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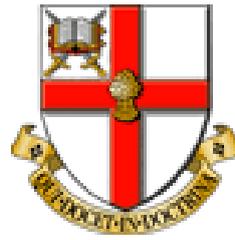
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1.0 Literature review

Attitudes towards obesity in health care

Word Count: 5,108

Key words: overweight, stigmatisation, trainee, registered

2.0 Literature review abstract

This paper reviews the literature that has investigated individuals' attitudes towards obesity, either quantitatively or qualitatively. This review primarily focuses on research involving trainee and registered health care professionals (HCPs). The inclusion criteria were (a) data-based research studies or (b) qualitative research of physicians, nurses and other HCPs; (c) evaluating obesity attitudes and beliefs of HCPs and (d) trainee HCPs; (e) studies published in English after year 2000.

The results revealed that negative attitudes towards obese persons are prevalent, irrespective of health profession. Yet variables of sex, ethnicity, age, body mass index (BMI) and work experience yielded conflicting results among the selected studies.

Implications include the need for additional research, awareness education and practice guidelines.

2.1 Introduction

Obesity is a global health problem affecting not only developed countries but developing countries as well (Finucane et al., 2011). The prevalence of obesity in England has almost trebled since 1980 (Canoy & Buchan, 2007). Approximately one quarter of adults (24.4% men, 25.1% women) were obese in 2012 (The Health and Social Care Information Centre, 2012) and by 2050 it is estimated that 50% of women and 60% of men will have a body mass index (BMI) ≥ 30 kg/ m² (Foresight, 2007). However, surveys performed in the past 10 to 15 years show evidence of stabilisation or decline in prevalence rates of childhood obesity in developed countries (Wabitsch, Moss, & Kromeyer-Hauschild, 2014). Thus, it remains to be seen if the former projections will be fulfilled.

In the midst of this obesity epidemic, media attention to obesity has soared (Saguy & Almeling, 2008), as has the discrimination against overweight and obese individuals (Andreyeva, Puhl, & Brownell, 2008). Juxtaposed with the increasing weight of the population is this counter intuitive rise in weight bias against those who are deemed to be 'fat'. Obesity stigma is present within a range of institutions and cultural settings, including workplaces (Roehling, 1999), educational institutions (Puhl & Brownell, 2001), families (Puhl & Latner, 2007), government agencies, industry and the media (Herbozo, Tantleff-Dunn, Gokee-Larose, & Thompson, 2004; Heuer, McClure, & Puhl, 2011).

Health care settings are not exempt from attributing stigma to obese persons.

Research has demonstrated negative stereotypes and attitudes toward obese patients by a range of healthcare providers and fitness professionals, including views that obese patients are lazy, lacking in discipline, dishonest, unintelligent, annoying and non-compliant with treatment (Puhl & Heuer, 2009). There is a growing body of research into HCPs' attitudes and beliefs about obesity. Early studies involving doctors, nurses and psychologists revealed that HCPs shared the predominant social biases the general public possessed against obese persons (Maiman, Wang, Becker, Finlay, & Simonson, 1979; Price, Desmond, Krol, Snyder, & O'Connell, 1987).

This review aims to comprehend the attitudes of HCPs towards obesity as found in studies published since 2000. The different types of HCPs studied and the methodologies employed will be described. Studies involving student and qualified practitioners will be included and comparisons drawn.

2.2 Background

Discrimination and stigmatisation have long been a topic for discussion. In 1963 Goffman defined stigma as an “attribute that is deeply discrediting “... [Reducing the person who possesses it] “From a whole and usual person to a tainted, discounted one” (p.3). Conversely, individuals with attributes and diseases that are deemed uncontrollable appear to be exempt from stigmatisation (Weiner, Perry, & Magnusson, 1988). In fact, attribution theory implies that perceiving a condition to be under individual control is the basis for stigmatising attitudes (Weiner et al., 1988). The view that obesity is a matter of personal responsibility is the prevailing message in the media. News coverage of the personal causes and solutions to obesity considerably out number other societal attributing factors (Bonfiglioli, Smith, King, Chapman, & Holding, 2007; De Brun, McCarthy, McKenzie, & McGloin, 2013; Kim & Willis, 2007). Lifestyle transformation media aids the notion that individuals control their own weight (Yoo, 2013) and research has shown that watching one episode of the television programme “The Biggest Loser” significantly increased viewers’ weight bias against overweight individuals and reinforced the belief that weight is controllable compared with controls, one week after exposure to the television episode (Domoff et al., 2012).

In 1980, Crawford coined the term ‘healthism’- a political ideology that elevates healthy lifestyle to a high moral calling. In 2006, he argued that the moralisation of health among the middle classes from the 1970s resulted from the defining of the

problem and solution of health “as matters within the boundaries of personal control” (p.408). Furthermore, Guthman and Dupuis (2006) postulated that neoliberal governmentality produces contradictory impulses such that the neoliberal citizen is emotionally compelled to participate in society as both an out of-control consumer and a self-controlled subject (Guthman & DuPuis, 2006). Neoliberalism and healthism may synergistically contribute to widespread societal weight bias as both place emphasis on individualism, in that the realisation of health and solutions to preventing illness lies in the realm of individual choice.

Conversely, the pervasiveness of the ‘personal responsibility’ message does not accurately represent research findings. Many significant contributing factors to obesity are beyond an individual’s control. There is evidence that biological and genetic factors (Frayling et al., 2007; Lee, 2009; Perusse & Bouchard, 2000) regulating body weight, as well as numerous social and economic influences, play a role in promoting and reinforcing obesity in the obesogenic environment (Swinburn et al., 2011).

While there is a consensus that stigma undermines public health, it does not appear that the principle has been applied to the obesity epidemic. Some contend that the stigma that the obese face may actually encourage them to lose weight and thus have a positive effect on health outcomes (Latner, Wilson, Jackson, & Stunkard, 2009; Saguy & Riley, 2005)’ and that weight stigma is acceptable and necessary. However, there is very little evidence to suggest that ‘shame based’ tactics are effective in health promotion strategies aiming to improve the health of obese persons (Lewis et al.,

2010; Thomas, Lewis, Hyde, Castle, & Komesaroff, 2010). Referring to the rise in obesity prevalence as an epidemic or crisis in itself may perhaps inadvertently have a negative effect on obesity prevalence. Other detrimental metaphors have been used throughout the obesity discourse portraying obese individuals as targets in a war or even as 'domestic terrorists' (Rail, Holmes, & Murray, 2010).

Despite the latter debate, the prevention and management of obesity is considered to be of importance for all HCPs (National Institute for Health and Care Excellence, 2006). Obese patients may delay or avoid health care due to fear of being stigmatised (Drury & Louis, 2002; Merrill & Grassley, 2008; Wee, McCarthy, Davis, & Phillips, 2000). Therefore, weight-based stigma, may undermine obese patients' opportunity to receive effective medical care and is a threat to quality health care.

2.3 Physicians

Results from 10 studies published between 2001 and 2013 indicate that physicians are biased in their attitudes and beliefs about obesity. Only one study found neutral to negative attitudes rather than entirely negative attitudes (Harvey & Hill, 2001). The latter study examined the views of 204 British GPs and 51 clinical psychologists regarding overweight people in comparison to their views on smokers. The postal survey employed a two by two, independent factorial design, so that respondents received questionnaires that were adapted from the Attitudes Toward Obese Persons (ATOP) and Beliefs About Obese Persons (BAOP) scale either about, moderately overweight, extremely overweight, moderate smokers or heavy smokers. Moderately

and extremely overweight people were perceived as having reduced self-esteem, low sexual attractiveness and poor health and to be moderately responsible for changing their situation. The degree of overweight appears to affect attitudes, as negative attitudes were more likely to be directed at extremely overweight people, rather than moderately overweight people.

A qualitative study carried out in Scotland, found that GPs understood the problem of obesity but generally had little enthusiasm for weight management, as they felt it was an inappropriate use of their time and passed obese patients onto their Practice nurses (Mercer & Tessier, 2001). A major theme that emerged was frustration at the “lack of success” of management objectives and lack of motivation on the part of the patient was seen as a major part of the problem.

Whether or not physicians’ decision making is influenced by their attitudes towards obesity is unclear. Wigton and McGaghie (2001) studied 72 medical students as they designed a management plan for ‘normal’ and ‘obese’ patients. They found that the obese patient’s appearance alone influenced the impressions of the students. The medical students rated the obese patients as “less intelligent” “unattractive” and “less likely to respond to dietary counseling” (Wigton & McGaughie, 2001, p. 262).

Comparable findings were reported in a geographically representative national random sample of American physicians (Foster et al., 2003). Similarly, a study involving 76 medical students investigating potential bias and care recommendations for obese

and non-obese virtual patients found negative stereotyping, less anticipated patient adherence, worse perceived health, more responsibility attributed for potentially weight –related presenting symptoms and less visual contact directed toward the obese version of the virtual patient than the non-obese version (Persky & Eccleston, 2011). Yet, although the appearance of the obese patient influenced attitudes, there were no significant differences in the tests ordered or treatment administered based on the patient’s size alone (Persky & Eccleston, 2011; Wigton & McGaghie, 2001). Contrary to this, Hebl and Xu (2001) found that the weight of a patient significantly affected how physicians’ viewed and treated them. Even though physicians indicated that they would order more tests for overweight patients, they also expressed that they would spend less time with overweight patients (Hebl & Xu, 2001).

Predominantly, studies investigating weight bias in medical students and physicians have been performed in the USA (Amy, Aalborg, Lyons, & Keranen, 2006; Block, DeSalvo, & Fisher, 2003; Brandsma, 2005; Foster et al., 2003; Hebl & Xu, 2001; Miller et al., 2013; Persky & Eccleston, 2011; Petrich, 2000; Phelan et al., 2014; Sabin, Marini, & Nosek, 2012; Wigton & McGaghie, 2001).

In comparison, data from Europe is scarce. In 2005, Bocquier and colleagues conducted a cross-sectional telephone survey of private GPs in southeastern France that assessed their knowledge, attitudes and practices in overweight adults and obesity management. Approximately 30% of respondent GPs had negative attitudes toward overweight and obese patients, with slightly more GPs reporting negative

attitudes towards obese patients than overweight patients. Negative attitudes towards obese patients were associated with not subscribing to any medical journals ($p = .03$), awareness of obesity management guidelines ($p = .03$) and never having dieted themselves ($p = .05$).

German medical students significantly rated an overweight vignette more negatively than a normal weight vignette (mean fat phobia scale (FPS) score 3.65 ± 0.45 versus 2.54 ± 0.38 , $p < .001$) (Pantenburg et al., 2012). Weight bias is also present in physicians in Eastern Europe. Physicians' attitude score was found to be accountable for 64% of the variance for their professional practice patterns score in a cross sectional survey of one health district in Turkey (Akman, Kivrakoglu, Cifcili, & Unalan, 2010).

In addition to explicit biases that are intentional and conscious, individuals also possess implicit or unconscious beliefs or biases that exist in memory but are frequently distinct from conscious values and beliefs and are automatically activated. Implicit bias may predict discriminatory behaviour even among persons who have no intention to discriminate (Dovidio & Gaertner, 2000). In recent years, a number of large scale studies in the USA investigating implicit and explicit attitudes simultaneously in physicians (Sabin et al., 2012) and medical students (Miller et al., 2013; Phelan et al., 2014) have been completed. The mean implicit association test (IAT) score reported for medical students (Phelan et al., 2014) and Physicians (Sabin et al., 2012) was similar (.42 versus .40 respectively). The latter values are indicative of moderate to strong implicit bias. Miller and colleagues did not report mean IAT score, but in their results

stated that 56% of the 310 participating students had a moderate or strong implicit weight related bias.

There is some evidence that male physicians and trainee physicians exhibit greater implicit and explicit bias compared with their female counterparts (Phelan et al., 2014; Sabin et al., 2012). Other demographic variables may also influence extent of anti-fat bias for example respondent's age (Miller et al., 2013) BMI and ethnicity (Phelan et al., 2014; Sabin et al., 2012).

2.3 Nurses

The Attitudes Toward Obese Adult Patient Scale (ATOAP) has been used to study American registered nurses' (RNs) attitudes towards adult obese patients. The ATOAP scale consists of 28 items designed to measure RNs' attitudes toward obese patients across the dimensions of nursing management, lifestyle and personality characteristics (Bagley, Conklin, Isherwood, Pechiulis, & Watson, 1989). Statements are rated along a 5-point Likert scale, with 1 signifying strong agreement and 5 representing strong disagreement.

In a convenience sample of 119 RNs from an acute care centre and rehabilitation site, Zuzelo and Seminara (2006) found that RNs have positive attitudes toward obese adults (mean ATOAP score 3.32.). On average, RN respondents disagreed or strongly disagreed with four items relating to the permissibility of punitive nursing interventions and the repugnancy of obese adult patients. Conversely, there were six

items related to the physical care demands and lifestyle of obese adults that the RNs either agreed or strongly agreed with (mean score 2.63). For example; obesity in adults can be prevented by self-control (2.82 ± 0.953), caring for an obese adult is physically exhausting (2.31 ± 0.960) and if given the choice most Nurses would prefer not to care for an obese adult patient (2.63 ± 0.907).

