

Talking about weight talk: Primary care practitioner knowledge, attitudes and practice

Short Title: Talking about weight talk

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Abstract

Background

Primary care practitioners (PCP) have a vital role in patient weight management. This study investigates knowledge, attitudes and practice of UK PCPs regarding patient weight management.

Methods

A cross-sectional questionnaire assessed PCP perceived knowledge, self-reported practice, attitudes towards overweight/obesity and actual knowledge regarding overweight and obesity management. Practitioners from NE Scotland were invited to participate.

Results

Participants comprised 107 PCPs. Most participants viewed management of overweight and obesity as core to their roles and 75% reported discussing weight with overweight/obese patients. Management techniques included discussion and advice provision. Behavioural change techniques (BCT) were reported infrequently, despite perceptions that patients lacked motivation to lose weight. A quarter of participants reported lack of training and a third reported inadequate skills to manage overweight/obese patients. Mean percent correct for knowledge questions was approximately 53%. Barriers to patient weight management included lack of specialists for referral and limited time.

Conclusions

This study confirmed a primary care role in managing weight in overweight/obese patients. Our finding that most participants reported discussing weight with their overweight or obese

patients is unsupported by previously published research, however a more comprehensive sample of practitioners is required to scrutinise this disparity. Incongruence exists between practitioners' perceptions of difficulties associated with patient weight loss and the tools they use to address them. Inclusion of training in BCT, the provision of weight care specialists, or referral on to commercial weight loss organisations may provide more effective pathways for PCPs to assist weight loss for overweight/obese patients in primary care.

Introduction

Obesity and overweight have reached epidemic proportions worldwide [1]. Along-side significant economic implications [2], obesity increases the risk for co-morbidities including diabetes [3], cancer [4, 5], hypertension [6], respiratory diseases [7], musculoskeletal disorders [8] and poor mental health [9]. In Scotland, 65% of adults were overweight in 2014, and 28% of adults were obese [10], presenting a significant public health issue in Scotland.

Approaches for treating obesity include dietary [11], physical activity (World Health [12], educational and psychological intervention such as behavioural change programmes [13].

Behavioural Change Theories (BCTs) are a collection of theories which provide a basis for interventions to promote behavioural change and have been successfully applied to numerous health behaviours, including weight loss [14-16]. Key components of behavioural change techniques for the management of weight [17] include goal setting, stimulus control, self-monitoring [18]. Recent evidence from a meta-analysis investigating the association between the use of interventions based on BCT, behaviour change and weight loss in patients diagnosed with type 2 diabetes has shown that BCT-based interventions use are associated with a reduction in body mass index [19], supporting a role for BCT in weight management. Current guidelines from the Scottish Intercollegiate Guidelines Network (SIGN) [20] and the National Institute for Health and Care Excellence (NICE) [21] stipulate routine patient screening for obesity, with dietary and physical activity recommendations to patients who are overweight or obese. Primary care practitioners are well placed to employ such guidelines using a patient-centred approach due to regular patient contact [20].

Primary care led weight management can be effective in reducing patient weight, but for this to arise communication about weight between the practitioner and patient must occur. Good doctor-patient communication is associated with improved patient health [22] and should be

used to facilitate discussion on patient weight management, weight loss and prevention of obesity [23, 24]. However, primary care practitioner (PCPs) are often reluctant to approach weight management with their patients [25, 26], due to fear of upsetting their patients [27], lack of perceived skills [28], beliefs that overweight patients lack self-efficacy to lose weight [29] and uncertainty about their role in providing this kind of aid to patients [30]. This reluctance to discuss weight is supported by data from a recent observational study in Scotland which found that discussion about weight was raised in 25% of General Practitioner (GP) consultations with overweight or obese patients [31]. In other data, less than 50% of Spanish primary care practitioners reported assessing weight during a routine consultation with patients new to the Practice[32, 33], supporting earlier evidence in the USA. These data suggest that the self-reported apparent reluctance of primary HCPs to discuss weight with overweight/obese patients translates into limited clinical management of patient weight, at least for GPs. To our knowledge there are no UK based studies examining PCP practitioner knowledge comprehensively together with practitioner attitudes and beliefs.

The aim of this study, therefore, was to examine current knowledge alongside attitudes and reported practice of UK GPs and practice nurses (PNs) towards patient weight management, to gain insight into current UK primary care practice for patient weight management. Specific research questions were:

- Do primary care practitioners (PCP) have the knowledge and reported skills to manage patient weight loss?
- What are the attitudes of PCPs towards providing weight management advice?
- Do PCPs report routinely discussing weight management with patients?
- What methods do PCPs report using to assess patient overweight and obesity?

- What tools/techniques do PCPs report using when advising patients about weight management?

