al, 2002; Foster et al, 2003; Bocquier et al, 2005; Thau and Avignon, 2005; Epling et al, 2011). It would be interesting to develop the present research by exploring if GP beliefs about the cause of obesity influences not just their likelihood to refer for different treatments but also their beliefs about the effectiveness of each treatment option. This could be achieved by developing similar questionnaires used by Foster and colleagues (2003) to identify GPs' expectations, confidence and beliefs about the effectiveness of each of the six treatment options. GPs would then complete a survey of beliefs about obesity, as they did in the current study. The relationship between the responses on the two surveys could then be explored.

This research could also be developed to see if GP beliefs about the cause of obesity influence their relationship with their obese patients. Qualitative research would be helpful to build up a theory of how GPs develop relationships with their patients, and to test the hypothesis that GPs are more likely to work directly with patients, providing information and guidance, if they believe obesity to be in patients' control. Interviews with GPs can explore the reasons behind these decisions. Identifying what they find difficult about the patients they work with, and what helps them feel effective would help develop an understanding of how GPs with different beliefs about LoC in obesity relate to their patients and if there is a relationship between their rapport with their patients and their outcomes.

In order to test the theory put forward in Pendleton's collaborative model of patient consultation (Pendleton et al, 1984), a study design could be developed to explore the relationship between GPs' beliefs and patients' beliefs about the cause of obesity and outcomes after intervention. This would test to see if the quality of the relationship is predicted by both parties holding similar beliefs about the cause of obesity. It would then be possible to examine more closely how consultations between GPs and their obese patients relate to the outcomes achieved in weight management. In order to avoid ethical difficulties with collecting real-life data, GPs

could complete a survey about how successful or unsuccessful their attempts have been to help their patients lose weight over the last twelve months. Coupled with a survey of each GPs' beliefs about obesity, it would be possible to test the hypothesis that better outcomes for obese patients are predicted by GPs holding a stronger belief that obesity is caused by factors outside the control of the patient. The Pendleton (1984) model of patient consultation predicts this; GPs are more able to establish rapport with patients who hold similar views about their condition.

Finally, decision-making could be explored in two ways. Firstly, through an extension of the factorial survey in the current study by including other variables that are reasonable to expect in real life scenarios, as discussed earlier. Secondly, building on the evidence from the data in this project, a study could be developed to explore the way the evidence base is assimilated by GPs in their decisions. A method for this could be appropriated from a cognitive psychology study examining neuroscience student, neuroscience expert and novice beliefs about psychological phenomena after reading different explanations of the phenomena (Weisberg, Keil, Goodstein, Rawson and Gray, 2008). The study was designed to test the hypothesis that neuroscience explanations of phenomena are more influential on the reader being satisfied with the explanation even if it does not make a link with how it accounts for a psychological mechanism. Weisberg and colleagues presented participants with one of four different types of explanation about psychological phenomena: two of them with neuroscience, two without; two of them accounting for a psychological mechanism, and two of them not making this link. Student and novice readers were more likely to rate the description as satisfying if neuroscience information was provided, even if the description did not make a link with the psychological mechanism it was aiming to explain.

Using this methodology, GP participants could be presented with abstracts from different research on the causes of obesity. In a between-subjects design, half of the participants could be presented with evidence for LoCI factors, and half of the participants with evidence for LoCE factors. Participants' interpretations would then be explored by asking them to rate their satisfaction with the evidence and then to rate their beliefs about obesity. By exploring the relationship between their

beliefs about the evidence and beliefs about obesity, this study would explore how the evidence base influences their decisions, providing insight into the way that GPs make interpretations about literature on this topic.

Clinical Implications

Whilst the data show that ‘watch and wait’ is the most likely treatment choice, the literature also suggests that GPs are not confident about their effectiveness to help (Foster et al, 2003). Therefore, one clinical implication from this study is that GPs may require support to help them work with obese patients who are finding it difficult to change.

