Effect of health-care professionals' weight status on patient satisfaction and recalled advice: a prospective cohort study

Martin Čadek,[a] Susanne Täuber,[b] Blake J. Lawrence,[c] and Stuart W. Flint[d,e,*]

[a]Carnegie School of Sport, Leeds Beckett University, Leeds, UK
[b]Faculty of Economics and Business, University of Groningen, Nettelbosje 2, 9712 TS Groningen, Netherlands
[c]School of Population Health, Curtin University, Perth, WA, Australia
[d]School of Psychology, University of Leeds, Leeds, UK
[e]Scaled Insights, Nexus, University of Leeds, Leeds, UK

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Summary

Background Research has demonstrated that healthcare professionals are not immune to weight stigma attitudes, with evidence showing that people living with overweight or obesity may experience direct and indirect stigma and discrimination. This can impact the quality of care provided and impact patients' engagement in healthcare. Despite this, there is a paucity of research examining patient attitudes towards healthcare professionals living with overweight or obesity, which can also hold implications for the patient–practitioner relationship. Thus, this study examined whether healthcare professionals' weight status impacts patient satisfaction and recalled advice.

Methods In this prospective cohort study, using an experimental design, 237 participants (113 women, 125 men) aged 32 ± 8.92 with a body mass index of 25.87 ± 6.79 kg m^2 were recruited through a participant pooling service (ProlificTM), word of mouth, and social media. The majority of participants were from the UK: 119, followed by participants from the USA: 65, Czechia: 16, Canada: 11, and other countries (N = 26). Participants completed an online experiment consisting of questionnaires assessing satisfaction with healthcare professionals and recalled advice after exposure to one of eight conditions assessing the impact of healthcare professional weight status (lower weight or obesity), gender (woman or man) and profession (psychologist or dietitian). A novel approach to creating the stimuli was used to exposure participants to healthcare professionals of different weight status. All of the participants responded to the experiment hosted on Qualtrics™ in the period from June 8, 2016 to July 5, 2017. Study hypotheses were examined using linear regression with dummy variables and follow up post-hoc analysis to estimate marginal means with adjustment for planned comparisons.

Findings The only statistically significant result was a difference with a small effect in patient satisfaction, where satisfaction was significantly higher in healthcare professional who was a women living with obesity compared to healthcare professional who was a man living with obesity (estimate = −0.30; SE = 0.08; df = 229; ω_p^2 = 0.05; CI = −0.49 to −0.11; $p < 0.001$), and healthcare professional who was a women living with lower weight compared to healthcare professional who was a man living with lower weight (estimate = −0.21; SE = 0.08; df = 229; CI = −0.39 to −0.02; ω_p^2 = 0.02; p = 0.02). There were no statistically significant differences in satisfaction of healthcare professionals and recall of advice in the lower weight compared to obesity conditions.

Interpretation This study has used novel experimental stimuli to examine weight stigma towards healthcare professionals which is vastly under-researched and holds implications for the patient–practitioner relationship. Our findings showed statistically significant differences and a small effect where satisfaction with healthcare professionals both living with obesity and with a lower weight were higher when the healthcare professional was a woman compared to man. This research should act as a stimulus for further research that aims to examine the impact of healthcare professional gender on patient responses, satisfaction and engagement, and weight stigma from patients towards healthcare professionals.

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*Corresponding author. School of Psychology, University Road, University of Leeds, Leeds, LS2 9JU, UK.
E-mail address: s.w.flint@leeds.ac.uk (S.W. Flint).

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Research in context

Evidence before this study

It is well documented that people living with obesity experience stigma in many settings including healthcare. Research examining weight stigma in healthcare has primarily focused on the impact of weight stigma from healthcare professionals towards patients living with obesity, with a dearth of studies exploring whether weight stigma from patients towards healthcare professionals living with obesity may impact the patient–practitioner relationship including perceptions of healthcare professionals as well as recall of medical advice.

Added value of this study

This study used a novel methodology to develop stimuli to test the impact of the healthcare professionals weight status, gender and profession on patient perceptions of healthcare professionals and recall of medical advice. The study identified significant differences in patient responses to healthcare professionals based on gender.

Implications of all the available evidence

The study findings have important implications for the patient–practitioner relationship where satisfaction was higher towards female healthcare professionals which was consistent in both the obesity and lower weight conditions.

Introduction

Many people living with obesity experience weight stigma from healthcare professionals. Empirical evidence dating back to the 1980's has examined the attitudes and behaviours of healthcare professionals towards patients living with obesity.[1–4] Research consistently shows that healthcare professionals report stigmatising attitudes and discriminatory behaviours towards patients living with obesity, such as use of stigmatising terminology, blaming patients for their weight status, not offering advice or support, and where relevant, referral or treatment.[5] These stigmatising attitudes may also lead to discriminatory behaviour and actions, which can impact the quality of care that people living with obesity receive.[6,7] The importance and implications of weight stigma in healthcare has been highlighted by the World Health Organization,[8] who call for non-stigmatising policy and healthcare delivery.

Stigmatising attitudes have also been reported in healthcare students and trainees. For example, a study by Phelan et al.[9] found evidence of implicit and explicit bias among first year medical students towards patients living with obesity. In another study, just 1.4% of trainee dietitians, nutritionists, doctors, and nurses (i.e., students) have expressed either neutral or positive attitudes towards people living with obesity.[10] Findings demonstrating healthcare students and trainees (i.e., the next generation of healthcare professionals) hold weight stigma attitudes are important, highlighting the need to intervene early as part of their education and training.