Methods

Participants and setting

Practising GPs and PNs from NHS Fife and Tayside in NE Scotland were invited to participate in the study. A two-phase recruitment method was employed. Phase 1: 127 Practices were identified from NHS Fife and Tayside websites. Practice managers were invited to distribute a link to the online questionnaire, or printed versions, to the GPs and PNs in their Practice. Phase 2: the online link to the questionnaire was emailed directly to 412 GPs from a further 80 unrepresented NHS practices in Fife and Tayside via the Scottish Primary Care Research Network. Following difficulties in recruitment, participants in phase 2 were offered a £10 honorarium for their participation, this was ethically approved.

Measures

A review of the literature revealed that current questionnaires within the research literature did not comprehensively measure all of the components we wished to address and additionally did not test knowledge. The Communication on Overweight and Obesity Project (CO-OP) questionnaire (75 items) was developed by our team from a review of the published literature to measure: i) demographics, ii) knowledge regarding weight management, iii) attitudes towards overweight/obese individuals, iv) perceptions of responsibility for weight management, v) approaches used with patients for weight management, vi) perceived barriers

to weight management in primary care. Items were included from several published questionnaires (of which one was validated[34]) [35-38] and additional new questions were developed by the research team following a review of the literature.

Demographics

Participants were asked to report their age, gender, role (GP, PN), length of time in current profession, Practice postcode, height, weight and specific training (in nutrition, obesity, behaviour change, physical activity) as an undergraduate, postgraduate or as part of continuous professional development.

Knowledge about overweight and obesity

Participants were asked to provide free text answers to questions relating to current prevalence of overweight and obesity in Scotland, BMI cut-offs for overweight and obesity, recommended daily calorie intake, recommended daily physical activity levels, current SIGN weight management recommendations [20], weight loss required to produce significant health benefits, and the use of waist circumference as a measure of obesity.

Attitudes to overweight/obese individuals and perceptions of responsibility

Sixteen items assessed GPs and PNs' attitudes towards overweight individuals and perceptions of their role in patient weight management [34-38]. Some statements regarding a particular health professions role were repeated to examine both GP and PN roles. Responses

for items were made on a four point Likert scale (strongly disagree, rather disagree, rather agree, strongly agree). Eight additional items were developed by the authors to gain a more comprehensive insight into PCP attitudes.

Current practice and barriers in patient weight management

Twenty-two statements regarding obesity management techniques were obtained from previously used questionnaires [34-38]. Three additional questions on current practice were developed by the authors (see ⊕ Appendix Table). Participants responded to these items on a four-point Likert scale (never/rarely, sometimes, often, always/almost always). Barriers to discussing patient weight management were assessed using five questions [35, 38]. Three additional questions were added following a review of the literature (See \$ in Table 5). The questionnaire was reviewed by four individuals (including one GP) who all provided feedback on content, length and clarity. The questionnaire is available as a supplementary file.

Data analysis

Statistical analysis was conducted using IBM SPSS Statistics 21 [39]. Self-report data were examined by frequency counts. Means and standard deviations (SD) were calculated for appropriate measures. Due to the low number of PN participants, data were analysed as a combined sample.

Ethical statement

This study was approved by the Teaching and Research Ethics Committee, University of St Andrews (MD1000) and NHS Fife and Tayside Research and Development departments (NRS13/GH73)

Results

Sample

A total of 707 practitioners were invited to participate in the study (295 phase 1, 412 phase 2). Of 131 questionnaires returned (response rate = 18.5%), 24 were excluded (incomplete data). The final sample of 107 participants (51 from phase 1, 56 from phase 2) represented 68 practices; of these, 14 did not provide a full post code and could not be allocated to a practice. Nearly 80% (n=85) of respondents completed the questionnaire online. The sample comprised 93 GPs and 14 PNs. Demographic data are shown in Table 1.

<Insert table 1 here>

Do PCPs have obesity-related knowledge?

Table 2 presents data relating to individual assessed knowledge questions. Just under a half of participants (47.0%) incorrectly estimated the prevalence of overweight and obesity within Scotland. Most participants (75.7%) correctly reported the BMI value at which a patient would be classed as obese; fewer (60.7%) knew at what BMI a patient would be considered overweight. Most participants (79.4%) acknowledged waist circumference as a 'reasonable measure' of obesity [20]. Very few (16.8%) were aware of the three components

recommended in a weight management programme [20]. The mean percent correct value for all knowledge questions was 53.4% for participants.

<Insert table 2 here>

Attitudes towards providing weight management advice to patients

Most respondents agreed that both GPs and PNs had an essential role in identifying and treating overweight/obese patients (Table 3). Over half of PCPs found treating overweight/obese patients professionally gratifying. However, most participants (72.9%) reported experiencing barriers to treating overweight/obese patients. Approximately 50% of respondents perceived that only a small percentage of overweight/obese patients can lose weight and maintain the loss. Likewise, 59.8% of participants perceived it was difficult for overweight/obese patients to lose weight despite being supported. Most respondents thought that they should attempt to treat overweight/obese patients themselves, rather than refer on.