Motivational interviewing (Miller and Rollnick, 2002) is one evidence-based strategy that has been shown to be effective when working with patients at different stages of change with diet and exercise management (e.g. Burke, Arkowitz and Menchola, 2003). Training in this psychological approach may be a way of helping GPs work with the large proportion of patients with whom they choose to ‘watch and wait’. This would enable GPs to continue to work directly with their patients, rather than to refer on to other professionals or for other interventions.

Clinical psychologists are one professional group who could provide this training for GPs, and this fits with recent recommendations to increase multidisciplinary working in obesity management (Rutter, 2011; RCP, 2013). This also has the benefit of bringing together different professionals with different beliefs about obesity; thinking with the patient about different ways to understand and manage their obesity.

Grol and Grimshaw (2003) recommend multidisciplinary working as a way to help teams to successfully follow national guidelines for interventions. This could be achieved through the extension of multidisciplinary weight management clinics comprised of GPs, nurses, pharmacists, and clinical psychologists, which can be accessed by the patient through their GP. The aim would be to improve patient’s outcomes in helping them to lose and manage their weight loss, and to improve patient experience of a service led by their needs.

Recommendations

Research recommendations

1. *Explore the impact of the relationship on outcomes*

Further research is required to explore the impact on the GP-patient relationship of the GP and patient holding different beliefs about the cause of obesity, and whether this in turn relates to outcome data for weight management.

2. *Explore contributing factors to making decisions*

This project explores two specific aspects of the decision to provide treatment for obese patients (LoC and BMI). Developing studies to explore how GPs take into account the evidence base, the characteristics of the patient and their relationship with the patient would help to build on the current findings.

Clinical recommendations

3. *Supporting GPs with their relationship with obese patients*

Clinical psychologists are one group of professionals who are in a position to help GPs consider how to work with obese patients who differ from them in their understanding about the cause of their obesity. Motivational interviewing (Miller and Rollnick, 2002) is one strategy that could help GPs and other healthcare professionals have conversations with their obese patients about lifestyle changes in a way that is led by patients' needs, responsive to their beliefs.

4. *Provision of multidisciplinary weight management clinics*

In order to work alongside patients, and joining with them in their understanding of obesity, it could be helpful for GPs to work with other healthcare professionals who hold different views about obesity. Providing patients with greater access to a team of different healthcare professionals with different ideas to help patients lose and manage their weight through weight management clinics, as is developing in the UK, is a way to achieve this. This is supported by the findings from the recent report by the Royal College of Physicians (RCP, 2013).

Conclusion

This study demonstrates that GPs are more likely to believe that obesity is caused more by factors in the control of the patient than factors outside of their control. GPs' beliefs that obesity is caused by factors outside of a patient's control are correlated with their ratings of medical interventions as a treatment choice. GPs' beliefs that obesity is caused by factors within a patient's control are correlated with their ratings of the behavioural-based intervention of 'watch and wait' as a treatment choice. However, the BMI of the patients in the vignettes explained the most variance. There was no association between the LoC in the cause of obesity for the patient in the vignettes and the treatment response.

It is likely that if these results were extended to real-life scenarios, GPs are adhering to national guidelines around obesity management (NICE, 2006). An exploration of the decision-making process is required in order to gain understanding about the relative influence of the additional factors involved in real-life consultations.

The differences between the way GPs and patients understand the cause of obesity (Ogden and Flanagan, 2008) may impact on the quality of the relationship in the patient consultation (Pendleton et al, 1984). GPs hold negative beliefs about their own effectiveness with helping patients to lose weight (Fogelman et al, 2002; Foster et al, 2003; Bocquier et al, 2005; Thau and Avignon, 2005; Epling et al, 2011). The results from this study show the most common intervention for obese patients is for the GP to 'watch and wait', providing behavioural, dietary and lifestyle advice to the patient, and that this is more likely to be chosen as an option if the GP believes obesity is in patients' control.