Bariatric sensitivity training may improve nursing attitudes toward obese patients. An online survey involving 266 nurses (145 from hospital 1 that had offered bariatric sensitivity training and 121 nurses from hospital 2 that did not) found that attitudes were slightly more positive in nurses that had completed the training (Gujral, Tea, & Sheridan, 2011). Attitudes and beliefs were assessed using the Attitudes Toward Obese Persons (ATOP) and Beliefs About Obese Persons (BAOP) scale. The mean ATOP score for nurses from hospital 1 and 2 were 18.0 versus 16.1 respectively, $p=0.03$). Although the nurses who had received the bariatric sensitivity training had exhibited modestly more positive attitudes, scores below 60 on the ATOP scale are indicative of negative attitudes, with higher scores associated with less prejudicial attitudes.

A study based in Hong Kong, investigating 352 undergraduate and 198 registered nurses' attitudes towards obese persons and towards the management of obese patients found that both undergraduate and registered nurses have negative attitudes towards obese persons, with registered nurses holding more negative attitudes towards obese persons than the student nurses (mean FPS score 3.6 ± 0.5 versus 3.5 ± 0.5 respectively) (Poon & Tarrant, 2009). The latter FPS score represents average

fat phobia according to the authors of the scale (Bacon, Scheltema, & Robinson, 2001). In addition to using the FPS score, Poon and Tarrant used a sub-scale of the ATOAP. Interestingly, while overall responses to the ATOAP scale were more neutral (mean ATOAP score 2.64 ± 0.51), RNs held more negative attitudes toward the management of adult obese patients. This may be perhaps explained by the fact that the responses to the ATOAP scale were affected by social desirability; in that student and RNs are reluctant, even anonymously to admit to negative attitudes that may affect their professionalism and the nursing care of patients.

The differences observed in attitudes between registered and student nurses may be due to the varying experience of caring for obese patients or the age of the student nurse/RN. In the latter study the RNs were significantly older than the student nurses (32.7 years versus 20.8 years). Although some studies have found a similar pattern between age and attitudes (Sikorski et al., 2013), others have found that with increasing age, implicit fat bias decreases (Schwartz, Chambliss O'Neal, Brownell, Blair, & Billington, 2003), as does explicit fat bias (Miller et al., 2013). This may perhaps be due to the fact, that with age comes understanding and acceptance and may reflect maturity and life experience with people of all sizes. Equally, with aging there is age related weight gain as most studies report that mean body weight increases with age up to about the age of 60 and then levels off (Rössner, 2001).

Implicit bias towards overweight individuals in medical and non-medical contexts in both nursing and psychology were assessed using a computerised IAT (Waller,

Lampman, & Lupfer-Johnson, 2012). They found a statistically significant implicit bias in both subject groups and in both target settings (medical and non- medical). Notably stronger weight bias was evident when the stimulus targets were female rather than male.

Keyworth, Peters, Chishlom and Hart (2013) completed a qualitative study of 20 nursing students from one university in Manchester (United Kingdom) designed to explore the perceptions of obesity, potential barriers to successful weight management and training needs of nursing students. Although there was limited focus on attitudes the students reported witnessing discriminative behaviour amongst qualified nurses. Participant 7 from the latter study, a 3rd year student, said

They [nurses] were quite discriminative about it, how they sort of took the mick but yeah I felt sorry for the patient 'cause he was being judged on his appearance ...all the way through his A&E experience he was being mocked a little bit. (Keyworth et al., 2013, p. 483).

Some of the nursing students also expressed prejudicial attitudes towards patients, blaming them (the patient) for being overweight. A third year nursing student said “ You do just immediately think how have you let yourself get that way, it’s not very pleasant to look at” (Keyworth et al., 2013, p. 483). In the USA, similar results were found through thematic analysis of a qualitative descriptive survey involving 102 nursing students. The student nurses perceived obesity to be unhealthy and assumed that individuals who were overweight were inactive, lazy, and lack self-control (Petrich, 2000). The latter research also involved medical students. There were similarities and

differences in the perspectives of nursing and medical students, but in general a greater percentage of medical students held negative attitudes toward obesity.

Nursing staff showed slightly more positive attitudes denoted by a their mean fat phobia score compared with physicians and therapists (psychotherapists and dietitians) in a study comparing weight stigma between different HCPs in a hospital in Germany (Sikorski et al., 2013) . The latter study involved 682 HCPs (183 physicians, 321 nurses and 118 therapists).

2.3 Dietitians

Two studies that involved dietetic students from American universities that used the FPS to assess the dietetic students attitudes towards obese persons, found similar results (Berryman, Dubale, Manchester & Mittelstaedt, 2006; Puhl, Wharton, & Heuer, 2009) (mean FPS= 3.6 and 3.7 respectively) that are indicative of moderate levels of fat phobia. The research by Berryman and colleagues involved a small sample of 38 dietetic and 38 non-dietetic students. However, it is one of a few that did not rely on self-reported weight and height to calculate participants' BMI. They found that two student groups were similar with respect to negative attitudes toward obesity and their perceptions were comparable to the general population. The subsequent study in 2009 involved a larger sample of 182 dietetic students and found that students rated obese patients as being less likely to comply with treatment recommendations compared with non-obese patients and they also rated their health status and diet

quality to be poorer than non-obese patients despite equivalent nutritional and health information across weight categories.

British dietitians' views of overweight and obese people have been investigated using an independent measures survey that explored beliefs about the causes of obesity, attitudes, perceptions of responsibility and reported weight management practices (Harvey, Summerbell, Kirk, & Hill, 2002). The latter survey used the ATOP scale developed by Allison, Basile and Yunker in 1991. The total mean attitude score showed that attitudes toward overweight and obese people were neutral to positive, though they failed to report the actual mean score or range. Furthermore, overweight people were rated more positively compared with obese people. The items that were rated most negatively overall were those that summarised perceptions of reduced self-esteem, low sexual attractiveness and poor health.

2.3 Other HCPs

The IAT was used to investigate the attitudes and beliefs of HCPs who specialise in obesity treatment and compare them with those of the general population (Teachman & Brownell, 2001). The heterogeneous sample included physicians, pharmacists, nutritional therapists and other unnamed HCPs. Even though a strong anti-fat bias was observed, it was reported as lower than the bias of the general population. However, the generalisability of the results needs to be questioned. The demographic variables of the obesity specialists and the circumstances of where the participants completed the test may have influenced results. Participants were predominantly middle-aged

men who were attending a meeting about weight stigma. They compared the obesity specialists' results to a sample of the data that was already gathered from the general population at a beach area in Connecticut. The authors did not report how they chose the 96 individuals involved in the comparison and they admitted that the results should be interpreted with caution due to the differences between the two samples' demographic variables and differences in data collection. However, similar results were found when the IAT was administered to a sample of 389 clinicians and researchers specialising in obesity (Schwartz et al., 2003). The results revealed that although the HCPs exhibited a very strong weight bias, those who actually worked with obese people directly; reported having a positive outlook on life, having friends who are obese and indicated an understanding of the experience of obesity, were less biased. In addition, the authors observed that age of the HCP affected bias, with younger HCPs exhibiting a greater level of bias toward obese patients than older HCPs.

In a study that aimed to assess dental students' knowledge, perceived professional duties and attitudes towards overweight and obese population, 343 dental and 17 dental hygiene undergraduates were surveyed during class attendance at the University of Michigan. This study employed the use of a questionnaire previously used with physicians (Foster et al., 2003) but adaptations were made to the original questionnaire. The authors observed that the students generally held a positive attitude towards obesity (Magliocca, Jabero, Alto, & Magliocca, 2005). Further research with the latter survey instrument was conducted with dental students in India (Kumar, Tadakamadla, Tibdewal, Duraiswamy, & Kulkarni, 2012). A few alterations to

the survey were made due to cultural differences. A greater number of students with clinical experience agreed that they felt uncomfortable when examining an obese patient compared with pre-clinical students (26% versus 18%, $p < .001$). The attitude that overweight people tend to be lazier, lack willpower and motivation compared with normal weight people was prevalent (Kumar et al., 2012), while in the former study conducted by Magliocca and colleagues, 40% of students disagreed that overweight people are lazier than normal weight people and 30% were neutral regarding this statement. Cultural differences may be responsible for these differences or perhaps the BMI of the participating students may have influenced results. Unfortunately in both the latter studies information related to BMI was not requested in either study.

Randomly selected members of the American Physical Therapy Association have also been mailed an adapted version of the questionnaire used by Foster et al. (2003). The authors reported that the attitude scores of the physical therapists regarding obesity were neutral (Sack, Radler, Mairella, Touger-Decker, & Khan, 2009). However, the mean score for the majority of responses for each set of adjectives on a 7 semantic differential scale were between 3 and 5 and ratings of 1-3 represent being closest to the most negative attribute. At least one half of the 345 respondents viewed people who are obese as awkward, unattractive, non-compliant and weak willed.

The ATOP scale has been used to investigate occupational therapy students' (Vroman & Cote, 2011) and occupational therapists' (OT) (Leemhuis & Cozzolino, 2010)

attitudes towards obese persons. Scores on the ATOP ranged from 36-106, (mean 72.8 ± 15.4), 27 to 101 (mean 68.6 ± 14.27) respectively. Scores on the ATOP scale can range from 0 to 120. A score of 60 or less indicates negative attitudes. The mean latter scores are not much greater than 60 and are indicative of negative bias within these sample of OT trainees and practitioners.

2.4 Sample size

Generally the studies had moderate sample sizes ranging from 20 to 4,732 and 20 to 2,284 (trainee and qualified, respectively). For a summary of the studies included in the review see table 1 and 2, pp 43-48 and 49-56, respectively. However, some studies failed to adequately and reliably differentiate outcome measures according to various variables due to small numbers of participants within each group (ranging from 4 to 60) (Amy et al., 2006; Berryman et al., 2006; Harvey & Hill, 2001; Hebl & Xu, 2001; Teachman & Brownell, 2001; Vallis, Currie, Lawlor, & Ransom, 2007).

2.5 Generalisability

The majority of authors used a convenience non-random sampling method to acquire their participants (Amy et al., 2006; Berryman et al., 2006; Kumar et al., 2012; Magliocca et al., 2005; Pantenburg et al., 2012; Poon & Tarrant, 2009; Puhl et al. 2009; Schwartz et al., 2003; Sikorski et al., 2013; Swift, Hanlon, El-Redy, Puhl & Glazebrook, 2013; Teachman & Brownell, 2001; Vallis et al., 2007; Waller et al., 2012; Wigton & McGaghie, 2001; Zuzelo & Seminara, 2006). However, the dearth of random and non-convenience sampling is understandable due to logistical difficulties completing it. In

addition, survey research examining attitudes and beliefs inherently pose a significant risk for introducing bias into the results as these are the very characteristics that may influence participation in the study. In addition, there is no way of knowing how those who refuse to participate differ from those who co-operate. Response rates varied greatly in studies involving trainee and qualified HCPs, ranging from 52% to 100% and 13% to 86% respectively. In addition, some studies did not report their response rate (Amy et al., 2006; Berryman et al., 2006; Hebl & Xu, 2001; Keyworth et al., 2013; Persky & Eccleston, 2011; Petrich, 2000; Puhl et al., 2009; Schwartz et al., 2003; Teachman & Brownell, 2001; Vroman & Cote, 2011; Waller et al., 2012).

2.6 Survey instrument validity

The majority of studies used validated and reliable survey instruments used to assess explicit attitudes and beliefs towards obese persons ATOP and BAOP (Allison et al., 1991), FPS (Bacon et al., 2001), ATOAP (Bagley et al., 1989), Anti-fat attitudes (AFA) (Crandall, 1994), Universal Measure of Bias- FAT (UMB-FAT) (Latner, O'Brien, Durso, Brinkman, & MacDonald, 2008), as well as implicit, IAT (Greenwald, Poehlman, Uhlmann, & Banaji, 2009). However, some did not use validated tools (Brandsma, 2005), or modified validated tools (Poon & Tarrant, 2009), or they did not describe the instrument employed to obtain HCPs' attitudes (Amy et al., 2006). Furthermore, one of the significant limitations of survey research is that it relies on self-reporting, which is often affected by social desirability bias, and the attitudes that are expressed may not necessarily accurately reflect actual behaviours.

2.7 BMI measurement technique

Many of the studies used self-reported weight and height to calculate participants' BMI. This is an important limitation as there is evidence that individuals may either under or over report their height or weight depending on what is being studied and other factors such as sex and age may also influence reporting (Ciarapica, Mauro, Zaccaria, Cannella, & Polito, 2010; Connor Gorber, Tremblay, Moher, & Gorber, 2007; Kuczmarski, Kuczmarski, & Najjar, 2001). The study completed by Berryman and colleagues (2006) was the only study that actually measured the height (with use of a wall mounted stadiometer) and weight of participants (with use of a BOD POD) accurately, by the same professional to ensure consistency in methods. A scale and tape measure was used in another study (Persky & Eccleston, 2011).