PCPs own weight was viewed as important: most respondents agreed that GPs and PNs should be role models for their patients and that PCPs own weight affected how patients view the advice provided by them (71%) (Table 3). Of the sample, 35.6% of PCPs were categorised as overweight (Table 1).

<Insert table 3 here>

Current practice in weight management

Current methods to assess patient overweight/obesity are summarised in Table 4. BMI was the most commonly used tool for assessment of overweight/obesity. Waist-to-hip ratio and

waist circumference were infrequently used, despite 79.4% of participants acknowledging waist circumference as a ‘reasonable measure’ of obesity.

<Insert table 4 here>

More than 80% of respondents reported that they ‘often’ or ‘always or almost always’ discuss weight with overweight/obese patients (Appendix Table). Discussing the health risks of overweight and obesity was also reported as common practice. PCPs reported frequently giving advice (more exercise, fewer calories, keeping a food diary). Motivational interviewing or other BCT were reported as used infrequently by participants (30.9%). Referral to a dietician, bariatric surgery, cognitive behavioural therapy and counselling were infrequently reported (Appendix Table).

Perceived barriers to weight management

Lack of knowledge of obesity and related conditions was reported as a barrier to weight management by a small proportion of participants (13.1%). Around a quarter of participants (26.2%) reported they lacked training to manage overweight/obese patients. Similarly, 29.9% of participants reported they lacked skills to deal with overweight/obese patients (Table 5).

<Insert table 5 here>

Respondents reported barriers to treating overweight/obese patients including a lack of time in appointments, a shortage of speciality staff to refer to (e.g. dieticians, psychologists) and lack of patient motivation to change (Table 5).

Discussion

In this study, we assessed the perceived knowledge, attitudes and practice of UK General Practitioners (GPs) and Practice Nurses (PNs) for patient weight management alongside actual knowledge. Weight management discussion with overweight and obese patients was perceived as a core component of both GP and PN roles by PCPs in this study. Only a quarter of participants reported lack of training as a barrier experienced while treating overweight and obese patients, whilst only a third reported lack of skills as a barrier, whereas the mean correct obesity knowledge score was low, at around 50%. These data suggest respondents perceived themselves as more efficacious in their practice than our assessment of their knowledge level would suggest. Reported practice focussed on provision of informational type advice despite participants acknowledging that patients did not lack knowledge but lacked motivation. Barriers to weight management discussions reported included lack of time within consultations and lack of specialist staff to refer on to.

Knowledge and skills

A perceived lack of training and skills has been found in previous studies of primary healthcare professionals in the UK and other countries, particularly when considering obese patients as compared with overweight patients [34, 35, 37, 40, 41] . A perceived lack of training was less prevalent in our sample than some other European countries, for example, in France, where 80% of GPs who responded to a survey acknowledged they needed more training, particularly in the areas of nutrition and behavioural therapy [37] to assist them in treating overweight and obesity. However, whilst fewer participants *perceived* they lacked knowledge relating to obesity compared to those reporting a lack of training or skills, the results from the assessment of participant knowledge in this questionnaire indicated inaccurate knowledge. This lack of knowledge was specific to weight loss, such as

recommended daily calorie intake for men, physical activity guidelines, the percentage body weight loss for significant health benefit and the components of weight management programmes as suggested by SIGN guidelines [20]. In a previous study in Scotland, 45.6% of GP respondents and 32.1% of PN respondents reported having read the SIGN guidelines for weight management, however that study did not assess knowledge of the content of the guidelines [42]. A lack of knowledge of the content of guidelines for obesity management was found by Bocquier and colleagues in French primary care physicians [37], thus the results in the current study are not unusual. However, it would seem that whilst health professionals in the Bocquier study recognised there was a gap in skills training [37], there seems to be an unrecognised gap in knowledge relating to weight loss and weight management advice in our data.

Attitudes towards providing advice to patients regarding weight management

In our study PCPs believed that it was their role to treat overweight and obese patients themselves and similar findings have been recently reported elsewhere [43], but this finding contrasts with the results of Peters, Chisholm and Hart [30] who found uncertainty in a sample of doctors and nurses about their role in providing this kind of aid to patients.

Most participants reported that they sometimes or often advised overweight or obese patients to utilise commercial weight loss organisations. Primary care led weight management, specifically communication based interventions can be effective in reducing patient weight and in increasing patient confidence for losing weight [24, 44]. However, programs which are delivered as a partnership between practitioner and an external body, such as a commercial weight loss organisation, are generally regarded as both effective and cost effective for reducing weight and weight related co-morbidities compared with standard (GP led only) programs [45, 46].

Despite strong acknowledgement of their role in treating obesity, 60% of PCPs participants found it professionally rewarding. Similar findings have been reported previously in studies of GPs in the UK and in other countries [35, 47]. Given that there is an increasing expectation for PCPs to provide weight management advice [48, 49] this is heartening, however our results relating to knowledge of weight management best practice suggest additional training in weight management would be beneficial.