It is therefore recommended that GPs have access to strategies, where required, to help them work with obese patients who find it difficult to make changes, or are feeling helpless to make changes for a condition they see as being out of their control. This could help GPs join with patients at their stage of change and achieve the better outcomes, strengthening their belief in their own effectiveness.

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APPENDICES

Appendix A: Ethical Approval (Airedale/Bradford)


Airedale, Bradford and Leeds

NHS Airedale, Bradford and Leeds
Research management and governance support team
Research and Innovation
Level 4
Douglas Mill, Bowling Old Lane
Bradford BD5 7JR
OurRef://RMG/Approval/approval_letter_version_3

Thursday, 25th October 2012

Mr Nicholas T. Hartley
Psychologist in Clinical Training
Clinical Psychology Department
Charles Thackrah Building
101 Clarendon Road
Leeds
LS2 9LJ

Re: GPs' beliefs about obesity and their decision to treat

Ref no: **B001_25_10_12_0000**

Thank you for your recent submission to NHS Airedale, Bradford and Leeds research management and governance support team.

Following consideration of your submission I am pleased to confirm that research management and governance permission has been granted by NHS Bradford and Airedale for the above research to take place as described in your completed application and accompanying documentation.

Conditions of permission
You should be aware that permission is granted subject to the conditions specified below:

Document	Version	Date
<i>R&D Form</i>	3.4	18 October 2012
<i>Protocol</i>		
<i>Appendices A: Sample Letter to GP Practice Manager</i>		
<i>Appendices B: Sample Letter to GP</i>		
<i>Appendices C: Participant Information Sheet and Consent</i>		
<i>Online Consent</i>		
<i>Appendices D: Factorial Survey</i>		
<i>Appendices E: Questionnaire on beliefs about obesity</i>		
<i>Indemnity/Liability Insurance Cert</i>	NHE 03CA02- 0013	29 September 2012

- If required you must obtain an honorary contract and Letter of Access from NHS Airedale, Bradford and Leeds prior to commencing your study
- All Global Governance checks must be completed on CSP Module
- All Local Governance must be completed on CSP Module

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Airedale, Bradford and Leeds

- Throughout the course of the study, all research activity should comply with relevant, current governance and regulatory requirements including (but not limited to)
 - The Research Governance Framework for Health and Social Care, 2nd Ed (2005)
 - The Medicines for Human Use (Clinical Trials) Regulations (2004) and subsequent amendments
 - The Mental Capacity Act (2005)
 - The Ionising Radiation (Medical Exposure) (Amendment) Regulations (2006)
 - The Medical Devices Regulations (2002) (Statutory Instrument 2002/618)
 - The Human Tissue Act (2004)
 - The Data Protection Act (1998)
- Consent for NHS Airedale, Bradford and Leeds to monitor and audit your project, which is implicit in your acceptance of permission.
- Where any amendments, substantial or non substantial are made throughout the course of the study these should be notified to NHS Airedale, Bradford and Leeds on the relevant form (available from <http://myresearchproject.org>)
- A copy of the final study report should be forwarded to NHS Airedale, Bradford and Leeds on the relevant form (available from <http://myresearchproject.org>) no later than 3 months following study completion
- Should any serious adverse event(s) occur throughout the course of the study these should be notified to NHS Airedale, Bradford and Leeds using the contact details set out above

Should you require any clarification regarding any of the points raised above, or have any further queries in relation to permissions and post permission study management process then please do not hesitate to contact Paul Carder on 01274 237406.

Finally, may I take this opportunity to wish you well with your study and look forward to hearing about your progress in due course.