Many of the studies did not request information regarding participants' height and weight and mean BMI of respondents was not calculated (Bocquier et al., 2005; Brandsma, 2005; Harvey et al., 2002; Hebl & Xu, 2001; Keyworth et al., 2013; Kumar et al., 2012; Leemhuis & Cozzolino, 2010; Magliocca et al., 2005; Mercer & Tessier, 2001; Miller et al., 2013; Petrich, 2000; Schwartz et al., 2003; Waller et al., 2012; Wigton & McGaghie, 2001; Zuzelo & Seminara, 2006). Of those with data regarding participants' BMI the analysis of the impact of respondents' BMI on their attitudes towards obesity are mixed. Some have found non-significant findings regarding the latter (Akman et al., 2010; Berryman et al., 2006; Foster et al., 2003; Gujral et al., 2011; Pantenburg et al., 2012; Persky & Eccleston, 2011; Sack et al., 2009; Vallis et al., 2007). However, it is important that the majority of the latter studies had a narrow BMI range, with very

low percentages of overweight and obese participants. Those that did find a significant difference in attitudes according to participants' BMI had much larger sample sizes (Phelan et al., 2014; Sabin et al., 2012) (4,732 and 2,284 respectively), indicating those with a lower BMI had more negative attitudes towards obese persons.

2.8 Sex

There are conflicting results whether sex of the participant affects implicit and explicit weight bias. There appears to be more evidence that males exhibit greater levels of bias (Miller et al., 2013; Pantenburg et al., 2012; Phelan et al., 2014; Sabin et al., 2012). However, no sex differences were found, albeit in a relatively small sample of health professionals specialising in obesity treatment (n=84), with 71% participants being male (Teachman & Brownell, 2001). A few studies used vignettes in combination with the survey tool. Females appear to be subjected to greater bias irrespective of their body weight (Falkner et al., 1999; Puhl, Andreyeva, & Brownell, 2008; Waller et al., 2012). This reflects the unequivocal drive for thinness present in society, driven in part by the media (Hesse-Biber, Leavy, Quinn, & Zoino, 2006). However, in some settings males may be more negatively evaluated for example regarding their employability in the fitness industry (Sartore & Cunningham, 2007).

2.9 Ethnicity

The majority of studies lack significant ethnic diversity and those with ethnic minorities, have small numbers that precludes confident assessment of correlations and significant differences in attitudes towards obese persons between ethnic groups.

Of the larger representative studies ethnicity did influence weight bias with those of a non-Black race exhibited greater implicit and explicit weight bias (Phelan et al., 2014; Sabin et al., 2012).

2.10 Terminology

The weight related terminology used in the surveys and manipulations may influence results and prohibits direct comparison between the studies that have used the same instrument tool to assess attitudes. For instance 'obese' is often used interchangeably with or very little distinction from 'overweight'. Some researchers rely on the BMI to define the constructs of overweight and obese, but this can also be problematic because it is not a direct measure of the excess accumulation of body fat that an individual has. In addition, heavy people do not uniformly gain weight everywhere, some are top heavy, some carry excess weight around their middle or their thighs but it is unclear whether one form or other is more or less tolerable than the others.

In a study that assessed attitudes towards moderately overweight and extremely overweight, participants were asked how they would define each of these. On average, moderately overweight and extremely overweight as were defined as 20% and 45% above ideal weight respectively. Unfortunately HCPs cannot always accurately define obesity according to BMI (Block et al., 2003; Sack et al., 2009).

2.11 Age and experience

It is unclear how the age and work experience of HCPs influence their attitudes. Actual contact with obese individuals may reduce bias, a fact supported by research showing

that greater work experience was associated with lower stigmatising attitudes in a sample of nurses (Culbertson & Smolen, 1999), while others have found no association with work experience (Vallis et al., 2007; Zuzelo & Seminara, 2006). On the other hand, in the only study that included trainee and registered professionals of the same profession, found that RNs had more negative attitudes.

2.12 Conclusion

Overall it is evident that negative attitudes towards obese persons are prevalent amongst trainee and qualified HCPs irrespective of their own BMI. While there are conflicting results with regards to mediating factors, such as sex, further research is needed with sufficient sample numbers, with a wide range in BMI and ethnic diversity, representative of the study population. The majority of the research within the health care domain has been conducted on doctors and nurses. This is understandable, as they are likely to be the professionals that have more regular contact with overweight and obese patients, as they may present to them with associated co-morbidities of obesity. However, they are not the only HCPs that may perpetuate the ingrained stigma of obesity within society into the health care setting and depriving obese patients the respect and quality of care they deserve.

Obesity has a significant effect on a person's musculoskeletal alignment and function. Studies have found that the prevalence of significant knee, hip and back pain increases with increased levels of BMI in adults 60 years and above. A recent review,

found that there is a strong association between increased BMI and non-specific foot pain and chronic plantar heel pain in a non-athletic population (Butterworth, Landorf, Smith, & Menz, 2012). As the prevalence of obesity has increased in recent decades, so too has the prevalence of diabetes. A prevalence model suggests that there are 3.1 million people in England with diabetes and if this trend continues the number will rise to an estimated 4.6 million of the adult population by 2030 (Yorkshire and Humber Public Health Observatory, 2010). Diabetic foot disease carries a significant burden with ulcerations of the foot and amputations that significantly reduce the quality of life of those affected. According to guidelines, individuals with diabetes should have an annual foot review in order to assign a risk category, educate, manage and review as appropriate in order to prevent foot problems (National Institute for Health and Care Excellence, 2004), Therefore, the podiatry profession is certainly challenged with dealing with the ramifications of the obesity epidemic and its effects on patients' lower limbs. Podiatrists play an important role in keeping people mobile and as pain free as possible while being so. Therefore, in terms of weight management it is very important that their relationship is not negatively affected by weight stigma and is ever encouraging. To date no study researching attitudes towards obese persons has included podiatrists worldwide and it would be valuable to ascertain not only their attitudes towards obese persons but also their knowledge about the health risks associated with obesity, so that any necessary changes in the undergraduate podiatric training and continued professional development could be implemented.

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4.0 Literature review appendices

Appendix 1. Table 1: Studies addressing trainee health care professionals' attitudes towards obese persons (arranged by date).

<i>Author (s) & country</i>	<i>Aim</i>	<i>Sample</i>	<i>Method</i>	<i>BMI (kg/m²)</i>	<i>RR^k (%)</i>	<i>Main findings</i>
Petrich (2000) USA	To describe the perceptions of medical and nursing u/g ^b s towards obesity.	n= 130, 28 1st, 2 nd , 3 rd or 4 th year medical and 102 3 rd or 4 th year nursing students from four universities	Qualitative survey of six open ended questions – Thematic analysis. Purposive sampling.	NR ³	DNS ^j	Feelings of repulsion prevalent in both groups towards someone that appeared to be OW, but greater % of medical u/g ^b s felt this way. Both groups perceived obesity to be unhealthy and assumed that individuals who were OW ^m were inactive, lazy, lacking self -control.
Wigton & McGahie (2001) USA	To investigate whether OB ⁿ appearance alone would affect medical students' decisions about the diagnosis and management of simulated patients.	n=72. CS ^d from two universities. 32, 3 rd year and 16 4 th year and 24 3 rd year students.	Videotapes of four patient simulators presenting each of four cases in two states: normal and OB ⁿ . Each student saw 4 different cases, arranged according to fractional factorial design. After each presentation students were asked to select the tests and treatments they would order from a set list.	NR ³	100	Students rated the OB ⁿ appearing patients as less attractive. Less compliant and more depressed. Students would be less likely to want the OB ⁿ patient in their continuity-of-care practice (p<0.015)
Block et al. (2003) USA	To analyse whether internal medicine residents are suited for their role treating OB ⁿ patients.	n=87. CS ^d , medicine residents from two universities 44% F ^l , 56% M ^s	Cross-sectional survey. Questionnaire measuring AT ² .	23.7	100	Negative AT ² prevalent.

Table 1 (continued)

<i>Author (s) & country</i>	<i>Aim</i>	<i>Sample</i>	<i>Method</i>	<i>BMI (kg/m²)</i>	<i>RR^k (%)</i>	<i>Main findings</i>
Magliocca et al. (2005) USA	To assess knowledge, perceived professional duties and AT ² towards OW ^m and OB ⁿ population.	n= 360. 343 dental u/g ^b 17 dental hygiene u/g ^b , from one university.	CS ^d and NRS ^f Assessing knowledge, beliefs and AT ² .	NR ³	91	U/g ^b s generally held positive AT ² regarding obesity. 30% of u/g ^b s felt that OW ^m are lazier than non-OB ⁿ people, and an equal number of u/g ^b s uncertain about statement. 26% of u/g ^b s felt that OW ^m people lack willpower and motivation when compared to non-OB ⁿ counterparts.
Berryman et al. (2006) USA	To explore AT ² toward obesity between dietetics and non-dietetic students and their relationship with dietary intake and body composition.	n= 76. 38 F ^l dietetic u/g ^{bs} and 38 F ^l non-dietetic u/g ^{bs}	CS ^d Used FPS ^e	HW ^l 22.5±4 ^g 24.1±4.5 ^h	DNS ^j	Mean score for dietetic u/g ^{bs} =3.66 (range 2.0-5.0). 16% of dietetic u/g ^{bs} had score of ≥4.4, indicative of high levels of fat phobia. The two groups of students were not different when comparing overall scores on the FPS ^e (P=0.86).
Poon & Tarrant (2009) Hong Kong	To study u/g ^b and RN ^a AT ² towards OB ⁿ persons & towards the management of OB ⁿ patients.	n= 550. 352 u/g ^b nurses 198 RN ^a	CS ^d and NRS ^f .FPS ^e and ATOAP ^c . Self-administered, researcher present.	19.8±2.5 ^b 20.7±2.5 ^a	2003-04=52 2005-06=81.8	Mean FPS ^e score 3.5±0.5 u/g ^b nurses, 3.6±0.5 RN ^a . Mean ATOAP ^c 2.6±0.5 u/g ^b , 2.7±0.6 RN ^a . Both u/g ^b & RN ^a have negative AT ² towards obesity. RNs ^a hold more negative AT ² towards OB ⁿ persons than u/g ^b nurses.

Table 1 (continued)

<i>Author (s) & country</i>	<i>Aim</i>	<i>Sample</i>	<i>Method</i>	<i>BMI (kg/m²)</i>	<i>RR^k (%)</i>	<i>Main findings</i>
Puhl et al. (2009) USA	To investigate dietetic u/g ^b AT ² toward OB ⁿ persons and test whether a patient's weight influences students' treatment decisions.	CS ^d n= 182. dietetic u/g ^b s, from 14 universities.	Online FPS ^e and read one of four mock health profiles of patients, only varying in weight and sex.	22.5±3.2	DNS ^j	Moderate fat phobia present. Mean FPS ^e = 3.7. Only 2 % demonstrated positive or neutral attitudes. Students rated OB ⁿ patients as less likely to comply with treatment than non-OB ⁿ .
Persky & Eccleston (2011) USA	To examine the effect of a patient's weight on medical students' AT ² and interpersonal behaviour toward the patient.	n=76. (3 rd or 4 th) year medical u/g ^b s 57% F ^l 43% M ^s	U/g ^b randomly assigned to interact with a digital, virtual F ^l patient who was visibly either OB ⁿ or non-OB ⁿ	23.9±3.6 (38% OW ^m or OB ⁿ) HW ^l with scale and tape measure	DNS ^j	Evidence of negative stereotyping, less anticipated patient adherence, worse perceived health, more responsibility attributed for potentially weight related presenting complaints and less visual contact directed toward the OB ⁿ version than the non-OB ⁿ
Vroman & Cote (2011) USA	To examine the AT ² and beliefs of occupational therapy (OT) students toward clients who are OB ⁿ .	n=189. OT students from three universities 122 u/g and 67 PG ^v . 181 F ^l , 8 M ^s	Quasi experimental study. ATOP, BAOP ^w , and IAT ^q	23.7±3.7	DNS ^j	ATOP scores 72.8±15.4, (36-106) ^b , 73.3±13.9, (44-100) ^v . Approximately 16% of students scored below 60, indicative of negative AT ² .

Table 1 (continued)

<i>Author (s) & country</i>	<i>Aim</i>	<i>Sample</i>	<i>Method</i>	<i>BMI (kg/m²)</i>	<i>RR^k (%)</i>	<i>Main findings</i>
Kumar et al. (2012) India	To assess the knowledge and AT ² toward obesity among clinical and preclinical dental u/g ^b s.	CS ^d n= 247. Dental students (1 st , 2 nd , 3 rd and 4 th year).	Adapted survey previously used by Magliocca et al. (2005).	NR ³	66	A greater number of clinical students agreed that they feel uncomfortable when examining an OB ⁿ patient (26.9% versus 18%, p<0.001), and it is difficult for them to feel empathy for the OB ⁿ patient. Prevalent AT ² that OW ^m people tend to be lazier and lack willpower and motivation compared to NW ^o people.
Pantenberg et al. (2012) Germany	To investigate European medical students towards OW ^m and OB ⁿ individuals.	n=845. Medical students enrolled at one University.	CS ^d , paper-pencil survey. Vignettes of NW ^o & OB ⁿ 42 year old F ^l , followed by FPS ^e	22.00±2.6	84.6	OW ^m vignette was significantly rated more negatively than NW ^o vignette (mean FPS ^e score 3.65±0.45 versus 2.54±0.38, p<0.001). Significantly higher percentage of students had negative AT ² towards the OW ^m vignette compared with NW ^o .98.9% versus 53.7%. F ^l sex associated with less negative AT ² .
Swift et al. (2012) UK	To assess weight bias among trainee health professionals.	n=1130. MSc Nutrition, MSc Nursing Science, Nursing BSc, Bachelor of Medical Sciences, BSc Nutrition u/g ^b , Fraction sampling.	Self-completed survey FPS ^e and BAOP ^w	21.5 (mediQR ^t) 3.93	80	Significant levels of fat phobia found. Mean FPS ^e score =3.8. Only 1.4% positive or neutral AT ² (FPS ³ ≤ 2.5). Lower fat phobia predicted by higher self-reported BMI ^u F ^l FPS ³ less than M ^s p <0.01. Strong explicit preference for thin people over fat people on average (Cohen's d=0.90. Among OB ⁿ MD ⁵ , moderate explicit anti-fat AT ² found (Cohen's d= 0.67).