Most participants in this study reported no reluctance in mentioning weight due to a fear of making patients uncomfortable. This contrasts with previous research which found that one of the reasons for the lack of weight discussion in consultations was a fear of upsetting patients [27]. This perhaps indicates a shift in attitudes, such that raising weight as a topic for discussion with overweight and obese patients is no longer a taboo [43]. Recent evidence from a brief intervention for obesity in primary care in the UK showed that patients found the intervention appropriate, [50], additionally qualitative research examining patients views on health professionals discussing weight, reported patients would welcome such discussion [51], suggesting practitioners should be less concerned about upsetting patients by mentioning weight. In our study, a large proportion of participants thought that a health professionals' own weight affects how patients view the advice provided by them. Primary care nurses have previously been found to be aware of their own body size in relation to discussing weight with overweight or obese patients [28]. In that study PNs with a low body mass index were concerned about appearing un-empathetic, whilst PNs who *were* overweight were concerned about being poor role models [28]. The current data does not separate these two potentially different viewpoints (although the majority of participants recognised that PCPs should try to maintain a healthy weight and be a good role model, despite an overweight prevalence of more than one third), but do highlight that healthcare professionals

are sensitive to the effect their own weight may have on how overweight or obese patients receive their attempts to discuss weight.

Current practice in weight management

NICE guidelines [21] stipulate that BMI along with waist circumference should be used to measure overweight status in adults, and that clinical judgement should be applied when deciding when to measure this. In line with these guidelines, BMI was the most commonly reported method of assessing patient weight by participants in the current study, whilst waist circumference was infrequently used. However, we found that around 40% of participants did not know the BMI at which a patient would be classified as overweight. This is concerning because it presents a missed opportunity for the identification of overweight individuals, and for initiating discussion of weight management with them.

More than three quarters of participants reported ‘often’ or ‘always or almost always’ discussing weight with overweight or obese patients, mirroring previous self-report data in the UK and in other countries [23, 24, 52]. In contrast to these data, direct observational studies have shown that weight discussion with overweight and obese patients is not routine within primary care practice in NE Scotland [31, 53]. A recent small observational study of GP practice identified that weight was discussed in only 25% of primary care consultations with overweight or obese patients [31]. Thus, discordance exists between self-reported practice and observed practice regarding weight management discussions for overweight and obese patients in the same geographical area.

Giving advice on lifestyle changes was the most commonly reported approach to treating overweight and obese patients by participants, with less than a third reporting use of

motivational interviewing or BCT often or almost always. Educational approaches alone, such as provision of lifestyle advice, for weight management have been found to be less effective than psychoeducational approaches [54], thus advising alone is unlikely to instigate behavioural change [24]. BCTs, such as motivational interviewing, have been shown to be effective for predicting weight loss in overweight patients. In our study around half of participants reported they had experienced postgraduate behavioural change training, fewer reported such training at the undergraduate level. The majority of participants believed that most overweight and obese patients knew the health risks of being overweight or obese but were not motivated to change their lifestyles. There appeared to be an acknowledgement amongst practitioners that patients were knowledgeable and that the difficulty in losing weight often lay with a lack of patient motivation, a perception reflected in a number of other studies [34, 35, 37]. In our study participants more commonly reported using approaches generally regarded as ineffective for patient weight loss, rather than using efficacious BCT, potentially reinforcing beliefs about the difficulty of patient weight loss. Such views may be self-perpetuating, as was found previously in a study in the USA where patients responded negatively to GPs' negative attitudes about weight loss, which then reinforced the GPs' attitude [55]. Thus, participants perceived overweight and obese patients to lack the motivation rather than the knowledge to lose weight, although they relied on the provision of advice as a technique to manage weight in their overweight and obese patients. Our data highlight a gap in training for primary healthcare professionals, either in the undergraduate or postgraduate realm relating to behavioural change techniques.

A barrier to the treatment of overweight and obesity reported by the majority of respondents was lack of time within consultations. This result contrasts with those found by Campbell and colleagues in their study of Australian GPs, where only 6% of participants reported lack of time within a consultation as being a barrier to managing overweight or obesity [35], perhaps

reflecting differences within the primary healthcare systems in the two different countries. A shortage of specialty staff to refer overweight and obese patients on to was another barrier to successful patient weight loss. A desire for specialist healthcare professionals whom primary care health professionals can refer overweight and obese patients to for weight loss advice and support has been noted previously in Scotland [42]. Recent evidence suggests that the referral pathway for patients is not uniform across Scotland possibly a reflection of the considerable variation in service provision across health boards [56]. Studies in other areas of the UK report reasonable referral rates to various specialists, such as commercial organisations and dieticians [34], whilst a study of Australian GPs reported that 65% of participants ‘normally’ referred patients to other healthcare professionals for weight management [35]. Resolution of these perceived barriers (lack of time, lack of specialty referral staff) could include an dedicated specialist within primary care practices [43] with specific training in obesity and BCT such as motivational interviewing for weight management, using standardized definitions for interventions [57]. This could enable targeted discussions regarding patient weight (which are currently not reflected), enhanced patient motivation and best practice in weight management. Additionally, a potential other solution would be through a partnership with commercial weight loss organisations.