Yours sincerely

Dr Damian Riley
Medical Director

Mr Paul Carder
Research Coordinator – Research & Innovation

NHS Airedale, Bradford and Leeds NHS Airedale, Bradford and Leeds

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Appendix B: Ethical Approval (Leeds)

Telephone enquiries, please contact Paul Carder
Phone: 01274 237406
Email: paul.carder@bradford.nhs.uk



Airedale, Bradford and Leeds

Thursday 25th October 2012

Mr Nicholas T. Hartley
Psychologist in Clinical Training
Clinical Psychology Department
Charles Thackrah Building
101 Clarendon Road
Leeds
LS2 9LJ

NHS Airedale, Bradford &
Leeds
4th Floor, Douglas Mill
Bowling Old Road
Bradford
BD5 7JR

PCT Ref: L001_25_10_12_0000

Dear Mr Hartley,

Re: GPs' beliefs about obesity and their decision to treat

Thank you for your recent submission requesting NHS permission for research to be conducted in NHS Leeds for the above study.

I am pleased to confirm that NHS permission for the above research has been granted on the basis described in the application form, protocol and supporting documentation.

Conditions of approval

You should be aware that approval is granted subject to the conditions specified below:

- In undertaking this research you must comply with the requirements of the Research Governance Framework for Health and Social Care (2nd edition 2005) which is mandatory for all NHS employees.
- Consent for NHS Leeds to audit your project, which is implicit in your acceptance of approval.
- Where any amendments, substantial or non substantial are made throughout the course of the study these should be notified to NHS Leeds.
- A copy of the final study report should be forwarded to NHS Leeds.
- Should any serious adverse event(s) occur throughout the course of the study these should be notified to NHS Leeds using the contact details set out above.
- You comply with NHS Leeds Policies on the handling of data. These policies are available from the research manager.



Chair: Linda Pollard OBE JP DL
Chief Executive: John Lawlor

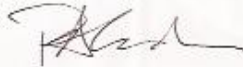
NHS Bradford and Airedale and NHS Leeds working together as NHS Airedale, Bradford and Leeds PCT Cluster

- All members of the research team must have passed and gained a valid GCP certificate prior to undertaking any research activity.

Should you require any clarification regarding any of the points raised above, or have any further queries in relation to approvals and post approval study management process then please do not hesitate to contact me on 01274 237406.

Finally, may I take this opportunity to wish you well with your study and look forward to hearing about your progress in due course.

Yours sincerely



Dr Damian Riley
Medical Director

Mr Paul Carder
Research Coordinator – Research & Innovation

NHS Airedale, Bradford and Leeds

NHS Airedale, Bradford and Leeds

Approved documents

The documents reviewed were:

Document	Version	Date
<i>R&D Form</i>	3.4	18 October 2012
<i>Protocol</i>		
<i>Appendices A: Sample Letter to GP Practice Manager</i>		
<i>Appendices B: Sample Letter to GP</i>		
<i>Appendices C: Participant Information Sheet and Consent</i>		
<i>Online Consent</i>		
<i>Appendices D: Factorial Survey</i>		
<i>Appendices E: Questionnaire on beliefs about obesity</i>		
<i>Indemnity/Liability Insurance Cert</i>	NHE-03CA02-0013	29 September 2012

Appendix C: Initial Letter to Practice Manager

Health Sciences



UNIVERSITY OF LEEDS

Nick Hartley,
Department of Clinical Psychology,
Leeds Institute of Health Sciences,
Charles Thackrah Building,
101 Clarendon Road,
Leeds LS2 9LJ
Tel: 0113 343 2732

Dear Practice Manager,

GPs' Beliefs about Obesity: A Research Project

Further to our recent phone call, I am writing to inform you about my research project that I am carrying out as part of my doctorate in Clinical Psychology.

The study is interested in the decisions that GPs make for their obese patients. It should only take participants up to ten minutes to complete the study which is featured at the following address:

www.survey.leeds.ac.uk/obesitygp

I would be very grateful if you could circulate the attached letters to each GP in your practice.

Yours Sincerely,

A handwritten signature in black ink, appearing to read 'Nick Hartley', written over a horizontal line.