Research demonstrating that healthcare professionals are not immune to weight stigma attitudes and discrimination is critically important and provides essential insights into the experiences of patients living with obesity when seeking healthcare support, and as such, can impact the patient–practitioner relationship.[4] Whilst the overwhelming majority of research has examined healthcare professionals' attitudes towards people living with obesity, and how this impacts the patient–practitioner relationship, there is a dearth of studies exploring attitudes among the general population towards healthcare professionals living with obesity. Given the prevalence of overweight and obesity among healthcare practitioners,[11,12] and the pervasiveness of weight stigma and discrimination, understanding patients' attitudes and behaviours towards healthcare professionals is warranted.

One study that explored patient attitudes and behaviours towards healthcare professionals of different body size reported that perceptions of healthcare professionals' credibility, trust and inclination to adhere to medical advice was likely to be lower in response to healthcare professionals living with overweight or obesity compared to lower weight counterparts.[13] A similar study exploring the impact of healthcare professionals' weight status on patient perceptions was conducted by Asimakopoulou et al.[14] Their study explored student responses to dental advice delivered by dentists living with either a lower weight or overweight, but they did not specifically refer to the healthcare practitioners' weight status. Asimakopoulou et al.[14] reported that there was no statistically significant difference between respondents' judgements of healthcare professionals living with a lower weight when compared to those living with overweight. More recently, McClure-Brenchley et al.[15] reported that healthcare professionals with obesity were evaluated more negatively compared to healthcare professionals without obesity, which was exacerbated when a healthcare professionals' expertise was related to weight management. These studies used still images or vignettes and description of healthcare professionals accompanied by advice before eliciting responses from participants (a passive stimuli), rather than a dynamic stimuli. Arguably, a dynamic stimulus

should provide a more realistic simulation of a consultation with a HCP.

Whilst research has not specifically shown reduced recall of advice, previous research has reported that people are less likely to follow an advice, have lower trust and a higher likelihood to change provider when cared for by HCPs living with overweight or obesity compared to a HCP living with lower weight,[13] and research has consistently shown that people living with obesity are stereotyped and portrayed in the media as lacking intelligence.[16,17] Previous research also reported that participants' weight stigma may result in a hyper-vigilance around weight which in turn impacts medical decisions towards patients.[18]

The current study extends the research exploring general population attitudes towards healthcare professionals living with obesity by using a novel approach to creating a video stimuli of healthcare provider consultation/providing health advice. In doing so, this study addresses limitations of previous research,[15] to examine whether healthcare professionals' weight status, gender, profession, and associated advice, impacts respondents' perceptions of healthcare professionals and the extent to which they could recall the health advice where the recall would be negatively impacted due to the participants being overly focused on weight.[18] The study also explored whether weight stigma attitudes impacted participants' responses to healthcare professionals. We proposed the following hypotheses:

1. In line with previous research,[13–15] participants would report more negative attitudes and recall less advice when responding to healthcare professionals living with obesity compared to lower weight (hypothesis 1)
2. In line with previous research[16,19] demonstrating higher weight stigma towards women compared to men, that participants would report more negative attitudes and recall less advice when responding to healthcare professionals who were women compared with men (hypothesis 2)
3. In line with previous research,[20,21] that healthcare professionals feel hypocritical and judged by patients that participants would report more negative attitudes and recall less advice when responding to healthcare professionals who were dieticians specifically providing advice about weight compared to psychologists providing advice about stress (hypothesis 3)

Methods

Study design and participants

A prospective cohort study was conducted online, with convenience sample of participants residing in several countries; the majority of participants were from the UK, USA, Czechia, Canada. All participants were fluent English speakers, aged 18 years and over. Participants were recruited through Prolific™, word of mouth, and social media between June 8, 2016 to July 5, 2017. Funding for recruitment via Prolific™ was provided through a small university research fund that one of the study authors (SWF) had access to. STROBE Guidelines have been adhered to in the preparation of this manuscript.[22]

Approach to analysis

The final data analysis was done with a series of planned contrast comparisons (with estimated marginal means) using univariate multiple regression with dummy variables (one-way analysis of variance, ANOVA). P-values were further adjusted using the multivariate t distribution.[23] The developed model included the following:

Outcome Variables (AHCP/RAQ) = Condition + Participant's BMI + Participant's Sex + Participant's Age + Participant's BAOP.

In the model the condition was either the effect of Weight, Weight & Gender, or Weight & Gender & Advice. Power was estimated using G*Power, however, the analysis was not relevant due to model revisions. The required sample size was estimated using G*Power 3.1.9.2.[24] The original estimate was done at the onset of the study in 2016 for a full model analysed using MANOVA (Multivariate analysis of variance) with special effects and interaction.[25] The full model included an interaction between Advice (2) x Gender (2) x Weight (2) and controlled for Attitudes Towards Obese Persons Scale.[26]

Measures

Satisfaction with HCPs

According to Linder-Perlz,[27] patient satisfaction is a positive individual attitude to the different dimensions of healthcare services, and most authors define it as a multidimensional construct (Linder-Perlz[27] in Cimas et al.[28] p. 276). To measure attitudes towards healthcare professionals (AHCP), we attempted to follow this definition. However, the high correlation among individual factors and bi-factor solutions indicated that the Single Factor model is more appropriate for the current study (Fig. S4 in Supplementary Materials). The measure is constructed from several domains (subscales) which are expected to influence attitudes towards HCP; however, it appears to represent an individual construct, i.e., patient satisfaction. The measure was comprised of six subscales: "advice adherence" (willingness to follow advice), "credibility" (perceiving the HCP as a professional), "trust" (feelings of trust, doubt, respect, or confidence in the HCP), "selection" (likelihood of recommending or choosing the HCP), "compassion" (perceiving the HCP to be interested, understanding, or caring towards a patient), and "impression" (common

stereotypes about people with obesity – in this case towards the HCP). Please see Supplementary Materials Fig. S1, which shows the final AHCP factor score plotted as a histogram showing a minimum and maximum value of –1.44, and 0.93 respectively. These values were estimated for the latent variables in the final model (shown in Fig. S4 in Supplementary Materials) and represent regression scores derived from the model. Cronbach's alpha of items included in the final scale was 0.96 but the fit statistics (except for Chi-Square and SRMR) indicated poor fit (See Table S2 for reliability indices and Table S1 for fit statistics in Supplementary Materials).