Limitations

There are several limitations to the results reported in this study. Firstly, the response rate was relatively low, particularly amongst PNs, confirming that this is a challenging group to engage. However, a good age range was achieved within the sample. Female GPs were over-represented in this sample generally (58% of the GP sample), however in Fife and Tayside NHS Health boards, the percentage of female GPs in 2014 was 54%, therefore the current sample was an appropriate reflection of the local context. Respondents from the Tayside

region were also underrepresented. Additionally, the sample is self-selecting and is likely therefore to be biased toward participants with an interest in this field. Disparities between self-reported and actual behaviour have been highlighted in this report and we recognise that a much more comprehensive sample of practitioners is required to examine this possible disparity more closely.

Conclusions

This study confirmed a primary care practitioner role in managing weight in overweight and obese patients with the majority of participants reporting frequently discussing weight with such patients, a frequency unsupported by observational data [31]. This discrepancy should be further examined on a larger scale. Additionally, PCP knowledge scores suggest obesity related education should be augmented within PCPs. This study also highlighted an inconsistency between PCP perceptions of why overweight and obese patients find it difficult to lose weight and the tools PCPs report employing to address patient weight management. The inclusion of training in psychological interventions based upon BCT, and encouragement of their use by PCPs, may help to achieve concordance between practitioner beliefs and their selected weight management techniques, which may be beneficial for practice. Alternatively, the provision of weight care specialists or referral on to commercial weight loss organisations may provide more effective paths to weight management and weight loss for overweight and obese patients in primary care.

References

1. World Health Organisation, *Obesity and overweight*. 2015:
<http://www.who.int/mediacentre/factsheets/fs311/en/>.

2. McKinsey Global Institute, , *Overcoming obesity: An initial economic analysis*. 2014.
3. Mokdad A, Ford E, Bowman B, et al., *Prevalence of obesity, diabetes, and obesity-related health risk factors, 2001*. JAMA, 2003. **289**(1): p. 76 - 79.
4. Pischon T, Boeing H, Hoffamn K, et al., *General and abdominal adiposity and risk of death in Europe*. New England Journal of Medicine, 2008. **359**(20): p. 2105 - 2120.
5. Bhaskaran K, Douglas I, Forbes H, et al., *Body-mass index and risk of 22 specific cancers: a population-based cohort study of 5.24 million UK adults*. The Lancet, 2014. **384**(9945): p. 755 - 765.
6. Rahmouni K, Carreia M, Haynes W, et al., *Obesity-associated hypertension: new insights into mechanisms*. Hypertension, 2014. **45**: p. 9 - 14.
7. Zammit C, Liddicoat H, Moonsie I, et al., *Obesity and respiratory diseases*. International Journal of General Medicine, 2010. **3**: p. 335 - 343.
8. Anandacoomarasamy A, Caterson I, Sambrook P, et al., *The impact of obesity on the musculoskeletal system*. International Journal of Obesity (Lond), 2008. **32**(2): p. 211 - 222.
9. Talen M and Mann M, *Obesity and Mental Health*. Primary Care: Clinics in Office Practice, 2009. **36**(2): p. 287 - 305.
10. The Scottish Government, *The Scottish Health Survey Annual Report 2014: Volume 1: Main Report*. 2015.
11. Ho M, Garnett S, Baur L, et al., *Impact of dietary and exercise interventions on weight change and metabolic outcomes in obese children and adolescents: a systematic review and meta-analysis of randomized trials*. JAMA Pediatrics, 2013. **167**(8): p. 759 - 768.
12. World Health Organisation, *Global Strategy on Diet, Physical Activity and Health: A Framework to Monitor and Evaluate Implementation*. 2006.