Nick Hartley
Trainee Clinical Psychologist

Appendix D: Initial Letter to Participant

Health Sciences



Nick Hartley,
Department of Clinical Psychology,
Leeds Institute of Health Sciences,
Charles Thackrah Building,
101 Clarendon Road,
Leeds LS2 9LJ
Tel: 0113 343 2732

Dear General Practitioner,

GPs' Beliefs about Obesity: A Research Project

I am writing to you as I am carrying out a research project as part of my doctorate in Clinical Psychology. The project examines the decisions that GPs make for their obese patients.

For the project, it is important that I approach a cross-section of GPs with a broad range of views about obesity. I am approaching you as a GP in West Yorkshire and am interested in what you have to say.

If you take part in the online study, it will take up to 10 minutes to complete. You will be asked to comment on treatment choices for four fictional obese patients and then you will be asked about your beliefs about obesity. All of your responses will be anonymised.

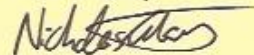
You can also opt-in to receive a *certificate of completion* and/or an *executive summary of the results* in which I will explain the theory and hypotheses of this project and explore the inferred conclusions.

You will also have the chance to be entered into a *prize draw for £100 in Amazon vouchers*.

Please go to the following website: www.survey.leeds.ac.uk/obesitygp to participate in this research.

Thank you for your time and help.

Yours Sincerely,



Nick Hartley,
Trainee Clinical Psychologist

Appendix E: Reminder Letter to Practice Manager

Health Sciences



UNIVERSITY OF LEEDS

Nick Hartley,
Department of Clinical Psychology,
Leeds Institute of Health Sciences,
Charles Thackrah Building,
101 Clarendon Road,
Leeds LS2 9LJ
Tel: 0113 343 2732

Dear Practice Manager,

GPs' Beliefs about Obesity: A Research Project

Thank you for your recent help with my research project that I am carrying out as part of my doctorate in Clinical Psychology.

I have had a good response so far however more participants are required in order to carry out the data analysis.

I am writing to you to ask if you could send around the attached reminder letter to each GP in your practice. The survey closes on 28th February 2013.

The study is interested in the decisions that GPs make for their obese patients. It should only take participants up to ten minutes to complete the study, which is featured at the following address:

www.survey.leeds.ac.uk/gpsobesity

Yours Sincerely,

A handwritten signature in black ink, appearing to read 'Nick Hartley', written over a horizontal line.

Nick Hartley
Trainee Clinical Psychologist

Appendix F: Reminder Letter to Participant

Health Sciences



Nick Hartley,
Department of Clinical Psychology,
Charles Thackrah Building,
101 Clarendon Road,
Leeds LS2 9LJ
Tel: 0113 343 2732

Dear General Practitioner,

GPs' Beliefs about Obesity: A Research Project

I am writing to you, as there are still a couple of weeks left to complete my survey about obesity. I have had a good response so far however more participants are required in order to carry out the data analysis.

For the research project, which is part of my doctorate in Clinical Psychology, I am approaching you as a GP in West Yorkshire and am interested in what you have to say.

If you have not yet taken part in the online study, it will take up to 10 minutes to complete. You will be asked to comment on treatment choices for four fictional obese patients and then you will be asked about your beliefs about obesity. All of your responses will be anonymised.

You can also opt-in to receive a *certificate of completion* and/or an *executive summary of the results* in which I will explain the theory and hypotheses of this project and explore the inferred conclusions.

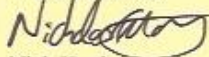
You will also have the chance to be entered into a *prize draw for £100 in Amazon vouchers*.

Please go to the following website: www.survey.leeds.ac.uk/obesitygp to participate in this research.

The survey closes on February 28th 2013.