The factor is formed of 35 items that have been taken and modified from the attitudes towards healthcare the measure used in Puhl et al.[13] and Asimakopoulou et al.[14] Categories were selected in line with Puhl et al.[13] who used subscales measuring attitudes towards HCP's health behaviour, their likelihood of being selected, their compassion, trust, and finally a general advice adherence. Items purported to measure adherence, trust, and credibility from Asimakopoulou et al.[14] and the Medical Interview Satisfaction Scale (MISS) and Consultation Satisfaction Scale (CSQ)[29] were used to measure adherence, compassion, trust, and credibility. Questions from the General Practice Assessment Questionnaire (GPA-Q;[30]) were used to develop scales for trust, credibility, compassion, selection. Finally, questions from Improving Practice Questionnaire (IPQ;[31]) were used to create scales measuring adherence, credibility, and trust. The final scale is provided in supplementary materials as 'Satisfaction Scale: Measuring advice provided by healthcare professionals'.

Recalled advice questionnaire

For this study, we created a questionnaire to measure recalled advice – "*Recalled advice questionnaire*". The questions were developed based on the script HCPs (actors) read to patients (participants). The measure was administered in the form of 16 open-ended questions which did not give participants any cues to recall information. For example, if a HCP told the patient about the BMI cut-off for lower weight, the question was phrased as, *"Please indicate what body-mass index (BMI) roughly defines lower weight according to the video?"*. The measure also included general questions about the video, for example, *"Can you please describe the place where Dr John Smith was standing?"*. These questions were included to provide additional information about the participant's perception of the experiment; however, they were not included when computing the total score. The measure was developed to match the conditions (e.g., woman/man, psychologist/dietitian) where minor variations of questions were implemented as seen in Table S3. The measure is not underlined by theory and it is not assumed that this measure is representative of a latent construct, rather this measure was used as a checklist of the extent of participant recall. The underlying measurement model is the sum of scores weighted by item difficulty (a proportion of correctly answered questions). Following data collection, the answers were manually coded by one of the researchers (MC) and validated by another researcher (SWF). The coding system was based on whether participants did or did not recall advice. Therefore, participants were rated on how much information they remembered and coded as zero for not recalling and one for recalling. Recalled information was then summed as an overall score ranging from 0 to 16, and once weighted by the item difficulty, scores ranged between 0 and 8.77 (See Supplementary Materials, Fig. S2). Cronbach's alpha of items included in the final scale was 0.60 (Table S2 in Supplementary Materials). The validity of the scale was not measured since we did not have a suitable criteria to compare with given the experimental nature of the scale. However, visualisation of correlation matrix is provided in supplementary materials (Fig. S5 in Supplementary Materials). Finally, the full set of questions presented to participants, including questions that were used for attention check, are provided as part of Tables S3 and S4 in Supplementary Materials.

Stimuli

Four actors were asked to attend a green room to take on the role of a psychologist providing advice about stress management and a dietitian providing advice about weight management in line with the NHS Healthy Choices website.[32] The advice was structured so that they had an equal amount of words. To reduce any impact of body language or movements that could impact the comparability of the video clips, the actors were 2 men and 2 women, who identified as either within the obesity or lower weight range. Actors were instructed to remain as still as possible throughout the recording.

The stimuli was created using digital compositing technique which is a video editing technique where multiple digital images are assembled to create the final image. Specifically, digital compositing is a "digitally manipulated combination of at least two source images to produce an integrated result", (Brinkmann,[32] p. 2). The method aims to create a single image or video clip without a viewer realising the fact that it was originally created from two different images or video clips. The stimuli used in the current study was created using Adobe After Effects™. Fig. S3 in Appendix shows the actors standing in front of the green screen before the final image was created. In one scene, two actors were reading the script, in another scene, two actors with different body sizes were standing still and pretended to read the script. The final image presented to participants combined the two scenes together.

The videos were pilot tested with 12 respondents who asked about the content delivered by both

the actors who were a man and woman, as well as the "attractiveness" and perceptions of body weight for the actors. Responses indicated that pilot participants indicated that content covered by the men and women actors was the same, and that there was no discernible difference in perceived attractiveness. There was only one difference in responses to the perceived weight status of the actors, with all participants indicating that they perceived the actors living with obesity to be in the obesity range, and all but one respondent identifying the actors with a healthy weight to be in the healthy weight range; one respondent indicated a belief that the male living with a healthy weight was in the overweight range.

Procedure

After receiving institutional ethical clearance from Sheffield Hallam University, adults who were interested in participating clicked on a link that directed them to Qualtrics™ which was used to host the experiment. After reading the information sheet and providing informed consent, participants were randomly assigned to one of eight conditions. Each condition involved participants taking the role of a patient and viewing a video of a HCP providing them with advice (see Fig. 1). The eight conditions were: 1) psychologist who is a woman living with a lower weight giving advice about stress management (n = 30); 2) psychologist who is a woman living with obesity giving advice about stress management (n = 25); 3) psychologist who is a man living with a lower weight giving advice about stress management (n = 24); 4) psychologist who is a man living with obesity giving advice about stress management (n = 32); 5) dietitian who is a woman living with a lower weight giving advice about weight management (n = 37); 6) dietitian who is a woman living with obesity giving advice about weight management (n = 30); 7) dietitian who is a man living with a lower weight giving advice about weight management (n = 29); 8) and dietitian who is a man living with obesity giving advice about weight management (n = 32).