13. Hardeman W, Griffin S, Johnston M, et al., *Interventions to prevent weight gain: a systematic review of psychological models and behaviour change methods*. International Journal of Obesity, 2000. **24**(2): p. 1313 - 143.
14. Davis R, Campbell R, Hildon Z, et al., *Theories of behaviour and behaviour change across the social and behavioural sciences: a scoping review*. Health Psychology Review, 2015. **9**(3): p. 323 - 344.
15. Shaw K, O'Rourke P, Del Mar C, et al., *Psychological interventions for overweight or obesity*. Cochrane Database of Systematic Reviews, 2005(2).
16. Butryn M, Webb V and Wadden T, *Behavioral Treatment of Obesity*. Psychiatric Clinics of North American, 2011. **34**(4): p. 841 - 859.
17. Michie S, Richardson M, Johnston M, et al., *The Behavior Change Technique Taxonomy (v1) of 93 hierarchically clustered techniques: Building an International consensus for the reporting of behavior change interventions*. Annals of Behavioral Medicine, 2013. **46**: p. 81 - 95.
18. Brown K, *The LEARN Program for Weight Management*. 10th ed. 2004, Dallas: American Health Publishing Co.
19. Avery L, Flynn D, van Wersch A, et al., *Changing Physical Activity Behavior in Type 2 Diabetes: A systematic review and meta-analysis of behavioral interventions*. Diabetes Care, 2012. **35**(12): p. 2681 - 2689.
20. Scottish Intercollegiate Guidelines Network, *Management of Obesity: A National Clinical Guideline*. 2010.
21. National Institute for Health and Care Excellence, *Managing overweight and obesity in adults - lifestyle weight management services*, in *NICE public health guidance 53*. 2014.

22. Stewart M, Brown J, Donner A, et al., *The impact of patient-centered care on outcomes*. Journal of Family Practice, 2000. **49**(9): p. 796 - 804.
23. Armstrong M, Mottershead T, Ronksley P, et al., *Motivational interviewing to improve weight loss in overweight and/or obese patients: a systematic review and meta-analysis of randomized controlled trials*. Obesity Reviews, 2011. **12**(9): p. 709 - 723.
24. Pollak K, Alexander S, Coffman C, et al., *Physician Communication Techniques and weight loss in adults: Project CHAT*. American Journal of Preventive Medicine, 2010. **39**(4): p. 321 - 328.
25. Kraschnewski J, Sciamanna C, Stuckey H, et al., *A silent response to the obesity epidemic: decline in US physician weight counseling*. Medical Care, 2013. **51**(2): p. 186 - 192.
26. Bleich S, Pickett-Blakely O and Cooper L, *Physician practice patterns of obesity diagnosis and weight-related counseling*. Patient Education and Counseling, 2011. **82**: p. 123 - 129.
27. Heintze C, Sonntag U, Brinck A, et al., *A qualitative study on patients' and physicians' visions for the future management of overweight or obesity*. Family Practice, 2012. **29**(1): p. 103 - 109.
28. Brown I and Thompson J, *Primary care nurses' attitudes, beliefs and own body size in relation to obesity management*. Journal of Advanced Nursing, 2007. **60**(5): p. 535 - 543.
29. Harvey E and Hill A, *Health professionals' views of overweight people and smokers*. International Journal of Obesity, 2001. **25**: p. 1253 - 1261.

30. Peters S, Chisholm A, Keyworth C, et al., *Effective ways of talking with patients about behavior change: A qualitative analysis of the challenges perceived by doctors and nurses*. International Journal of Behavioral Medicine, 2010. **17**(92 - 93).
31. Laidlaw A, McHale C, Locke H, et al., *Talk weight: An observational study of communication about patient weight in primary care consultations*. Primary Health Care Research & Development, 2014. **16**(3): p. 309 - 315.
32. Lopez-de-Munain J, Torcal J, Lopez V, et al., *Prevention in routine general practice: activity patterns and potential promoting fact*. Preventive Medicine, 2001. **32**(1): p. 13 - 22.
33. Kristeller J and Hoerr R, *Physician attitudes towards managing obesity: Differences among six specialty groups*. Preventive Medicine, 1997. **26**: p. 542 - 549.
34. Brown I, Stride C, Psarou A, et al., *Management of obesity in primary care: nurses' practices, beliefs and attitudes*. Journal of Advanced Nursing, 2007. **59**(4): p. 329 - 341.
35. Campbell K, Engel H, Timperio A, et al., *Obesity management: Australian general practitioners' attitudes and practices*. Obesity Research, 2000. **8**(6): p. 459 - 466.
36. Foster G, Wadden T, Makris A, et al., *Primary Care Physicians' Attitudes about Obesity and Its Treatment*. Obesity Research, 2003. **11**(10): p. 1168 - 1777.
37. Bocquier A, Verger P, Basdevant A, et al., *Overweight and Obesity: Knowledge, Attitudes, and Practices of General Practitioners in France*. Obesity Research, 2005. **13**(4): p. 787 - 795.
38. Al-Ghawi A and Uauy R, *Study of the knowledge, attitudes and practices of physicians towards obesity management in primary health care in Bahrain*. Public Health Nutrition, 2009. **12**(10): p. 1791 - 1798.
39. *SPSS Statistics for Windows*. 2012, IBM: Armonk, NY.