Thank you for your time, help and contribution both to my thesis and to this area of research,

Yours Sincerely,



Nick Hartley,
Trainee Clinical Psychologist

Appendix G: Final Reminder Letter to Practice Manager

Health Sciences



Nick Hartley,
Department of Clinical Psychology,
Leeds Institute of Health Sciences,
Charles Thackrah Building,
101 Clarendon Road,
Leeds LS2 9LJ
Tel: 0113 343 2732

Dear Practice Manager,

GPs' Beliefs about Obesity: A Research Project **The Final Push**

Thank you for all of your help with my research project that I am carrying out as part of my doctorate in Clinical Psychology.

This will be the last time I am writing to you to ask you to remind GPs of the online survey.

The survey closes this Thursday evening, 28th February 2013, and I would appreciate you disseminating the enclosed letters to the GPs in your practice.

To remind you, the study is interested in the decisions that GPs make for their obese patients. It should only take participants up to ten minutes to complete the study, which is featured at the following address:

www.survey.leeds.ac.uk/obesitygps

Yours Sincerely,



Nick Hartley
Trainee Clinical Psychologist

Appendix H: Final Reminder Letter to Participant

Health Sciences



Nick Hartley,
Department of Clinical Psychology,
Charles Thackrah Building,
101 Clarendon Road,
Leeds LS2 9LJ
Tel: 0113 343 2732

Dear General Practitioner,

GPs' Beliefs about Obesity: A Research Project **The Final Push**

My project is in the final stages and I have until Thursday night to collect the rest of my data.

This research project, part of my doctorate in Clinical Psychology, takes up to 10 minutes to complete. You will be asked to comment on treatment choices for four fictional obese patients and then you will be asked about your beliefs about obesity. All of your responses will be anonymised.

What's in it for you? That's a fair question...

- i) Certificate of completion
- ii) Executive summary of the results

And the big one... the chance to enter a *prize draw for £100 in Amazon vouchers*.

If this gets your interest up, go to the following website to participate in the 10 minute survey:

www.survey.leeds.ac.uk/obesitygps

The survey closes this Thursday night - February 28th 2013. Thank you for all of your help.

Yours Sincerely,



Nick Hartley,
Trainee Clinical Psychologist

Appendix I: Participant Information Sheet Bristol Online Survey

'General Practitioners' Beliefs about Obesity



UNIVERSITY OF LEEDS

Welcome

Welcome to this survey entitled 'General Practitioners' Beliefs about Obesity'.

This survey aims to explore how GPs' beliefs about obesity are related to the decisions they make for their obese patients.

The information sheet on the following page contains further details. Please take the time to read this before you decide whether or not you wish to take part.

The survey is completed anonymously and takes between 5 and 10 minutes to complete.

Please note that all data collected in this survey will be held anonymously and securely. No personal data is required.

Note that once you have clicked on the CONTINUE button at the bottom of each page you can not return to review or amend that page

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Participant Information

Participant Information Sheet

You are being invited to take part in a research project as part of a thesis for a doctorate in Clinical Psychology.

Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take the time to read the following information carefully and do not hesitate to contact the researcher if there is anything that is not clear or that you would like more information on. The researcher's email address is umnth@leeds.ac.uk.

Purpose of the Research

The study is interested in particular in the decisions that GPs will make when offering treatments or making referrals for obese patients.

Why have I been chosen?

You have been chosen as you are a General Practitioner working at a GP practice in the West Yorkshire region.

Do I have to take part?

It is up to you whether or not you wish to take part. If you do decide you wish to take part you are free to withdraw at any time without giving a reason up until you submit the online form. A decision to withdraw, or a decision not to take part, will not affect you in any way. If you complete the online form, it is understood that you are giving your consent to participate in the study, and that you have read and understood the information sheet for the study and that you have had the chance to consider the information.

What will I have to do if I agree to take part?

If you decide you wish to take part you will be asked to complete a survey in two parts, which is on pages X AND Y of this form. In the first part, you will be presented with four vignettes featuring fictional obese patients. After each vignette, you will then be asked to consider the fictional patient's GP and rate the GP's likelihood of making various treatment decisions for this patient. In the second part, you will then be asked about your beliefs about obesity. This will involve rating your beliefs on a number of dimensions. Both parts together will take approximately 5 to 10 minutes to complete.