The video advice was read by the actors reflecting advice from the NHS Healthy Choices website[32] and was structured so that they had an equal amount of words.

Statistical analysis

Study hypotheses were examined using multiple regression with dummy variables and post-hoc follow up tests calculating estimated marginal means adjusting for Type 1 error using the multivariate t distribution to assess the probability.[23] Specifically, participants' satisfaction and recall of advice was examined across three hypotheses. Hypothesis 1 compared only the effect of HCP weight status on either recalled advice or satisfaction, hypothesis 2 added gender to the comparison alongside weight status; and finally, hypothesis 3 added also the type of advice provided alongside HCP weight status, and gender. For all analyses the default level of significance, or alpha (α) was set at 0.05. These hypotheses can also be represented in the following formula where the relationship shown is that of dependent variable(s) ~ independent variable(s).

H1) Satisfaction or Recalled advice ~ Condition H1 + BMI + Sex + Age + BAOP.

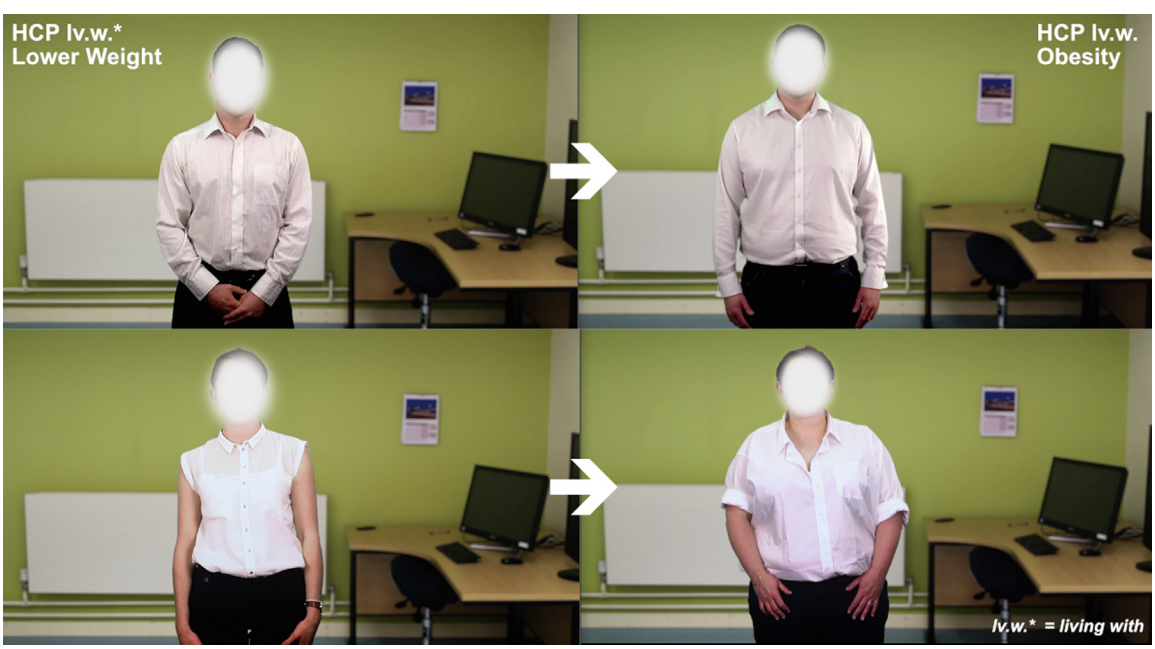

Fig. 1: Participant's point of view in the experiment.

H2) Satisfaction or Recalled advice ~ Condition H2 + BMI + Sex + Age + BAOP.
H3) Satisfaction or Recalled advice ~ Condition H3 + BMI + Sex + Age + BAOP.

An alternative analysis in Table S5 of the supplementary materials also compared models across all hypotheses with and without BAOP; the models performed similarly and the original decision to include BAOP was sustained.

In the formula above, Condition H1 (2 levels) represents either HCP living with obesity (level 1) or HCP living with lower weight (level 2). Condition H2 (4 levels) represents either HCP living with obesity who is a woman, HCP living with obesity who is a man, HCP living with lower weight who is a woman, or HCP living with lower weight who is a man. Finally, condition H3 (8 levels) further extends the comparison by including either dietitian or psychologists. These hypotheses were tested in the presented order and the planned comparisons are visualised in Figs. 2–4 where we visualised how the levels were compared.

Role of the funding source

The funder of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report. MC and SWF had full access to the dataset. SWF had final responsibility to submit for publication.

Results

The study recruited 237 participants (Table 1); 113 women and 124 men. Participants were 32 years old (SD = 8.92), with a body mass index (BMI) of 25.87 ± 6.79 kg m^2; 12 living with underweight (17.4 ± 0.514), 118 living with lower weight (22.1 ± 1.74), 56 living with overweight (26.8 ± 1.29), and 51 living with obesity (35.7 ± 7.63). Average BAOP (Beliefs About Obese Persons) score was 14.67 ± 7.03. Majority of participants were from the UK: 119, followed by participants from the USA: 65, Czechia: 16, Canada: 11, and other countries (N = 26).

From the total sample, 82 (35%) participants were a convenience sample while the remaining 155 (65%) participants were recruited using Prolific™. With regards to missing data, the original sample had 262 participants, 25 participants (10%) were removed due to low quality or missing responses (See Supplementary Materials: Data Quality for further information.

Mean and standard deviation (SD) of factor score for satisfaction with healthcare professionals (AHCP) was 0.01 (SD = 0.47) respectively and 5.20 (SD = 1.59) for recalled advice (RAQ).