Table 1 (continued)

<i>Author (s) & country</i>	<i>Aim</i>	<i>Sample</i>	<i>Method</i>	<i>BMI (kg/m²)</i>	<i>RR^k (%)</i>	<i>Main findings</i>
Waller et al. (2012) USA	Determine unconscious AT ² of nursing and psychology majors towards OW ^m persons in medical and non-medical contexts.	n=90. (45 nursing and 45 psychology u/g ^b students). 85.5% F ¹ from one university	CS ^d computerised IAT ^q	NR ³	DNS ^j	Significant implicit bias towards OW ^m detected in both groups and in both settings. Stronger weight bias when stimulus targets F ¹ .
Keyworth et al. (2013) UK	Explore perceptions of obesity, potential barriers to successful weight management and training needs of nursing students.	n= 20 nursing students, (19F ¹), from one university.	Qualitative, semi-structured interviews, purposive sampling method, thematic analysis.	NR ³	DNS ^j	Limited focus on AT ² . Students reported witnessing discriminative behaviour.
Miller et al. (2013) USA	Determine the prevalence of weight related biases among medical students	n=354. 3 rd year medical students	Computerised weight IAT ^q Semantic differential item assessing explicit preferences	NR ³	88	Overall 33% self-reported moderate or strong explicit anti-fat bias. 56% had moderate or strong implicit weight bias. Both NS ^z . Explicit anti-fat bias decreased with increasing age, but NS ^z .
Puhl et al. (2013) USA	To examine weight bias among students training in health disciplines.	n=107 students. PG ^v level physician associate, clinical psychology or psychiatric residency, 68% F ¹ .	CS ^d , NRS ^f paper-pencil survey UMB-FAT ^x .	23.25±4.0	93	Mean UMB-FAT ^x score= 3.04±0.75. Higher levels of weight bias associated with the belief that it is acceptable to make jokes about patients with obesity (0.372 ¹ , p<0.001) and more negative AT ² about treating patients with obesity (0.483 ¹ , p<0.001).

Table 1 (continued)

<i>Author (s) & country</i>	<i>Aim</i>	<i>Sample</i>	<i>Method</i>	<i>BMI (kg/m²)</i>	<i>RR^k (%)</i>	<i>Main findings</i>
Phelan et al. (2014) USA	To examine the magnitude of explicit and implicit weight biases among medical students.	n=4,732. 1st year medical students from 49 medical schools.	Web based survey Weight IAT ^q Explicit AT ² : a feeling thermometer and the AFA ^p .	23.3±0.6	81	Mean IAT ^q score= 0.42± 0.01. 59% students: moderate or strong implicit bias. Implicit and explicit bias weakly correlated (r=0.13). M ^s exhibit more negative implicit & explicit AT ² than F ^l , NS ^z . Racial differences present (p<0.01) Black students had the most positive implicit and explicit AT ² . Mean explicit score=2.29.

Key for table 1.

^a RN = registered nurses	^b u/g= undergraduate
^c Attitudes Toward Obese Adult Patients Scale	^d CS = convenience sampling
^e FPS= Fat Phobia Scale	^f NRS= Non-random sampling
^g dietetic	^h non-dietetic
^l HW= height and weight measured by professional	^j DNS= Does not state
^k RR= response rate	^l F=female
^m OW=overweight	ⁿ OB=obese
^o NW=normal weight	^p AFA= Anti-fat attitudes test
^q IAT= implicit association test	^r MD= medical doctors
^s M=male	^t medIQR= median interquartile range
^u BMI= body mass index	^v PG= post-graduate
^w BAOP= Beliefs About Obese Persons Scale	^x UMB-FAT= Universal measure of bias-FAT
^z NS = non-statistically significant (p<0.05).	¹ denotes z-standardized coefficients
² AT= attitudes,	³ NR= not recorded
⁴ n= number	⁵ MDs = medical doctors

Appendix 2. Table 2: Studies addressing qualified health care professionals' attitudes toward obese persons (arranged by date).

<i>Author (s) & country</i>	<i>Aim</i>	<i>Sample</i>	<i>Methodology</i>	<i>BMI (kg/m²)</i>	<i>RR^k (%)</i>	<i>Main findings</i>
Harvey & Hill (2001) UK	Examine HPs ^a views of OW ^m people and compare these with smokers.	n=255. 204 GPs ^g and 51 Clinical psychologists.	Postal survey with two by two independent factorial design. Adapted BAOP ⁶ & ATOP ^h . Latter used moderately OW ^m people or extremely OW ^m instead of OB ⁿ . Questions about responsibility of the OW ^m person.	23.2	33.4	Overall AT ² to OW ^m people neutral to negative. The level of severity affected AT ² with the most negative AT ² towards extreme level. Of the four groups, moderately OW ^m people were viewed most positively and extremely OW ^m (OB ⁿ) were viewed least positively.
Hebl & Xu (2001) USA	To investigate how a patient's weight affects the attitudes of Physicians and the treatment they prescribe.	n=122 primary care Physicians, from three hospitals, 90 M ^s , 30 F ^l and 2 unidentified.	Six case studies. One of six variations was posted to PP ^r . PP ^r were randomly assigned to receive forms for average weight F ^l (n=17), OW ^m F ^l (n=21), OB F (n=29), average weight M ^s (n=17), OW ^m M ^s (n=19) and OB ⁿ M ^s (n=19). Recommendations given regarding medical procedures their AT ² and plans regarding the patients.	NR ³	NR ³	The patient's weight significantly affected how Physicians viewed and treated them. The heavier the patient was, the more negative the AT ² and distancing behaviours were. Physicians ordered more tests for OB ⁿ patients and they indicated they would spend significantly less time with patients, the heavier they were.

Table 2 (continued)

<i>Author (s) & country</i>	<i>Aim</i>	<i>Sample</i>	<i>Methodology</i>	<i>BMI (kg/m²)</i>	<i>RR^k (%)</i>	<i>Main findings</i>
Mercer & Tesser (2001) UK	To examine GPs ^g and Practice Nurses perceptions of obesity and their strategies and AT ² towards weight management.	10 F ⁱ Practice Nurses, and 10 GPs ^g (7 F ⁱ and 3 M ^s) from Glasgow.	Semi-structured interview, asked about perceptions of obesity. Thematic analysis	NR ³	33.3	Ambivalence and little enthusiasm for working with OB ⁿ patients on weight management, except in the context of established disease such as diabetes. Lack of patient motivation seen as a major problem.
Teachman & Brownell (2001) USA	To study whether negative implicit AT ² and beliefs towards OW ^m persons exist among HPs ^a who specialise in obesity treatment and compare to general population.	n=84. HPs ^a who treat obesity, 71% M ^s . 72% Physicians. CS ^d of HPs ^a attending a continuing education meeting on obesity.	Self-administered timed survey. PP ^r completed the IAT ^q , reported explicit AT ² and beliefs about thin and fat persons and a demographic questionnaire	25.4	NR ³	PP ^r reported a strong implicit anti-fat bias for both attitude and stereotype measures. Bias was less than that of the general population. No age or gender differences were found for either the implicit or explicit measures.
Harvey et al. (2002) UK	To examine Dieticians' views of OW ⁿ & OB ⁿ .	n=187 members of British Dietetic Association.	Survey of beliefs about the causes, AT ² , responsibility & reported WM ^w practices. Adapted ATOP ^h as part. Postal survey & distribution at conference.	22.3±2.3	75.2 (post) 42.6 (C ^t)	AT ² were mixed- neutral to positive. Most negative AT ² were described in terms of perceived reduced self- esteem, low sexual attractiveness and poor health. OB ⁿ were rated more negatively than OW ^m persons.

Table 2 (continued)

<i>Author (s) & country</i>	<i>Aim</i>	<i>Sample</i>	<i>Methodology</i>	<i>BMI (kg/m²)</i>	<i>RR^k (%)</i>	<i>Main findings</i>
Foster et al. (2003) USA	To assess Physicians' AT ² toward OB ⁿ patients and the causes and treatment of obesity.	n=620. Physicians, 63% M ^s . national random sample.	Postal survey, a questionnaire assessed AT ² . 1 sample (n=2500) received a questionnaire that defined obesity as a BMI ^u of 30 to 40 kg/m ² , whereas the other (n=2500) the BMI ^u which characterised obesity was >40 kg/m ² .	25.5±1 5.8	13	More than 50% of Physicians viewed OB ⁿ patients as awkward, unattractive, ugly and non-compliant. 9% and 3% of respondents indicated that OB ⁿ individuals were unpleasant and dishonest, respectively.
Schwartz et al. (2003) USA	To determine the level of anti-fat bias in HPS ^a specialising in obesity and to identify personal characteristics that correlate with this bias.	n=389. CS ^d of clinicians and researchers at an international obesity conference. 198 F ^l and 191 M ^s .	Self-administered timed survey, the IAT ^q and a self-report questionnaire assessing explicit AT ² , personal experiences with obesity and demographic characteristics of PP ^r .	DNS ^j	DNS ^j	PP ^r reported a significant prothin, anti-fat bias & endorsed the stereotypes of lazy, stupid and worthless on the IAT ^q . Those working directly with obese patients showed less anti-fat bias on the IAT ^q lazy-motivated measures. Anti-fat bias less in M ^s , being older, weighing more, and having OB ⁿ friends.
Bocquier et al. (2005) France	To describe current knowledge, AT ² and practices of French GPs ^g in OW ^m adults.	n=600. GPs, 75.3% M ^s , 24.7% F ^l	Telephone survey, private GPs ^g , assessed personal characteristics, AT ² and opinions about OW ^m and OB ⁿ , knowledge, training and practices.	30% OW ^m , 3% OB ⁿ	55.8	30% had negative AT ² toward OW ^m and OB ⁿ patients. Negative AT ² towards OB ⁿ patients were associated with not subscribing to any medical journals ($p=0.03$), awareness of obesity management guidelines ($p=0.03$), and never dieted themselves ($p=0.05$).

Table 2 (continued)

<i>Author (s) & country</i>	<i>Aim</i>	<i>Sample</i>	<i>Methodology</i>	<i>BMI (kg/m²)</i>	<i>RR^k (%)</i>	<i>Main findings</i>
Brandsma (2005) USA	Examine Physicians' and their OB ⁿ patients' AT ² toward obesity.	26 physicians and 26 OB ⁿ patients from an outpatient medical clinic.	The Bray Attitude Toward Obesity Scale and a demographic questionnaire.	NR ³	46 % Physician 53% patient	Both Physicians and their OB ⁿ patients reported ambivalent overall AT ² regarding obesity. The Physicians reported less negative AT ² than what their OB ⁿ patients perceived.
Amy et al. (2006) USA	To investigate the factors that contributes to lower rates of gynecological cancer screening as related to women's body size.	n=129, 91% F ^l . 25 Physicians, 88 Physicians' assistants or Nurses, 11 Nurse midwives and 5 other Nursing professionals. CS ^d used,	Developed a survey of 13 questions concerning providers' care of OB ⁿ F ^l patients based on data obtained from focus groups with Physicians, Physician assistants and Nurse practitioners.	25.1±5.1	NR ³	Physician responses did not differ from the Nurse practitioners or other providers. Survey responses were not influenced by professionals' self- reported weight or by the percentage of OB ⁿ patients they treated.
Zuzelo et al. (2006) USA	To describe the AT ² of RNs ^x towards OB ⁿ adult patients.	CS ^d , n= 119. RNs ^x ; 15% from an acute care Medical Centre, 22% employed in a rehabilitation site.	Used the ATOAP ^c . PP ^r ranked their own body weight using a 4-point scale from less than ideal weight to greater than ideal body weight. Qualitative responses were encouraged.	NR ³	16.2	No significant correlation between the PP ^r own body weight, years of practice, educational level, work setting and any attitude score. Many PP ^r emphasized the importance of treating OB ⁿ patients "as they would any other patient" in the qualitative remarks.