What are the possible risks and advantages of taking part?

It is unlikely that there will be any risk for you when filling out the online form. The research project offers the opportunity to reflect on elements of your profession and your beliefs about obesity. It is hoped that ultimately this study will lead to improvement of NHS patient care by providing insight into the relationship between beliefs and practice in professional decision-making of GPs. You will be asked if you would like to opt in to receive i) a brief report of results, ii) a certificate of completion for your records and/or iii) to be entered into a prize draw for £100 in Amazon vouchers.

The closing date for the prize draw is February 28th 2013. A cash alternative cannot be substituted for the prize. Winners will be announced and notified of results by their e-mail on March 12th 2013. Participation in the project is not necessary to enter the free prize draw. This can be done through using the additional consent form on the following page and by supplying your e-mail address. Your e-mail address will not be connected to your data from the project.

What happens when the project finishes?

Once the project has finished and the results are established, you are welcome to this information even if you have not opted in to receive them on this form. The results will be used as a basis for any conclusions forming part of the thesis which will be written up and submitted to the University of Leeds.

Who has reviewed this study?

This research has been reviewed and approved by the Leeds Institute of Health Sciences Ethics committee and the Research and Development department of Leeds Foundation Hospitals Trust.

Contact for further information

This project is being co-ordinated by:

Nick Hartley,
Psychologist in Clinical Training,
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If you would like to make any complaints about this study, please contact the administration team for the Leeds Training Course on the above number. Thank you for taking the time to read this information.

[Continue >](#)

Appendix J: Participant Consent Form
Bristol Online Survey

'General Practitioners' Beliefs about
Obesity



Consent

The following options are **not** necessary for you to consent in order to take part in the project:

1. I would like to receive a written summary of the results on the completion of the project. *(Optional)*

More Info

Yes No

2. I would like to receive a certificate of completion on my completion of this survey. *(Optional)*

More Info

Yes No

3. I would like to be entered into a prize draw for the chance to win £100 in Amazon vouchers. *(Optional)*

More Info

Yes No

4. Please supply your e-mail address if you would like to opt in to *any* of the above. *(Optional)*

By clicking continue, you are consenting to participation in this study.

Thank you very much for agreeing to take part in the study.

Continue >

**Appendix K: Clinical Vignettes – Factorial Survey
Bristol Online Survey**

**'General Practitioners' Beliefs about
Obesity**



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Clinical Vignettes

I am going to present to you a description of four fictional patients that are new to a GP practice. They are meeting with the GP as part of a new patient health check. Think about the GP that is seeing the patient and the variety of options that are open to them. You are to rate the likelihood of whether the GP acts on each of these options. There is no right or wrong answer and I would like you to answer based on the hypothetical scenario posed in each vignette.

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Clinical Vignette 1

Sam, aged 45 with a BMI of 35kg/m², presents at the GP's clinic as a new patient for a general check-up after moving to the area. Sam has recently had an operation to treat an over-active thyroid which is currently being managed well by medication. Sam has been told that the medication has caused the obesity.

More Info

5. Please consider how likely you think it is that the GP in the vignette will make each of the following choices. All of the below six options are equally available for the GP in the vignette to consider.

Click the level of likelihood that corresponds to your thoughts for each of the six options.

There are no right or wrong answers. Use your own judgement.

The questionnaire is completely anonymous so please be as honest as possible.

	Very unlikely	Unlikely	Not sure	Likely	Very likely
a. Pharmacological treatment with Orlistat.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Referral for bariatric surgery.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Referral to a nurse-led behavioural intervention.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Referral to a dietician to collaborate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Referral to clinical psychology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. The GP will 'Watch and Wait' and provide behavioural, dietary and lifestyle advice to the patient.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Continue >



Clinical Vignette 2

Pat, aged 45 with a BMI of 45kg/m², presents at the GP's clinic as a new patient for a general check-up after moving to the area. Pat has recently had an operation to treat an over-active thyroid which is currently being managed well by medication. Pat has been told that the medication has caused the obesity.