H1: satisfaction and recalled advice towards HCP based on body size

Interpreting the results in the Figures (Fig. 2, Left A), & Right B), the results do not show statistically significant (estimate = –0.11; SE = 0.06; df = 231; CI = –0.24 to 0.01; ω_p^2 = 0.01; p = 0.06) evidence for less satisfaction towards healthcare professionals living with obesity compared to HCP living with lower weight (see Fig. 2, Left A).

Similarly, the results did not show statistically significant (estimate = –0.24; SE = 0.21; df = 231; CI = –0.66 to 0.17; ω_p^2 < 0.01; p = 0.24) evidence that participants recalled less advice when delivered by a healthcare professional living with obesity compared to HCP living with lower weight (see Fig. 2, Right B).

H2: satisfaction and recalled advice towards HCP based on gender

Our results indicate a statistically significant difference in participants satisfaction with HCPs due to gender (Fig. 3, Left A), where satisfaction was lower towards men HCP living with obesity compared to women HCP living with obesity (estimate = –0.30; SE = 0.08; df = 229; ω_p^2 = 0.05; CI = –0.49 to –0.11; p < 0.001). Similarly, a statistically significant difference was observed between HCP with a lower weight based on gender (Fig. 3, Left B), where satisfaction was lower towards man HCP with a lower weight compared to women HCP living with lower weight (estimate = –0.21; SE = 0.08; df = 229; CI = –0.39 to –0.02; ω_p^2 = 0.02; p = 0.02). Both of the effects were small.[33]

There were no statistically significant differences between participants' recall of advice (Fig. 3, Right A & B) when comparing woman and man HCPs living with obesity (estimate = –0.27; SE = 0.29; df = 229; CI = –0.93 to 0.39; ω_p^2 < 0.001; p = 0.59), and women and men HCPs with a lower weight (estimate = 0.06; SE = 0.29; df = 229; CI = –0.60 to 0.71; ω_p^2 < 0.001; p = 0.98).

H3: satisfaction and recalled advice towards HCP based on profession & advice

Interpreting Fig. 4 statistically, none of the following results showed statistically significant differences when measuring satisfaction either towards the woman psychologist living with obesity compared to the woman dietician living with obesity (estimate = 0.17; SE = 0.12; df = 225; CI = –0.14 to 0.47; ω_p^2 < 0.001; p = 0.52, Fig. 4, B); or satisfaction of the woman psychologist living with lower weight compared to the woman dietician living with lower weight (estimate = –0.06; SE = 0.11; df = 225; CI = –0.34 to 0.22; ω_p^2 < 0.001; p = 0.97, Fig. 4, D); or satisfaction of the man psychologist living with obesity compared to the man dieticians living with obesity (estimate = 0.10; SE = 0.11; df = 225; CI = –0.19 to 0.38; ω_p^2 < 0.001; p = 0.86, Fig. 4, A); or finally, satisfaction of the man psychologist living with lower weight compared to the man dietician living with lower weight (estimate = –0.14; SE = 0.12; df = 225; CI = –0.46 to 0.17; ω_p^2 < 0.001; p = 0.69, Fig. 4, C).

Finally, no statistically significant differences were observed when measuring recall of advice either