Table 2 (continued)

<i>Author (s) & country</i>	<i>Aim</i>	<i>Sample</i>	<i>Methodology</i>	<i>BMI (kg/m²)</i>	<i>RR^k (%)</i>	<i>Main findings</i>
Vallis et al. (2007) Canada	To assess bias against OB ⁿ persons in HPs ^a .	CS ^d . n=78. (14.3% Physicians, 15.4% Nurses, 37.4% Dieticians, 4.4% Psychologists, 8.8% Physiotherapists, 19.8% other. (88.5% F ^l).	IAT ^q administered to professionals attending an obesity symposium.	25% OW ^m , 4% OB ⁿ	86	Strong evidence for the presence of a bias against the OB ⁿ . No significant difference in implicit bias by profession, age (r= -0.04) or years of experience (r= 0.054). Although it did not reach statistical significance, OB ⁿ PP ^r showed less bias.
Sack et al. (2009) USA	To determine Physical therapists' AT ² , knowledge & practice approaches to obesity.	n=341. Physical therapists (70.4% W, 29.6% M).	Paper mail survey of randomly selected members of the APTA ¹ . Survey adapted from questionnaire used by Foster et al. (2003).	24.2±4.0	34.6	Attitude scores regarding obesity were neutral. The mean knowledge score was 6.7 (out of 10). A significant correlation (r=0.133, p=0.043) was found between PP ^r knowledge scores and AT ² regarding statements about obesity. Inverse correlation between knowledge scores and the PP ^r age and number of years in clinical practice (r=-0.195, p<0.0005, r= -0.216, p<0.0005, respectively).
Akman et al. (2010) Turkey	To investigate AT ² and professional practice patterns of HCPs towards OB ⁿ patients	n=104. 50.9% Physicians, 49.1% Nurses, 23.1% M ^s .	Cross –sectional survey of one health district, all the primary care health centres visited twice during two consecutive weeks	24.4± 3.2 ^p 24.3± 3.8 ⁿ	77.6	Personal AT ² score was found to be accountable for 64% of the variance for professional practice patterns score.

Table 2 (continued)

<i>Author (s) & country</i>	<i>Aim</i>	<i>Sample</i>	<i>Methodology</i>	<i>BMI (kg/m²)</i>	<i>RR^k (%)</i>	<i>Main findings</i>
Leemhuis & Cozzolino (2010) USA	To explore if there is a bias against obesity that negatively affects the services that OT ⁵ professionals provide to OB ⁿ patients.	n=145. Randomly selected members of the AOTA ⁷ (86.9-OT ⁵ , 12.4% OT ⁵ assistants and 0.7% other. 94.5% F ^l .	Survey: demographic information, clinical experience with obesity, open-ended questions regarding facilitators and barriers to practice and the ATOP ^h .	NR ³	58	Scores on the ATOP ^h ranged from 27 to 101 (mean= 68.6±14.296). Scores <60 by 20.7% PP ^r and cumulatively less than 69 for 52.6% PP ^r .
Gujral et al. (2011) USA	To determine whether bariatric sensitivity training could improve nursing attitudes and beliefs toward adult OB ⁿ patients.	n=266 Nurses. 145 hospital 1 121 hospital 2	Online survey of nurses between hospital 1 that did offer bariatric sensitivity training and hospital 2 that did not. Scales used- ATOP ^h and BAOP ⁶ .	Hospital 1 18.5- 29.9 (73.1 %), 30.0-39.9 (21.4%) Hospital 2 18.5-29.9 (76%), 30.0-39.9 (19.8%)	29	Mean ATOP ^h scores modestly greater than those for hospital 2 (18.0 versus 16.1, p= 0.03). BMI ^u weakly correlated with the overall ATOP ^h score (r=0.13, p=0.04). Weak association between BAOP ⁶ and ATOP ^h score (r=0.26, p=<0.001).

Table 2 (continued)

<i>Author (s) & country</i>	<i>Aim</i>	<i>Sample</i>	<i>Methodology</i>	<i>BMI (kg/m²)</i>	<i>RR^k (%)</i>	<i>Main findings</i>
Sabin et al. (2012) USA	To examine implicit and explicit AT ² about weight among MDs ^b .	Project Implicit, non-targeted sample. n=2,284 58% F ^l .	Online, weight IAT ^q Explicit: choosing one statement, which represents their preference between thin and fat people.	24±4.7	DNS ^j	Mean IAT ^q score= 0.40. Strong implicit anti-fat bias (Cohen's <i>d</i> =0.93). F ^l MDs ⁵ implicit anti-fat bias significantly weaker than M ^s (<i>p</i> <0.01). PP ^r reported a strong explicit preference for thin people over fat people on average (Cohen's <i>d</i> =0.90. Among OB ⁿ MDs ^b , moderate explicit anti-fat attitudes were found (Cohen's <i>d</i> = 0.67). Significant difference in explicit anti-fat bias dependent upon MDs ^b BMI ^u and race.
Sikorski et al. (2013) Germany	To compare weight stigma between different health professions in a hospital.	682 HPs ^a from a hospital in Germany. (28.4% Physicians, 49.8% Nurses, 18.3% Therapists (Psychotherapist and Dieticians).	Paper questionnaires passed out at in a staff meeting. Stigmatising AT ² were assessed by FPS ^e based on a vignette describing an OB ⁿ F ^l and normal weight F ^l patient.	23.36±3.8	39	The mean FPS ^e score was comparable to that in the general public (mean= 3.59). Nursing staff showed slightly more positive AT ² compared to Physicians and therapists. Higher age and higher BMI ^u and ascribing personal responsibility for obesity to the individual were associated with higher levels of stigmatising AT ² .

Key for table 2.

^a HPs= Health professionals	^b MD= medical doctor
^c Attitudes Toward Obese Adult Patients Scale	^d CS = convenience sample
^e FPS= Fat Phobia Scale	^f NRS= Non-random sampling
^g GPs= general practitioners	^h ATOP= Attitudes Towards Obese Persons Scale
^k RR= response rate	^j DNS= Did not state
^m OW=overweight	^l F=female
^o NW=normal weight	ⁿ OB=obese
^q IAT= implicit association test	^p AFA= Anti-fat attitudes test
^s M=male	^r PP= participants
^u BMI= body mass index	^t C= conference
^w WM= weight management	^x RNs= registered nurses
^z NS = non-statistically significant (p<0.05).	¹ APTA= American Physical Therapy Association
² AT= attitudes,	³ NR= not recorded
⁴ n= number	⁵ OT= occupational therapist
⁶ BAOP= Beliefs About Obese Persons Scale	⁷ AOTA= American Occupational Therapy Association

5.0 Project report

Obesity: Knowledge and Attitudes of UK Podiatrists

Word count: 4,398.

Key words: podiatry; weight bias; attitudes toward obese persons scale; obesity risk

5.1 Appropriate journal for the publication of the paper

If this research paper were to be published, the present study would match the requirements of the *International Journal of Obesity* (IJOB). A significant proportion of the studies that have investigated attitudes towards obese persons and obesity stigma, irrespective of health discipline have been published in the IJOB. The journal is a multi-disciplinary forum for research regarding all aspects of obesity, such as physiology, genetic, molecular, metabolic, epidemiological and psychological. The present study would add to the existing body of research in the area of weight stigma and aid raising awareness regarding negative attitudes towards obese persons in health care.

5.2 Acknowledgments

I would like to take this opportunity to express my sincerest gratitude to Dr Stephen Fallows for his guidance and support through the formulation, preparation and data analysis of this research project.

6.0 Abstract

Objective: This study examined podiatrists' knowledge of the health risks associated with obesity and their attitudes towards obese persons.

Design: A cross-sectional online questionnaire was designed to obtain demographic characteristics, attitudes and knowledge. Participants were members of the Society of Chiropodists and Podiatrists.

Methods: The questionnaire included the validated and reliable Obesity Risk Knowledge-10 (ORK-10) scale and Attitudes Toward Obese Persons (ATOP) scale. 897 podiatrists were invited by email to complete the questionnaire.

Results: The response rate was 17%, (n=130). Attitude scores regarding obese persons were neutral. The mean ATOP scale score was 67.91 ± 18.02 . The median knowledge score was 7 (of 10). No statistically significant correlation was found between ATOP scale scores and participants' self-reported body mass index (BMI) and ORK-10 scale scores. No significant difference in ATOP scale scores by sex ($p=.11$). ATOP scale scores were significantly negatively correlated with work experience in the podiatry profession ($r= -0.265$, $p=.002$) and age ($r= -0.173$, $p=.049$). No significant relationship between ORK-10 scale scores and participants' BMI, age or work experience.

Conclusion: The results suggest that podiatrists have neutral to positive attitudes towards obese persons, however negative responses were prevalent. Podiatrists have a moderately good level of knowledge of the health risks associated with obesity, which should enable them to counsel their patients of the risks that obesity poses to their health. Nevertheless, the development of continuing professional development

modules in the area of obesity risk knowledge and anti-obesity stigma may be beneficial for podiatrists, their patients and their clinical interactions.

7.0 Introduction

Public awareness of obesity has changed substantially in recent decades, with the ever-increasing number of prevention campaigns. Despite this rise in awareness and readiness to acknowledge obesity as a chronic relapsing condition of clinical significance, obese individuals face high levels of stigmatization (Puhl & Brownell, 2001) . This weight bias affects nearly all areas of life; particularly education, employment and health care as well as interpersonal relationships (Puhl & Brownell, 2003; Puhl & Heuer, 2009) . Obesity is associated with numerous physical health problems such as cardiovascular disease, stroke, type 2 diabetes, fatty liver disease, osteoarthritis, sleep apnoea, reproductive disorders and some forms of cancer (Brown, Fujioka, Wilson, & Woodworth, 2009; Finer, 2011) . Although the latter list of conditions alone may appear overwhelming, researchers have identified psychological consequences of obesity, which must not be underrated, but likewise recognised by health care professionals (HCPs). The relationship between stigma and obesity associated disease is a complex one. Muennig (2008) debated a number of hypotheses that may explain the observed increase in morbidity and mortality associated with obesity that are at odds to the conventional wisdom that obesity-related excess mortality arises purely from a series of biochemical changes associated with adiposity.

People who are obese may delay seeking health care, for fear of being criticised about their weight or their presenting symptoms being predominantly attributed to their weight. Negative attitudes have unfortunately have been repeatedly reported in both

in trainee and qualified practicing HCPs of varying professions, such as doctors, nurses, dietitians, occupational therapists, physical therapists and even those specialising in obesity management. However, there is a paucity of published results on podiatrists' knowledge of and attitudes towards obesity and obese persons.

Podiatrists' are HCPs that aim to improve individuals' mobility, independence and quality of life through the prevention and management of pathological foot problems and their associated morbidity. There appears to be a link between obesity and foot pain, with both fat mass (Tanamas et al., 2012) and increased body mass index (BMI) (Butterworth et al., 2012). Furthermore, type 2 diabetes is associated with obesity and the former's secondary complications can significantly affect the lower limb including diabetic peripheral neuropathy, peripheral vascular disease and Charcot arthropathy, which can in turn predispose to ulcerations and lower limb amputation. In the current obesity and diabetes epidemic, podiatrists are important members of the multi-disciplinary team that can aim to optimise the health of obese individuals.

8.0 Method

Aims

To explore the stigma of obesity in the podiatry profession and podiatrists' knowledge of the health risks associated with obesity and to examine the relationship between knowledge and attitudes.

Hypotheses

1. There will be a significant relationship in podiatrists' attitudes towards obese persons and the podiatrist's BMI.
2. There will be a significant relationship in podiatrists' attitudes towards obese persons and the duration of employment of the participant in the podiatry profession.
3. There will be a significant difference in podiatrists' attitudes towards obese persons dependent upon the participant's sex.

8.1 Study design and sampling

This study was an online, prospective cross-sectional survey. Potential participants were located using the 'Find a Podiatrist' on the Society of Chiropractors and Podiatrists (SOCAP) website (<http://www.scpod.org/find-a-podiatrist/>) of which there are 4,160. However, on closer examination of the database, it was evident that there were many duplications or members without a recorded email address. A cleaning exercise of the data was completed to reveal that there were potentially 897 podiatry members. All 897 members were emailed an invitation to take part.

8.2 Participants

Subjects were HCPC registered podiatrists (n=130).

Measures

The survey instrument included demographic information (sex, ethnicity, height, weight, number of years of work experience in the podiatry profession, sector(s) of work and sub specialism(s) of podiatry in which they currently practice), the Obesity Risk Knowledge- 10 (ORK-10) scale and Attitudes Toward Obese Persons (ATOP) scale.

ORK-10 scale

The ORK-10 scale is a reliable and validated 10-item instrument measuring knowledge regarding health risks associated with obesity (Swift, Glazebrook, & Macdonald, 2006). The scale is designed to be self-completed with respondents being required to judge whether statements are 'true' or 'false' by ticking the right box. If respondents are unsure of the answer they are encouraged to select the 'don't know' option, therefore reducing the distorting effect of guessing. Correct responses score one point, while incorrect and don't know responses score zero points. Scores on the ORK-10 scale range from zero to 10, with higher scores indicative of higher levels of knowledge.