40. Fogelman Y, Vinker S, Lachter J, et al., *Managing obesity: a survey of attitudes and practices among Israeli primary care physicians*. International Journals of Obesity and Related Metabolic Disorders, 2002. **26**(10): p. 1393 - 1297.
41. Price J, Desmond S, Krol R, et al., *Family practice physicians' beliefs, attitudes, and practices regarding obesity*. American Journal of Preventative Medicine, 1987. **3**(6): p. 339 - 345.
42. Hankey C, Eley S, Leslie W, et al., *Eating habits, beliefs, attitudes and knowledge among health professionals regarding the links between obesity, nutrition and health*. Public Health Nutrition, 2004. **7**(2): p. 337 - 343.
43. Claridge R, Gray L, Stubbe M, et al., *General practitioner opinion of weight management interventions in New Zealand*. Journal of Primary Health Care, 2014. **6**(3): p. 212 - 220.
44. LeBlanc E, O'Connor E, Whitlock E, et al., *Screening for and Management of Obesity and Overweight in Adults*, A.f.H.R.a.Q. (US), Editor. 2011: Rockville.
45. Jebb S, Ahern A, Olson A, et al., *Primary care referral to a commercial provider for weight loss treatment versus standard care: a randomised controlled trial*. The Lancet, 2011. **378**: p. 1485 - 1492.
46. Fuller N, Carter H, Schofield D, et al., *Cost effectiveness of primary care referral to a commercial provider for weight loss treatment, relative to standard care: a modelled lifetime analysis*. International Journal of Obesity 2013. **38**(8): p. 1104 - 1109.
47. Cade J and O'Connell S, *Management of weight problems and obesity: knowledge, attitudes and current practice of general practitioners*. British Journal of General Practice, 1991. **41**(345): p. 147 - 150.
48. *National Service Framework for Coronary Heart Disease*, Department of Health, UK, 2000: London.

49. Counterweight Team, *Evaluation of the Counterweight Programme for obesity management in primary care: a starting point for continuous improvement*. British Journal of General Practice, 2008. **58**(553): p. 548 - 554.
50. Aveyard P, Lewis A, Tearne S, et al., *Screening and brief intervention for obesity in primary care: a parallel, two-arm, randomised trial*. The Lancet, 2016. **In Press**.
51. Hart J, Yelland S, Mallinson A, et al., *When is it ok to tell patients they are overweight? General public's views of the role of doctors in supporting patients' dieting and weight management*. Journal of Health Psychology, 2016. **21**(9): p. 2098 - 2107.
52. Kraschnewski J, Sciamanna CN, Stuckey HL, et al., *A silent response to the obesity epidemic: Decline in US Physician weight counseling*. Medical Care, 2013. **51**(2): p. 186 - 192.
53. Scott J, Cohen S, Dicicco-Bloom B, et al., *Speaking of weight: how patients and primary care clinicians initiate weight loss counseling*. Preventative Medicine, 2004. **38**(819 - 827).
54. Kushner R and Ryan D, *Assessment and Lifestyle Management of Patients With Obesity: Clinical Recommendations From Systematic Review*. JAMA, 2014. **312**(9): p. 943 - 952.
55. Hebl M and Xu J, *Weighing the care: physicians' reactions to the size of a patient*. International Journal of Obesity, 2001. **25**(8): p. 1246 - 1252.
56. Read S and Logue J, *Variations in weight management services in Scotland: a national survey of weight management provision*. Journal of Public Health, 2015. **38**(3): p. e325 - e335.
57. Michie S, *Talking to primary care patients about weight: a study of GPs and practice nurses in the UK*. Psychology, Health and Medicine, 2007. **12**: p. 521 - 525.

Table 1: Demographic characteristics of participants.

	Survey n (%) (n=107)		Total Sample (n = 107)
	GPs (n=93)	PNs (n=14)	
Health Board			
Fife	43 (40.2)	8 (7.5)	51 (47.7)
Tayside	39 (36.5)	3 (2.8)	42 (39.3)
Did not state	11 (10.3)	3 (2.8)	14 (13)
Age (years)			
18-24	0	0	0
25-34	19 (17.8)	1 (0.9)	20 (11.8)
35-44	31 (29)	3 (2.8)	34 (31.8)
45-54	32 (29.9)	9 (8.4)	41 (38.3)
55-64	11 (10.3)	1 (0.9)	12 (11.2)
Sex			
Male	39 (36.4)	0	39 (36.4)
Female	54 (50.5)	14 (13.1)	68 (63.6)
BMI			
Underweight (<18.5)	0	0	0
Normal weight (18.5 - 24.9)	56 (52.3)	5 (4.7)	61 (57)
Overweight (25 – 30)	22 (20.6)	8 (7.5)	30 (28.1)
Obese (> 30)	8 (7.5)	0	8 (7.5)
Not provided	7 (6.5)	1 (0.9)	8 (7.5)
Training at undergraduate level			
Nutrition	33 (30.8)	5 (4.7)	38 (35.5)
Obesity	26 (24.3)	4 (3.7)	30 (28)
Behaviour change	22 (20.6)	4 (3.7)	26 (24.3)
Physical activity	18 (16.8)	3 (2.8)	21 (19.6)
Training at postgraduate level/continuous professional development			
Nutrition	24 (22.4)	1 (0.9)	25 (23.3)
Obesity	47 (43.9)	1 (0.9)	48 (44.8)
Behaviour change	52 (48.6)	3 (2.8)	55 (51.4)
Physical activity	34 (31.8)	0	34 (31.8)

Table 2: PCP participant knowledge of obesity and related conditions.