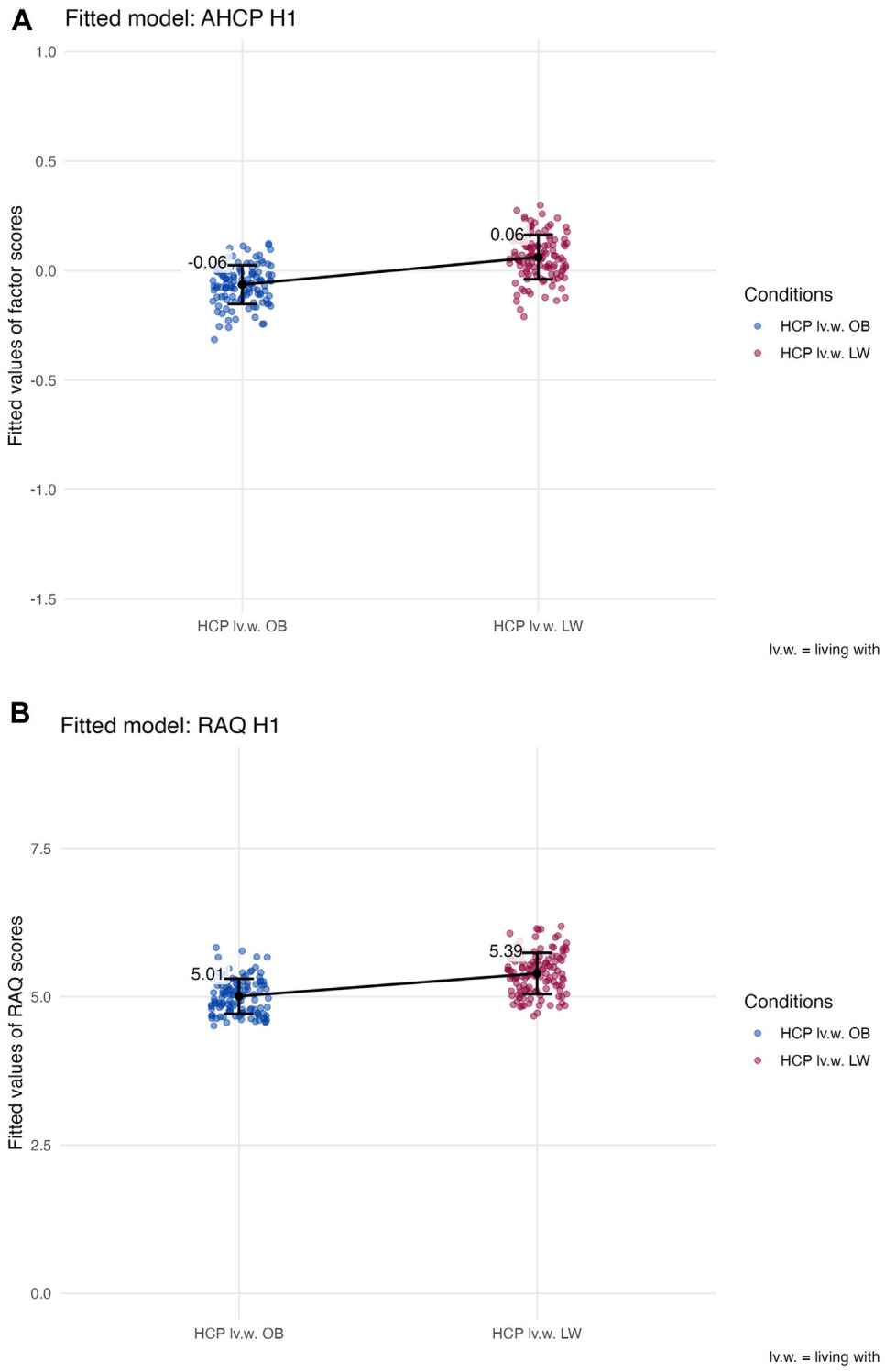

Fig. 2: Satisfaction (Top) and recalled advice (Bottom) towards healthcare professionals (HCPs) with a lower weight (LW) and living with obesity (OB). RAQ = recalled advise questionnaire; H1 = hypothesis 1.

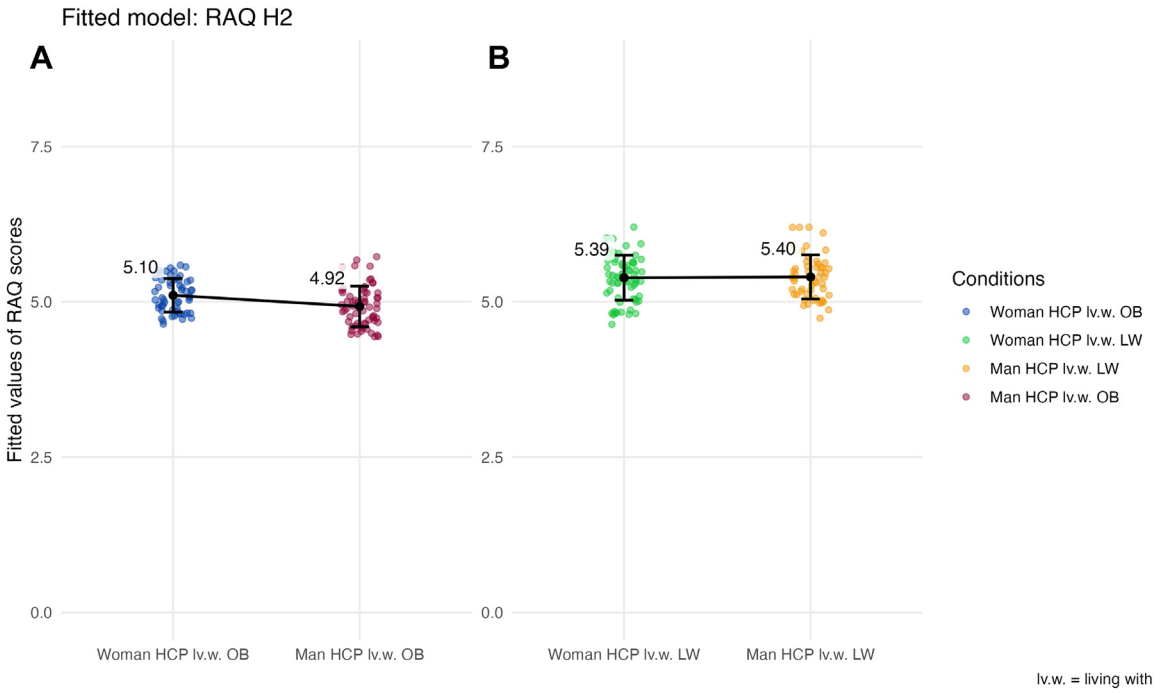

Fig. 3: Satisfaction (Left) and recalled advice (Right) towards women and men healthcare professionals (HCPs) with a lower weight (LW) and living with obesity (OB). RAQ = recalled advise questionnaire; H2 = hypothesis 2.