ATOP scale

The ATOP scale is a 20-question survey designed to measure explicit attitudes regarding obesity using a 6-point Likert scale (Allison, Basile & Yuker, 1991). The

greater the score, the more favorable the attitudes toward obese persons are. The scales' author defined no parameters for the degree of positive or negative association. Previous researchers, ascertained that a score of 60 or more is indicative of neutral to positive attitudes and a score below 60 is indicative of negative attitudes (Harvey et al., 2002). Scoring instructions for both scales can be found in appendix 1, p. 105.

8.3 Data Collection

An email was sent through a user- friendly online survey inviting podiatrists to take part. A subsequent reminder email was sent seven days later. The period of data collection was during the month of July 2014.

Procedures

The survey was offered by electronic mail with a participant information sheet (see p. 93) and the Web link to ensure anonymity. The data collected is stored on a password-protected computer that only the lead researcher has access to. SmartSurvey was used to power the online questionnaire. The data that is collected through SmartSurvey is stored securely and backed up daily on UK servers. SmartSurvey is fully compliant with the UK Data Protection Act.

Ethical considerations

The study received approval from the University of Chester Faculty of Life Sciences Research Ethics Committee. Participants were considered to have consented to taking part in the study if they completed the online questionnaire and submitted it.

8.4 Data analysis

Cross tabulations were completed for variables sex, BMI and number of years of work experience with ORK-10 and ATOP scale scores after the continuous variables and outcome measures were categorised. SPSS (version 22.0) was used to conduct further data analyses. Questionnaires with missing values were excluded from data analyses (n=1). The majority of the data failed to achieve normality of distribution. Non-parametric analyses were conducted to assess correlation (Spearman's rank correlation) between ATOP scale scores and BMI, work experience and ORK-10 scale scores. In addition, correlation between ORK-10 scale scores and BMI, age and work experience was assessed using the Spearman's rank correlation. Age and ATOP scale score data were normally distributed. Therefore, the Pearson's product moment test was conducted. The Independent T test was used to assess for a difference between ATOP scale score and sex of the respondent. Statistical significance was set at $p < .05$.

9.0 Results

Response rate

Overall responses were received from 169 podiatrists. SmartSurvey reported that there were 38 partial responses. Further exploration revealed that some only opened

the survey and did not answer any questions (n= 24), some completed the demographic questions (n=5), demographic and ORK-10 (n=7) and demographic, ORK-10 and partial completion of ATOP (n=2) .One case was excluded from analysis because of missing weight data alone. A total of 130 complete responses were received resulting in an overall useable response rate of 17.0 %.

9.1 Demographics

Respondents were HCPC registered podiatrists with membership of SOCAP. The majority of respondents (n=98; 75.4%) were female. This is broadly in line with the profession according to a report published in 2002 by the Department of Health, Social Services and Public Safety. Ages ranged from 25 to 66 (median= 49 years old). The majority of participants were White (n= 125; 96.2%). Years of practice ranged from 1 to 43 years (median= 18 years). The majority of the podiatrists work in private practice (n=123; 94.6%), with some working in more than one sector. (National Health Service, n= 28; 21.5%), (Education, n= 11, 8.5%) (Research, n=5, 3.8%) and three respondents (2.3%) selected 'Other'. Two reported prior experience in the National Health Service and one reported to working in occupational health.

Body Mass Index

Mean BMI was in the overweight range ($25.10 \pm 4.33 \text{ kg m}^{-2}$). Minimum, maximum and median BMI were 16.69, 39.86 and 24.30 kg m^{-2} respectively. Frequencies of the podiatrists' BMI classification are presented in table 1, p.69.

Table 1: Frequency of podiatrists' BMI according to BMI classification.

BMI classification	n	%
Underweight	2	1.5
Normal	73	55.7
Overweight	40	30.5
Obese	15	11.5
Total	130	100

BMI classification as outlined by National Institute for Health and Care Excellence (2006).

The ORK-10 scale was used to assess the podiatrist's knowledge of health risks associated with obesity. The results are shown in table 2, p.71. Incorrect and 'Don't know' responses were combined. The median score was 7, with scores ranging from 3 to 9. Figure 1 illustrates the frequency of the scores. Initial analysis using cross tabulations are presented in appendix 2, tables 4-8, pp 107-108.

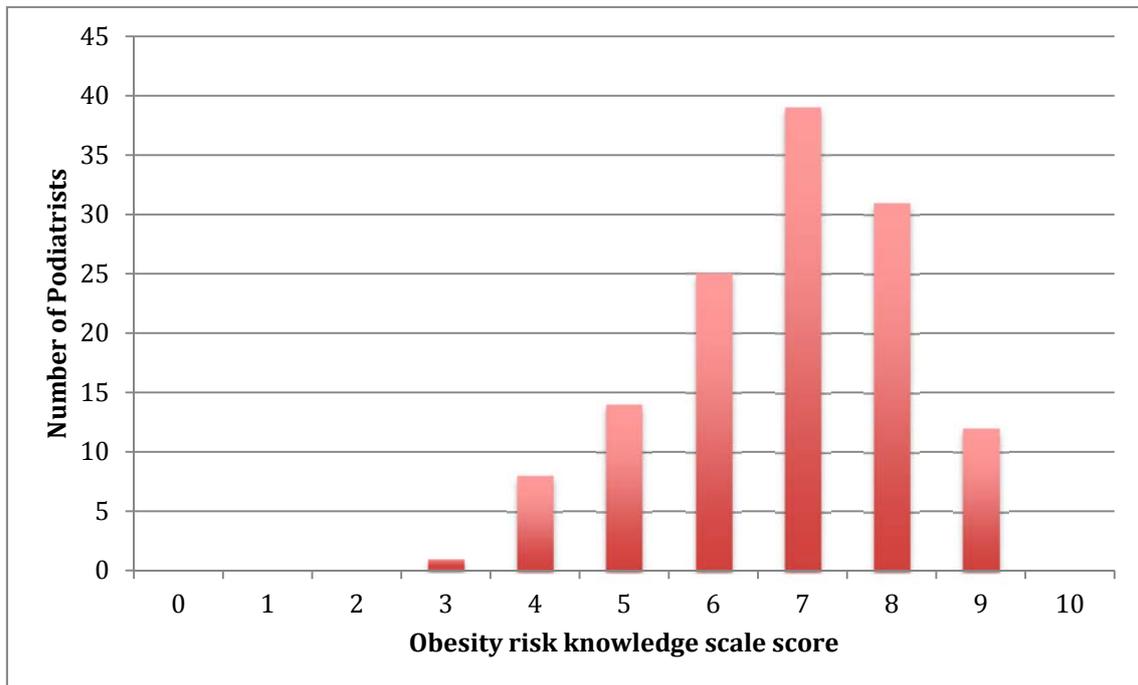


Figure 1: Frequency of ORK-10 scale scores of the podiatrists.

Questions that were answered correctly by a very high percentage of the respondents (>90%) were: "A person with a beer-belly shaped stomach has an increased risk of

getting diabetes?” “Obese people can expect to live as long as non-obese people?”

“There is no major health benefit if an obese person who gets diabetes, loses weight?”

“Obesity does not increase the risk of developing high blood pressure?” The questions

that had the greatest incorrect and don’t know answers (> 60%) were “An obese

person who gets diabetes needs to lose at least 40% their body weight for clear health

benefits?” “Obesity is more of a health risk for people from South Asia (e.g India and

Pakistan) than it is for White Europeans?” “Obesity increases the risk of getting a food

allergy?”

No significant correlation was found between respondent’s ORK-10 scale score and

BMI ($r = -0.03$, $p = .75$), age ($r = 0.06$, $p = .48$), work experience ($r = 0.14$, $p = .12$) and ATOP

scale score ($r = -0.07$, $p = .40$).

Table 2: Answers for the ORK-10 scale from participating podiatrists.

Questions from the ORK-10	Podiatrists	
	Correct (%)	Incorrect & Don't know (%)
1. A person with a 'beer- belly' shaped stomach has an increased risk of getting diabetes.	93.9	6.1
2. Obesity increases the risk of getting bowel cancer.	71.5	28.5
3. An obese person who gets diabetes needs to lose at least 40% of their body weight for clear health benefits.	35.4	64.6
4. Obese people can expect to live as long as non- obese people.	92.3	7.7
5. Obesity increases the risk of getting breast cancer after the menopause	51.5	48.5
6. Obesity is more of a health risk for people from South Asia (e.g India and Pakistan) than it is for White Europeans.	37.7	62.3
7. There is no major health benefit if an obese person who gets diabetes, loses weight.	98.5	1.5
8. Obesity does not increase the risk of developing high blood pressure.	97.7	2.3
9. It is better for a person's health to have fat around the hips and thighs than around the stomach and waist.	70.8	29.2
10. Obesity increases the risk of getting a food allergy.	30.8	9.2

The mean ATOP scale score was 67.91±18.02 with the minimum and maximum score being 14 and 116 respectively. 31.5% (n= 41) had a score of less than 60, 46.2% (n=60) had a score between 60 and 80, 20% (n=26) had a score between 81 and 100 and 2.3% (n=3) had score of 101 or more. Answers for each statement for the ATOP scale have been tabulated and can be found in table 3, pp.74-75. Irrespective of the statement, low levels of respondents (<16%) strongly agreed with any of the statements from the

ATOP scale. The three statements that had the greatest percentage of respondents 'strongly agreeing' were "Most obese people are more self-conscious than other people" (15.4%) "Most non-obese people would not want to marry anyone who is obese" (7.7%) and "One of the worst things that could happen to a person would be for him or her to become obese" (6.9%). Statements that respondents 'strongly disagreed' (>40%) were " Obese people should expect to live normal lives" (42.3%), " Obese people are just as healthy as non-obese people" (45.4%) and "severely obese people are usually untidy" (48.5%). A significant negative correlation was observed between ATOP scale score and number of years work experience in the podiatry profession ($r = -0.27$, $p = .002$). ATOP scale scores and number of years work experience were categorised and can be seen graphically in figure 2.

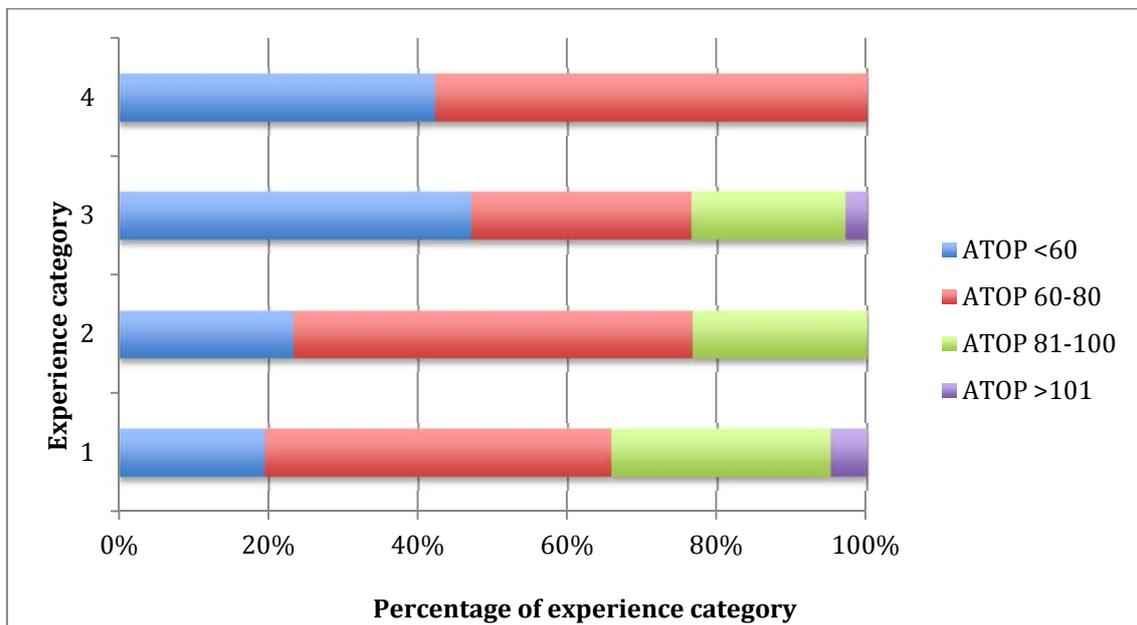


Figure 2: Podiatrists' ATOP scores and experience by category.

Experience category 1=1-9 years, 2= 10-19 years, 3= 20-29 years, 4= ≥ 30 years
 Number of respondents in each experience category 1: n= 41, 2: n=30, 3: n=33, 4: n=26

A significant correlation was found between the respondent's age and ATOP scale scores (-0.17, $p= 0.04$). Finally, there was no significant difference ($p= 0.11$) in ATOP scale score dependent on the sex of the respondent.

Table 3: Summary of podiatrists' responses to each statement of the ATOP scale.