6. Please consider how likely you think it is that the GP in the vignette will make each of the following choices. All of the below six options are equally available for the GP in the vignette to consider.

Click the level of likelihood that corresponds to your thoughts for each of the six options.

There are no right or wrong answers. Use your own judgement.

The questionnaire is completely anonymous so please be as honest as possible.

	Very unlikely	Unlikely	Not sure	Likely	Very likely
a. Pharmacological treatment with Orlistat.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Referral for bariatric surgery.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Referral to a nurse-led behavioural intervention.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Referral to a dietician to collaborate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Referral to clinical psychology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. The GP will 'Watch and Wait' and provide behavioural, dietary and lifestyle advice to the patient.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Continue >



Clinical Vignette 3

Alex, aged 45 with a BMI of 35kg/m², presents at the GP's clinic as a new patient for a general check-up after moving to the area. Alex finds it hard to adhere to a diet and does not do regular exercise. Alex has been told that this lifestyle has caused the obesity.

7. Please consider how likely you think it is that the GP in the vignette will make each of the following choices. All of the below six options are equally available for the GP in the vignette to consider.

Click the level of likelihood that corresponds to your thoughts for each of the six options.

There are no right or wrong answers. Use your own judgement.

The questionnaire is completely anonymous so please be as honest as possible.

	Very unlikely	Unlikely	Not sure	Likely	Very likely
a. Pharmacological treatment with Orlistat.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Referral for bariatric surgery.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Referral to a nurse-led behavioural intervention.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Referral to a dietician to collaborate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Referral to clinical psychology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. The GP will 'Watch and Wait' and provide behavioural, dietary and lifestyle advice to the patient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Continue >

Clinical Vignette 4

Frankie, aged 45 with a BMI of 45kg/m², presents at the GP's clinic as a new patient for a general check-up after moving to the area. Frankie finds it hard to adhere to a diet and does not do regular exercise. Frankie has been told that this lifestyle has caused the obesity.

8. Please consider how likely you think it is that the GP in the vignette will make each of the following choices. All of the below six options are equally available for the GP in the vignette to consider.

Click the level of likelihood that corresponds to your thoughts for each of the six options.

There are no right or wrong answers. Use your own judgement.

The questionnaire is completely anonymous so please be as honest as possible.

	Very unlikely	Unlikely	Not sure	Likely	Very likely
a. Pharmacological treatment with Orlistat.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Referral for bariatric surgery.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Referral to a nurse-led behavioural intervention.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Referral to a dietician to collaborate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Referral to clinical psychology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. The GP will 'Watch and Wait' and provide behavioural, dietary and lifestyle advice to the patient.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Appendix L: Participant Survey of Beliefs about Obesity

'General Practitioners' Beliefs about Obesity



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Questionnaire on beliefs about obesity

This short questionnaire aims to survey your views about obesity.

Consider how strongly you disagree or agree with each of the following causes.

Again there are no right or wrong answers. We are only interested in your views.

The questionnaire is completely anonymous so please be as honest as possible.

9. To what extent do you agree or disagree that each of the following is the main cause of obesity?

	Disagree strongly	Disagree	Neither agree or disagree	Agree	Agree strongly
a. Individuals eating too much	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Lacking restraint	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. An individual's genetics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Eating calorie-dense foods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Slow metabolism	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Low availability of healthy foods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. General medical reasons	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Not doing enough exercise	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Eating out frequently	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. Hormones	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k. Difficult life events	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l. The food industry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m. Side effects of medication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
n. Eating too many unhealthy foods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
o. Sedentary lifestyle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
p. Lack of control	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>