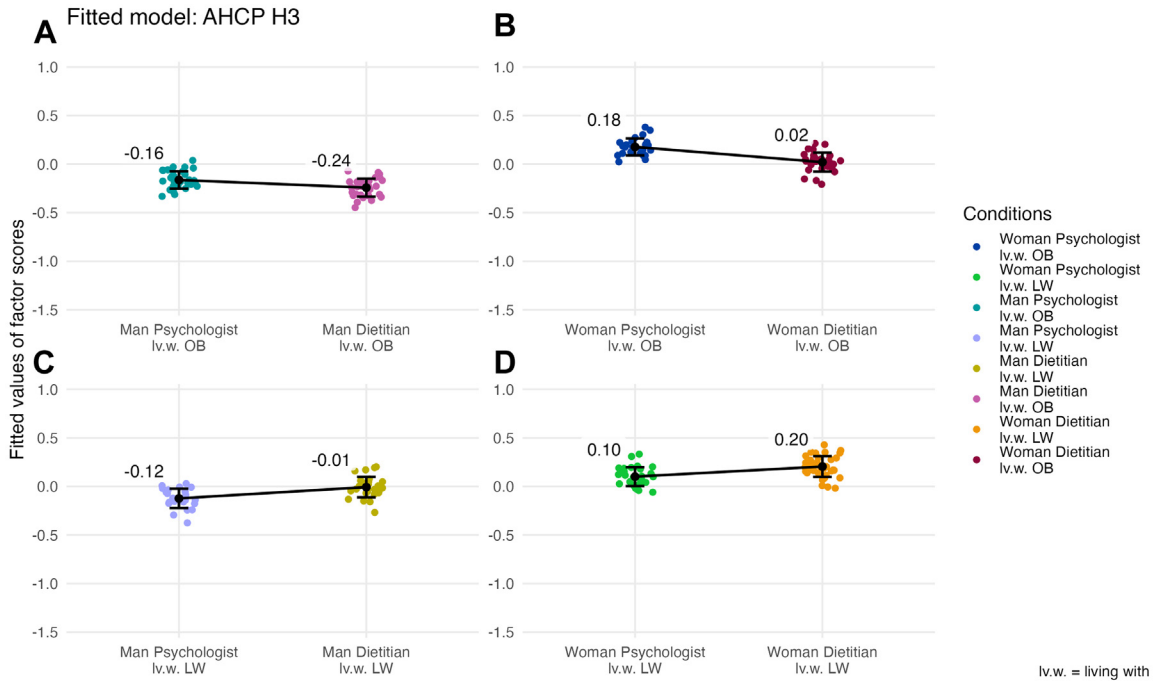

Fig. 4: Comparison of satisfaction by healthcare professional (HCP) profession, weight status and gender. AHCP = Satisfaction questionnaire; Attitudes towards Healthcare Professionals; H3 = hypothesis 3; OB = obesity; LW = lower weight.

	All participants/Mean (SD)	Men/Mean (SD)	Women/Mean (SD)
Age	32.19 (8.92)	32.65 (8.87)	31.69 (8.99)
BMI	25.87 (6.79)	25.71 (5.68)	26.06 (7.85)
BAOP	14.67 (7.03)	13.78 (6.95)	15.64 (7.01)
AHCP	0.01 (0.47)	0.01 (0.46)	0.01 (0.48)
RAQ	5.20 (1.59)	4.96 (1.59)	5.47 (1.55)
Total	237	124	113

BMI = body-mass index; BAOP= Beliefs About Obese Persons; AHCP = Satisfaction questionnaire; Attitudes towards Healthcare Professionals; RAQ = Recalled advice questionnaire.

Table 1: **Table of participant characteristics.**

between the woman psychologist living with obesity compared to the woman dietitian living with obesity (estimate = –0.22; SE = 0.42; df = 225; CI = –1.28 to 0.85; $\omega_p^2 < 0.001$; p = 0.98; Fig. 5, B); or the woman psychologist living with a lower weight compared to the woman dietitian living with a lower weight (estimate = –0.73; SE = 0.39; df = 225; CI = –1.71 to 0.25; $\omega_p^2 = 0.01$; p = 0.22 Fig. 5, D), the man psychologist living with obesity compared to the man dietitian living with obesity (estimate = –0.05; SE = 0.40; df = 225; CI = –1.05 to 0.95; $\omega_p^2 < 0.001$; p = 1.0; Fig. 5, A); or finally, the man psychologist living with a lower weight compared to the man dietitian living with a lower weight (estimate = –0.79; SE = 0.44; df = 225; CI = –1.89 to 0.31; $\omega_p^2 < 0.001$; p = 0.26; Fig. 5, C).

Discussion

Our study examined satisfaction and recall of advice from HCPs of different weight status, and whether any differences were exacerbated by gender, profession, and advice given. The only statistically significant difference and small effect was observed for participant satisfaction, where greater satisfaction was reported for the HCP who was a woman living with obesity compared to the HCP who was a man living with obesity, and the HCP who was a woman with a lower weight compared to the HCP who was a man with a lower weight. As such, our findings do not support our proposed hypotheses. We hypothesised a statistically significant difference based on HCPs gender in line with previous research demonstrating that weight stigma is stronger towards women compared to men living with overweight or obesity,[13,17] however, the current study found an opposing effect. Our findings may reflect perceived differences in the higher prevalence and consequently stereotypical perceptions of the gender of HCPs who are dieticians and psychologists; 92% and 76.7% of dieticians and psychologists respectively are women.[34,35] Alternatively, whilst the study design does extend and improve on limitations of stimuli in previous research, there may have been a difference in the delivery of the man and woman actors used to deliver the psychologist and dietitian role (e.g., body language). Nevertheless, the findings from this study therefore show that patients may be more satisfied with health advice from women psychologists and dieticians, when compared to