Statements from the ATOP	Slightly and Moderately Agree (%)	Strongly Agree (%)	Slightly and Moderately Disagree (%)	Strongly Disagree (%)
1. Obese people are as happy as non-obese people.	23.8	5.4	60.8	10
2. Most obese people feel that they are not as good as other people.	50	6.2	34.6	9.2
3. Most obese people are more self-conscious than other people.	60	15.4	20	4.6
4. Obese workers cannot be as successful as other workers.	23.8	3.9	34.6	37.7
5. Most non-obese people would not want to marry anyone who is obese.	39.2	7.7	36.9	16.2
6. Severely obese people are usually untidy.	20	1.5	30	48.5
7. Obese people are usually sociable.	52.3	4.6	39.2	3.9
8. Most obese people are not dissatisfied with themselves.	35.4	0.8	57.6	6.9
9. Obese people are just as self-confident as other people.	33.9	5.4	56.1	4.6
10. Most people feel uncomfortable when they associate with obese people.	20.8	0	46.1	33.1

Table 3 (continued)

Statements from the ATOP	Slightly and Moderately Agree (%)	Strongly Agree (%)	Slightly and Moderately Disagree (%)	Strongly Disagree (%)
11. Obese people are often less aggressive than non-obese people.	18.5	0	60.7	20.8
12. Most obese people have different personalities than non-obese people.	17.7	1.5	41.6	38.9
13. Very few obese people are ashamed of their weight.	17.7	2.3	60.8	19.2
14. Most of obese people resent normal weight people.	22.3	1.5	47	29.2
15. Obese people are more emotional than non-obese people.	17.7	0	53.8	28.5
16. Obese people should not expect to lead normal lives.	23	0.8	33.9	42.3
17. Obese people are just as healthy as non-obese people.	5.4	2.3	46.9	45.4
18. Obese people are just as sexually attractive as non-obese people.	32.3	4.6	40	23.1
19. Obese people tend to have family problems.	17.7	0.8	50	31.5
20. One of the worst things that could happen to a person would be for him or her to become obese.	24.6	6.9	33.1	35.4

10.0 Discussion

The aim of the present study was to explore the stigma of obesity in the podiatry profession and podiatrists' knowledge of the health risks associated with obesity and to examine the relationship between knowledge and attitudes and other demographic characteristics. The study revealed that podiatrists' appear to have a moderately good level of knowledge regarding the associated health risks of obesity and possess neutral to positive attitudes towards obese persons.

10.1 Knowledge

The results indicate there is no significant correlation between obesity risk knowledge and attitudes towards obese persons. The latter relationship has not been studied in any published papers, using the ORK-10 scale. Others investigating the relationship between knowledge and attitudes in internal medicine residents found that knowledge and attitudes were not correlated (Block et al., 2003). In comparison to the scores reported in the sample that was used to validate the ORK-10 scale, that comprised of individuals with no specific obesity related expertise and experts in obesity (Swift et al., 2006), podiatrists have a moderately high degree of obesity risk knowledge (median score= 7); they are more knowledgeable than the general public (non-experts: median score of 4) but not as knowledgeable as the experts (median score= 9) regarding health risks associated with obesity. The latter finding is to be expected as one would hope that health professionals having undergone undergraduate training

and are working in the health care arena would possess a keen interest in health. However, there was a broad range in podiatrists' ORK-10 scale scores with the lowest being 3 and the highest 9. Therefore, podiatrists may not have sufficient knowledge about the risks of obesity to health to clarify any queries regarding this from their patients and may impact on their ability to provide essential health promotion. Similar results were found in medical and nursing students (Swift, Sheard, & Rutherford, 2007) (median ORK-10 scale score 7 and 6 respectively). A subsequent study that investigated HCPs' knowledge, beliefs and practice towards preventing childhood obesity in infancy found that different AHPs had differing degrees of obesity risk knowledge (Redsell et al., 2011), with the GPs having significantly greater obesity risk knowledge than nurses ($p=.009$), median ORK-10 scale score of 9 (range: 8-9) and 7 (range: 5-8), respectively.

From these results it appears that obesity risk knowledge differs between HCPs and is perhaps due to the differences in undergraduate curricula and post-graduate training and experience. In this obesity epidemic, it is pertinent that all allied health professionals are educated to a high standard regarding the associated health risks of obesity, with the aim of providing patients with as much information and advice as they can and/ or referring patients appropriately to specialist weight management services if the patient agrees.

It does not appear that an individual's BMI, age or number of years work experience as a podiatrist impacts the degree of an individuals' obesity risk knowledge. Regarding,

the demographic variable, age, contrary results have been found, in that there was a significant association between age and ORK-10 scores, with older participants obtaining better scores (Swift et al., 2006). This may be due to the fact that the latter studies' sample of participants had a wider age range (17-66). Moreover, sex of an individual may affect obesity risk knowledge, with the female podiatrists having a greater percentage of ORK-10 scores in the high category (score = 7-10) compared with male podiatrists 68.7% (n=67) versus 46.9% (n=15). However, others have found that sex does not predict ORK-10 scale scores (Swift et al., 2006).

The majority of podiatrists (93.9%) knew that a person with a 'beer-belly' shaped stomach has an increased risk of developing diabetes. This is important as podiatrists may use this knowledge together with findings from clinical examination and patient symptomatology and refer at risk patients to their GP for diagnosis of diabetes or provide education on how to help prevent the development of type 2 diabetes. The extent to which podiatrists intervene, educate and make appropriate referrals to weight management specialists is likely to depend upon their recognition of the potential consequences of obesity upon their patients' health (Kristeller & Hoerr, 1997). While the majority of the podiatrists correctly identified that there is no major health benefit if an obese person who gets diabetes loses weight as false (98.5%), 64.6% believed that the latter occurs only with at least with loss of 40% of their body weight, which is incorrect. This incorrect assumption may deter them from engaging in health promotion with their obese patients.

10.2 Attitudes

This study found that podiatrists' attitudes towards obese persons were neutral to positive as the total mean attitude score was above the mid-point of 60 (67.91 ± 18.02). The items that were rated most positively generally described obese people as without social difficulties. The items rated most negatively were related to perceptions regarding reduced self-esteem, low sexual attractiveness, and poor health. Similar results have been found in dietitians (Harvey et al., 2002) and GPs and psychologists in the UK (Harvey & Hill, 2001). Comparable mean ATOP scale scores have been found in a sample of occupational therapy undergraduates (72.8 ± 15.4), occupational therapy postgraduate students (73.3 ± 13.9) (Vroman & Cote, 2011) and occupational therapists (68.6 ± 14.3) (Leemhuis & Cozzolino, 2010).

Although the mean ATOP scale score was above 60, 31.5% of the sample ($n=41$) had an ATOP scale score of less than 60 showing that they hold negative attitudes towards obese persons. In addition, there was a large range in scores (14 to 116). From this study it appears that the age of the respondent and the number of years of work experience in the podiatry profession influences podiatrists' attitudes towards obese people. This may be because of the cumulative effect of potential obstacles in podiatric care that excessive body weight poses, particularly in the domiciliary setting, in conjunction with the podiatrist's aging body. The latter inferences are supported by the results of a study investigating attitudes of undergraduate nurses and registered nurses (RNs) simultaneously (Poon & Tarrant, 2009). Experienced RNs exhibited more

negative views towards obese patients than the student nurses. However, the evidence is ambiguous, as others have concluded that the actual experience of caring for obese people reduces bias (Culbertson & Smolen, 1999; Schwartz et al., 2003; Sikorski et al., 2013). Likewise, older age has been linked to greater stigmatizing attitudes in a variety of HCPs in a German teaching hospital (Sikorski et al., 2013), while the contrary was found by others (Schwartz et al., 2003) and some have concluded that age has no significant effect on weight bias (Brandsma, 2005; Miller et al., 2013; Teachman & Brownell, 2001).

The personal BMI of healthcare providers can influence their attitudes towards obese persons (Brown, Stride, Psarou, Brewins, & Thompson, 2007). The results of the current study do not concur with this, as there was no significant correlation between the ATOP scale scores of the podiatrists and their self-reported BMI. No correlation between BMI and attitudes was also found in a study involving nurses (Gujral et al., 2011) and in a study with occupational therapists (Leemhuis & Cozzolino, 2010) that employed the use of the ATOP scale. The latter lack of association has also been found in studies using other measures to assess attitudes (Poon & Tarrant, 2009). The difference may be due to the fact that the studied sample populations did not involve a substantial number of participants in each BMI category, particularly in the obese range.

Although statistically not significant, it appears that male podiatrists' exhibit more negative attitudes towards obese persons than do their female counterparts. ATOP

scale scores of 100 or more (reflective of very positive attitudes) were exclusively female, albeit a very small number (n=3). Similar conclusions have been made by other researchers, which used the Implicit Association Test (IAT) to assess implicit bias, in that males have more implicit bias (Phelan et al., 2014; Sabin et al., 2012) and explicit bias than females using the Fat Phobia Scale (FPS) (Pantenburg et al., 2012) and anti-fat attitudes test (Phelan et al., 2014). Others however, have found that implicit bias is less in males than females (Schwartz et al., 2003). The latter study included near equal numbers of males and females (191 and 198, respectively), who specialise in the treatment of obesity. However, 13.6% (n=53) were excluded from the IAT analysis due to partial completion of the latter instrument, which may have influenced the results. Equally, there is evidence to suggest that being male or female does not influence an individual's weight bias among HCPs (Brandsma, 2005; Teachman & Brownell, 2001). The latter indifference reported by Brandsma (2005) and Teachman and Brownell (2001) may be due to a small underpowered sample size. Furthermore, there was substantial difference in percentages of males (71%, n= 60) and females (29%, n= 24) enrolled in the study by Teachman and Brownell (2001). Outside the healthcare setting there is considerable evidence that men show more stigmatising attitudes towards obesity than women (Chen & Brown, 2005; Crandall, 1994; Latner, Stunkard, & Wilson, 2005; Perez-Lopez, Lewis, & Cash, 2001). Thus, the results of the current study indicate male podiatrists tend to have more negative attitudes towards obese persons than female podiatrists and this appears to be in line with previous research analysing the determinants of obesity stigma.

10.3 Limitations

The current study has several limitations. The cross-sectional, self-report nature of the data leave important questions unanswered. For example, without the assessment of the podiatrists' behaviour, it is unclear whether the reported attitudes affect actual clinical interactions between the podiatrists and their patients and precludes making any causal inferences. In addition, self-reported height and weight data were used to calculate the participant's BMI, which may be inaccurate and generally under reported (Connor Gorber et al., 2007). Social desirability bias may have influenced the podiatrists' responses to the statements regarding their attitudes towards obese persons and some may even have genuinely deceived the researcher regarding all of their responses, including demographic variables. Similarly, a response bias may have operated in that respondents may have been more interested in or favourably disposed to the subject of the research than non-respondents.

In addition, although there was a wide BMI range in the sample of podiatrists, there were relatively few in the obese range, which may have influenced the results. The current findings may be less generalisable to podiatrists employed in the NHS, as the majority of the respondents worked in private practice. This is likely to affect the amount and type of contact with obese patients due to the extent of patient's co-morbidities. This was not measured and therefore was a confounding variable.

Finally, the generalisability of the findings is dependent on the response rate. Although there is no universally accepted level for defining an acceptable response rate, 17% is relatively low, even for online surveys, with other reporting response rates of around 30% (Swift et al., 2007).

10.4 Recommendations for future research

As to my knowledge this is the first effort to research podiatrists' attitudes towards obese persons. Therefore, there is much need for further research in this area. The current study assessed explicit attitudes towards obese persons. Future research could assess podiatrists' implicit attitudes, using the IAT, towards obese and overweight persons to see whether the degree of deviation from normal weight affects podiatrists' attitudes. Furthermore, it would be useful to have a larger sample size study with predominantly podiatrists employed in the NHS. Additional measures that would be beneficial to include, would be items related to the beliefs about the causes of obesity as this is likely to influence attitudes towards obese persons (Crandall & Moriarty, 1995). Finally, it would be useful to study undergraduate podiatry students in order to determine the effect of undergoing podiatric training has on attitudes towards obesity and obese persons.

10.5 Conclusion

In conclusion, the results of the current study suggest that podiatrists have neutral to positive attitudes towards obese persons, however negative responses were prevalent when individual answers were analysed separately. Podiatrists appear to have a moderately good level of knowledge regarding the health risks associated with obesity, which may help motivate and enable them to counsel their patients' regarding these risks. Nevertheless, the development of continuing professional development modules in the area of obesity risk knowledge and anti-fat prejudice may be beneficial for podiatrists, their patients and their clinical interactions, particularly as the results from this study suggest that prejudice towards obese persons increases with increasing age and experience as a podiatrist. As to what form this may take at present, it is unknown as research addressing anti-fat prejudice is in its infancy. A recent review concluded that results appear encouraging from studies that adopt social norm and social consensus based approaches, (Danielsdottir, O'Brien, & Ciao, 2010) but much further, well designed research is needed.

Obesity stigma is pervasive; it must be tackled as it has far reaching effects on the physical and psychosocial health of an affected individual. Furthermore, negative attitudes may hamper the development of trusting relationships between HCPs and subsequently compromise the effectiveness of health promotion (Harvey & Hill, 2001).

Clinical encounters need to take place from the perspective of the obese patient (Svenningsson, Gedda, & Marklund, 2011) so that they can be supported, guided and educated effectively. Podiatrists' need to be aware of the potential effects that weight bias can have on the quality of their care.

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12.0 Supporting documents for administering the project.

12.1 Participant information sheet.



Participant Information Sheet

Podiatrists' Knowledge of the Associated Health Risks and Attitudes Towards Obesity.

You are being invited to take part in a research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Take time to decide whether or not you wish to take part.