Question	Total Sample (%)
% of adult Scottish society overweight and obese	46 (43.0)
% of adult Scottish society obese	28 (26.2)
Calories per day for healthy weight: women	71 (66.4)
Calories per day for healthy weight: men	62 (57.9)
BMI overweight	65 (60.7)
BMI obese	81 (75.7)
Recommended physical activity for healthy weight	67 (62.6)
SIGN guidelines for weight management programme	18 (16.8)
% bodyweight loss for significant health benefit	39 (36.4)
Waist circumference as a measure of obesity	85 (79.4)

Table 3: PCP participant attitudes towards overweight and obese patients and the role of primary care health professionals in the treatment of overweight and obesity.

	Agreed (Rather agree / Strongly agree)
	Total sample n (%)
Primary care in the treatment of overweight and obesity	
Practice nurses have an essential role in identifying and treating overweight and obese patients**	95 (88.8)
GPs have an essential role in identifying and treating overweight and obese patients**	89 (83.2)
Treating overweight and obese patients is professionally gratifying	64 (59.8)
I feel well prepared to manage overweight and obese patients	58 (54.2)
GPs' time would be best spent in this area by preventing overweight and obesity in the first place	44 (41.1)
Obesity is a disease	46 (43.0)
Practice nurses' time would be best spent in this area by preventing overweight and obesity in the first place	42 (39.3)
I do not like treating overweight or obese patients**	26 (24.3)
Treatment for weight loss should be offered only to adults who are obese (not overweight)	26 (24.3)
I don't believe that I can have any effect on patients' ability to lose weight**	11 (10.3)
Overweight and obese patients are usually quite motivated about lifestyle change	10 (9.3)
I would only offer advice regarding weight control when a patient requests it	9 (8.4)
Difficulties of weight loss	
It is very difficult for overweight and obese patients to lose weight, no matter what support they are given**	64 (59.8)
Only a small percentage of overweight and obese patients can lose weight and maintain this loss	51 (47.7)
GPs' role is to refer overweight and obese patients to other professionals rather than attempt to treat them themselves	21 (19.6)
Practice nurses' role is to refer overweight and obese patients to other professionals rather than attempt to treat them themselves	18 (16.8)
Impacts of health professionals weight	
I feel my own weight affects how my overweight/obese patients view my advice**	76 (71.0)
GPs should be role models and maintain normal weight	75 (70.1)
Practice nurses should be role models and maintain normal weight	68 (63.6)
Attitudes towards overweight patients	
Most overweight and obese patients are well aware of the health risks of obesity	68 (63.6)
I do not experience any barriers to treating overweight and obese patients**	29 (27.1)
I am reluctant to mention weight as I don't want to make patients feel uncomfortable**	21 (19.6)
Weight loss and health	
Normal weight is important for health	104 (97.2)
For overweight and obese patients, even small weight loss can produce health benefits	102 (95.3)

** . Eight additional items developed by the investigators to gain a more comprehensive insight into health professional attitudes and beliefs.

Table 4: Diagnosis methods for determining whether patients were overweight or obese reported by PCP participants.

Diagnosis methods	Responses n (%)				
	Never or rarely	Sometimes	Often	Always or almost always	Not stated
Weight without reference to height	57 (53.3)	36 (33.6)	14 (13.1)	0	0
BMI	0	5 (4.7)	38 (35.5)	63 (58.9)	1 (0.9)
Waist/hips ratio	81 (75.7)	24 (22.4)	1 (0.9)	1 (0.9)	0
Waist circumference	57 (53.3)	36 (33.6)	11 (10.3)	3 (2.8)	0
Comparison with ideal weight	15 (14.0)	43 (40.2)	41 (38.3)	6 (5.6)	2 (1.9)
Appearance	28 (26.2)	39 (36.4)	32 (29.9)	8 (7.5)	0

Table 5: Frequency of PCP reported barriers experienced whilst treating overweight and obese patients.

Barrier	Experienced often or almost always
Barrier	Total Sample n (%)
Lack of time in appointments	84 (78.5)
Shortage of specialty staff to refer to	78 (72.9)
Lack of patient motivation to lose weight or change eating habits	79 (73.8)
Lack of clinical priority \$	42 (39.3)
Lack of skills \$	32 (29.9)
Lack of training	28 (26.2)
Lack of knowledge	14 (13.1)
Lack of confidence in myself as a role model \$	7 (6.5)

\$ Additional barriers added following review of the recent literature.