Thank you for reading this.

What is the purpose of the study?

This research is being conducted with Podiatrists, working in a variety of sectors, such as the National Health Service, privately or as a Lecturer in Podiatry.

The aim of the study is to determine Podiatrists' knowledge of the health risks associated with obesity and their attitudes towards obese persons. The research will also be measuring correlations within the data to see if gender, body mass index and the number of years' work experience within the podiatry profession has any influence on the knowledge of the health risks of obesity and attitudes towards obese persons.

Why have I been chosen?

You have been chosen because you are a HCPC registered Podiatrist.

Do I have to take part?

It is up to you to decide whether or not to take part. If you decide to take part you can keep this information sheet. If you decide to take part you are free to withdraw at any time, without giving a reason. Consent will be assumed if the questionnaire is completed.

What will happen to me if I take part?

You will be asked to complete eight questions about yourself, for example, what is your gender? Then you will be asked to complete a questionnaire that incorporates the Obesity Risk Knowledge Scale (ORK-10) and Attitudes Toward Obese Persons (ATOP) scale.

ORK-10 scale comprises of ten questions, which are to be answered with one of the following; “true”, “false” or “I don't know”. The ATOP scale comprises of 20 statements which you will be asked to indicate how much you agree or disagree with each statement. Overall the whole questionnaire takes approximately ten minutes to complete. Your answers will be anonymous and no one will be identifiable in the final report. The questionnaires will be stored securely.

What are the possible disadvantages and risks of taking part?

There are no disadvantages or risks foreseen in taking part in the study.

What are the possible benefits of taking part?

By taking part the general knowledge of the health risks associated with obesity and attitudes towards obesity can be measured. The data will be analysed and will identify whether education is required for Podiatrists regarding the health risks linked with obesity.

What if something goes wrong?

If you wish to complain or have any concerns about any aspect of the way you have been approached or treated during the course of this study, please contact: Professor Sarah Andrew, Dean of the Faculty of Life Sciences, University of Chester, Parkgate Road, Chester, CH1 4BJ. Alternatively the Dean of the Faculty of Life Sciences may be contacted by telephone: 01244 513055.

Will my taking part in the study be kept confidential?

All information that is collected about you during the course of the research will be kept strictly confidential so that only the researcher carrying out the research will have access to such information.

What will happen to the results of the research study?

The results will be written up into a report for my dissertation for my MSc in Weight Management. Individuals who participate will not be identified in any subsequent report or publication.

Who is organising and funding the research?

The research is conducted as part of an MSc in Weight Management within the Department of Clinical Sciences & Nutrition at the University of Chester. The study is organised with supervision from the department, by Noelle Newell, an MSc student.

Who may I contact for further information?

If you would like more information about the research before you decide whether or not you would be willing to take part, please contact:

*Miss Noelle Newell,
Email: @chester.ac.uk*

Thank you for your interest in this research.

12.2 Letter confirming ethical approval.



Faculty of Life Sciences
Research Ethics Committee

frec@chester.ac.uk

19th June 2014

Dear Noelle,

Study title: A questionnaire study to determine Podiatrists' knowledge of the associated health risks and attitudes towards obesity.
FREC reference: 910/14/NN/CSN
Version number: 1

Thank you for providing the documentation for the amendments recommended following the approval of the above application. These amendments have been approved by the Faculty Research Ethics Committee.

- Recruitment Email, version 3
- Participant Information Sheet, version 3.
However, in the section 'What if something goes wrong?' correct the telephone number of the Dean of the Faculty of Life Sciences to 01244 513055.
- Questionnaire, version 3.

With the Committee's best wishes for the success of this project.

Yours sincerely,

itee

12.3 Blank example of questionnaire.

Podiatrists' Knowledge of the Associated Health Risks and Attitudes Towards Obesity

This survey is being conducted to gather Podiatrists' knowledge of the health risks associated with and attitudes towards obesity. In order to complete this survey please ensure that you are a HCPC registered Podiatrist.

Questions about you the participant.

1) Are you male or female? *

Male Female

2) Please state your age (in years) in the box below. *

3) Please select your ethnic origin *

White

Black

Asian

Other (please specify):

4) Please state your weight, using your preferred unit of measurement: kilograms (kg), stones and pounds or pounds (lbs) *

kg

Stones and pounds

lbs

5) Please state your height in one of boxes below, according to your preferred unit of measurement: metres (m), centimetres (cm) or foot and inches (ft ") *

m

cm

ft "

6) Please state the time, (to the nearest year) you have been working in the podiatry profession since achieving your podiatry qualification. *

7) Please select the sector(s) in which you work *

National Health Service

- Private practice
- Private business sector
- Leisure
- Education
- Research
- Other (please specify):

8) Please select the area(s) of podiatry in which you currently work

- Routine podiatry
- Podopaediatrics
- Diabetes care
- Rheumatology
- Biomechanics
- Podiatric surgery
- Sports injuries
- Forensics
- Domiciliary care
- Other (please specify):

The Obesity Risk Knowledge Scale (ORK-10)

Please select the answer you think is correct for each question. If you are unsure whether the answer is true or false, please select "don't know"

9) A person with a 'beer-belly' shaped stomach has an increased risk of getting diabetes. *

- True
- Don't know
- False

10) Obesity increases the risk of getting bowel cancer. *

- True
- Don't know
- False

11) An obese person who gets diabetes needs to lose at least 40% of their body weight for clear health benefits. *

- True
- Don't know
- False

12) Obese people can expect to live as long as non-obese people. *

- True
- Don't know
- False

13) Obesity increases the risk of getting breast cancer after the menopause. *

- True
- Don't know
- False

14) Obesity is more of a health risk for people from South Asia (e.g India and Pakistan) than it is for White Europeans. *

- True
- Don't know
- False

15) There is no major health benefit if an obese person who gets diabetes loses weight. *

- True
- Don't know
- False

16) Obesity does not increase the risk of developing high blood pressure. *

- True
- Don't know
- False

17) It is better for a person's health to have fat around the hips and thighs than around the stomach and waist. *

- True
- Don't know
- False

18) Obesity increases the risk of getting a food allergy. *

- True

Don't know

False

Attitudes Toward Obese Persons Scale

Please select an answer according to how much you agree or disagree with each statement. Please do not leave any blank.

19) Obese people are as happy as non-obese people. *

I strongly disagree

I moderately disagree

I slightly disagree

I slightly agree

I moderately agree

I strongly agree

20) Most obese people feel that they are not as good as other people. *

I strongly disagree

I moderately disagree

I slightly disagree

I slightly agree

I moderately agree

I strongly agree

21) Most obese people are more self-conscious than other people. *

I strongly disagree

I moderately disagree

I slightly disagree

I slightly agree

I moderately agree

I strongly agree

22) Obese workers cannot be as successful as other workers. *

I strongly disagree

I moderately disagree

I slightly disagree

I slightly agree

I moderately agree

I strongly agree

23) Most non-obese people would not want to marry anyone who is obese. *

I strongly disagree

I moderately disagree

I slightly disagree

I slightly agree

I moderately agree

I strongly agree

24) Severely obese people are usually untidy. *

I strongly disagree

I moderately disagree

I slightly disagree

I slightly agree

I moderately agree

I strongly agree

25) Obese people are usually sociable. *

I strongly disagree

I moderately disagree

I slightly disagree

I slightly agree

I moderately agree

I strongly agree

26) Most obese people are not dissatisfied with themselves. *

I strongly disagree

I moderately disagree

I slightly disagree

I slightly agree

I moderately agree

I strongly agree

27) Obese people are just as self-confident as other people. *

- I strongly disagree
- I moderately disagree
- I slightly disagree
- I slightly agree
- I moderately agree
- I strongly agree

28) Most people feel uncomfortable when they associate with obese people. *

- I strongly disagree
- I moderately disagree
- I slightly disagree
- I slightly agree
- I moderately agree
- I strongly agree

29) Obese people are often less aggressive than non-obese people. *

- I strongly disagree
- I moderately disagree
- I slightly disagree
- I slightly agree
- I moderately agree
- I strongly agree

30) Most obese people have different personalities than non-obese people. *

- I strongly disagree
- I moderately disagree
- I slightly disagree
- I slightly agree
- I moderately agree
- I strongly agree

31) Very few obese people are ashamed of their weight. *

- I strongly disagree
- I moderately disagree
- I slightly disagree

- I slightly agree
- I moderately agree
- I strongly agree

32) Most obese people resent normal weight people. *

- I strongly disagree
- I moderately disagree
- I slightly disagree
- I slightly agree
- I moderately agree
- I strongly agree

33) Obese people are more emotional than non-obese people. *

- I strongly disagree
- I moderately disagree
- I slightly disagree
- I slightly agree
- I moderately agree
- I strongly agree

34) Obese people should not expect to lead normal lives. *

- I strongly disagree
- I moderately disagree
- I slightly disagree
- I slightly agree
- I moderately agree
- I strongly agree

35) Obese people are just as healthy as non-obese people. *

- I strongly disagree
- I moderately disagree
- I slightly disagree
- I slightly agree
- I moderately agree
- I strongly agree

36) Obese people are just as sexually attractive as non-obese people. *

- I strongly disagree
- I moderately disagree
- I slightly disagree
- I slightly agree
- I moderately agree
- I strongly agree

37) Obese people tend to have family problems. *

- I strongly disagree
- I moderately disagree
- I slightly disagree
- I slightly agree
- I moderately agree
- I strongly agree

38) One of the worst things that could happen to a person would be for him or her to become obese. *

- I strongly disagree
- I moderately disagree
- I slightly disagree
- I slightly agree
- I moderately agree
- I strongly agree

13.0 Project report appendices

Appendix 1: Scoring instructions for ATOP and ORK-10 scales.

Scoring Instructions for the Obesity Risk Knowledge Scale (ORK-10).

Each question that is answered correctly on the ORK-10 scale scores one point. There are 10 questions. Therefore the maximum score that can be achieved is 10. If participants select the wrong answer or they select the 'don't know option, they score zero points for that question (Swift et al., 2006).

Obesity Risk Knowledge Scale-10: correct answers.

01. A person with a 'beer- belly' shaped stomach has an increased risk of getting diabetes. (TRUE)
02. Obesity increases the risk of getting bowel cancer. (TRUE)
03. An obese person who gets diabetes needs to lose at least 40% of their body weight for clear health benefits. (FALSE)
04. Obese people can expect to live as long as non- obese people. (FALSE)
05. Obesity increases the risk of getting breast cancer after the menopause. (TRUE)
06. Obesity is more of a health risk for people from South Asia (e.g India and Pakistan) than it is for White Europeans. (TRUE)
07. There is no major health benefit if an obese person who gets diabetes, loses weight. (FALSE)
08. Obesity does not increase the risk of developing high blood pressure. (FALSE)
09. It is better for a person's health to have fat around the hips and thighs than around the stomach and waist. (TRUE)
10. Obesity increases the risk of getting a food allergy. (FALSE)

Scoring Instructions for the Attitudes Toward Obese Persons (ATOP) Scale.

Step 1: Multiply the response to the following items by -1 (i.e.; reverse the direction of the scoring.

- Item 2 through Item 6, Item 10 through Item 12, Item 14 through Item 16, 19 and 20.

Step 2: Add up the responses to all the items

Step 3: Add 60 to the value obtained in Step 2. This value is the ATOP score.

Higher numbers indicate more positive attitudes.

(Allison & Baskin, 2009).

Appendix 2: Cross tabulation analysis.

Table 4: Cross tabulation of ORK-10 scores by respondent's BMI category.

		Total n	ORK-10 score		
			Low (0-3)	Medium (4-6)	High (7-10)
% BMI category	Underweight	2	0	0	100
	Normal	73	0	37	63
	Overweight	40	0	40	60
	Obese	15	6.7	26.7	66.6

Table 5: Cross tabulation of ORK-10 scores by work experience category.

			Total n	ORK-10 score		
Experience Category	Category Parameters (Experience in years)			Low (0-3)	Medium (4-6)	High (7-10)
% Experience category	1	1-9	41	0	39	61
	2	10-19	30	0	43.3	56.7
	3	20-29	33	0	24.2	75.8
	4	≥30	26	3.8	38.5	57.7

Table 6: Cross tabulation of ORK-10 scores by sex.

		Total n	ORK-10 score		
% Sex			Low (0-3)	Medium (4-6)	High (7-10)
% Sex	Male	32	3.1	50	46.9
	Female	98	0	31.3	68.7

Table 7: Cross Tabulation of categorised BMI and ATOP score.

	ATOP score					
		UW	Norm	OW	Obese	Total
% BMI category with designated ATOP score	<60	100	34.2	32.5	6.7	41
	60-80	0	42.5	52.5	53.3	60
	81-100	0	23.3	12.5	26.7	26
	≥101	0	0	2.5	13.3	3
	Total	2	73	40	15	130

Table 8: Cross Tabulation of categorised ATOP score by sex.

	ATOP score	Sex		Total <i>n</i>
		Male	Female	
% sex with designated ATOP score	<60	46.9	26.5	41
	60-80	37.5	49	60
	81-100	15.6	21	26
	≥101	0	3.1	3
	Total <i>n</i>	32	98	130