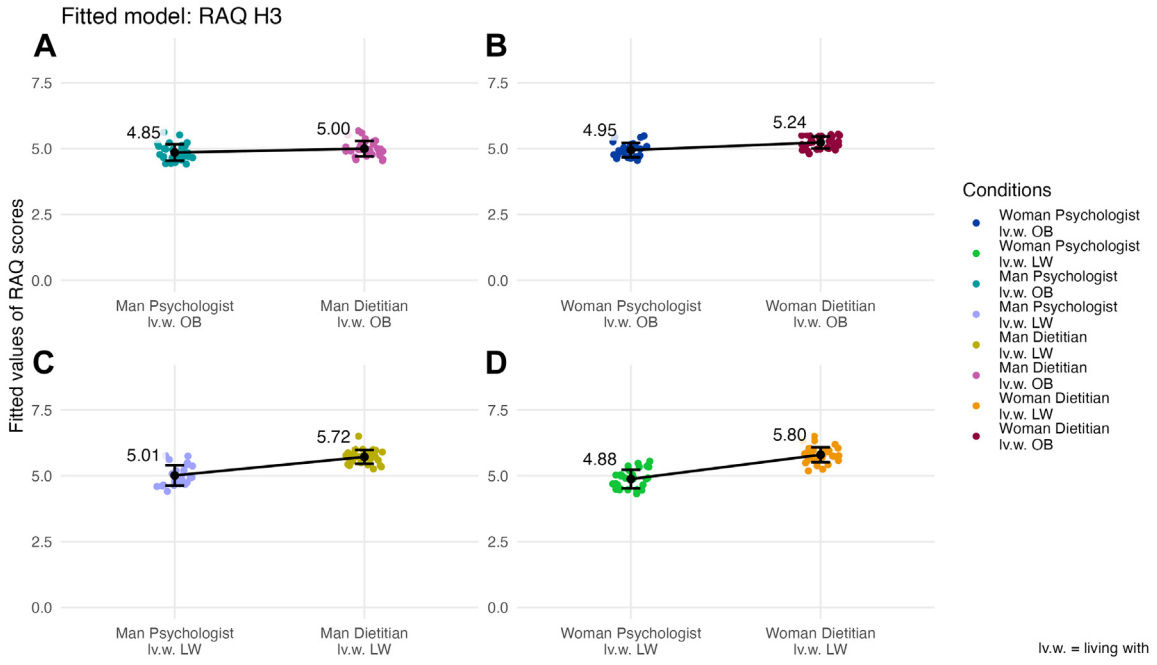

Fig. 5: Comparison of recalled advice by healthcare professionals (HCPs) profession, weight status and gender. RAQ = Recalled advice questionnaire; H3 = hypothesis 3; OB = obesity; LW = lower weight.

receiving similar advice from men psychologists and dieticians. These findings highlight the importance of gender for assessing the patient–practitioner relationship. Future research may explore the intersection between weight status and gender using similar stimuli with larger sample sizes.

Our study extends previous work comparing judgements of HCPs of different weight status, by considering the profession and advice. Both Puhl et al.[13] and Asimakopoulou et al.[14] examined judgements towards HCPs of different weight status but compared the same profession. Our study also extends beyond previous research that has used still images of HCP by using innovative stimuli to create video clips of HCPs providing NHS advice and as such a more real life experience of a consultation. This novel video methodology addressees limitations of previous research[13–15] that impact the comparability of trials assessing weight bias towards healthcare professionals, and represents an approach that could be used to study weight bias, and indeed other forms of bias, in other settings (e.g., workplace). Future research that compares face to face consultations between practitioner and patients which mirror a real life consultation would extend the findings of the current study. This research could therefore, use a blinded Randomised Controlled Trial design, examine patient responses to healthcare professionals and in doing so, replicate a real life consultation in a healthcare setting.

This study has used innovative stimuli to account for limitations of research exploring judgements of people with different body size, namely, using different people, attractiveness, tone of voice, posture and body language and skin tone. This stimulus could be employed by future research in this area. The study also contributes to an under-researched aspect of the patient–practitioner relationship in relation to weight stigma judgements, focusing on patients' perceptions of practitioners living with obesity, whilst previous research has focused on practitioner attitudes and behaviours towards patients.[4]

This study is not without its limitations. First, this study used a hypothetical design where participants took on the role of a patient to respond to healthcare professionals' advice. Whilst this provides an indication of how people respond to healthcare professionals of different body sizes, examining whether the effects observed in the current study hold true in real life scenarios is needed. Second, the initial power analysis relied on an outdated statistical test which was removed from analyses after revision. As a result, it is possible that the study suffers from lack of statistical power. Originally, we assumed that a smaller participant sample was required, a more powerful test would be used, and medium effect size would be observed. However, the true effects may be in fact smaller than expected since the highest measured effect size was small ($\omega_p^2 = 0.05$) and most of the other effects were null ($\omega_p^2 < 0.01$). Given the aforementioned circumstances, the study may be underpowered as a result. Third, our study did not examine the impact of ethnicity, which has been identified as a factor that influences weight stigma attitudes and judgements of people living with obesity. Fourthly, the measures of satisfaction and recalled advice are experimental and further research is recommended to improve these measures. Finally, whilst our innovative stimuli controlled for comparisons between healthcare professionals of the same gender, there is a potential that comparison of participants' responses to the practitioners who were a man and a woman may have been impacted by HCP body posture and tone of voice.

Future research that addresses these limitations and examines the potential differences in patient responses towards HCPs based on weight status as indicated in the current study, remains warranted, particularly given the paucity of research that has examined weight stigma from patients to practitioners. Where stigmatising perceptions of healthcare professionals living with obesity are associated with more negative attitudes about healthcare professionals amongst patients, perceptions that healthcare professionals living with obesity are less capable, and a greater likelihood that patients' adherence will be lower amongst patients with stigmatising perceptions of healthcare professionals living with obesity. Moreover, given the prevalence of overweight and obesity amongst healthcare professionals,[12] this study offers important insights that should be considered given the potential of weight stigma to impact the patient–practitioner relationship and ultimately, may impact the effectiveness of healthcare.

In conclusion, this study has highlighted statistically significant differences in participants' satisfaction towards men and women HCPs, and that these gender differences were evidence in the lower and higher weight conditions, where participants reported greater satisfaction towards women healthcare professionals who were more positive than men. With the overwhelming majority of research exploring weight stigma from healthcare professional to patient, our study explored a novel approach to oppositely, exploring weight stigma towards healthcare professionals. Whilst there was no effect or statistically significant result based on HCPs weight status, the significant differences in patient satisfaction towards women over men healthcare professionals may hold implications for the practitioner–patient relationship. Further research using similar stimuli and larger sample sizes is warranted to explore whether these effects are also observed across other healthcare professions, with the current study exploring perceptions towards healthcare professionals performing the role of a dietitian or psychologist.

Contributors

The article was conceived by MC & SWF. MC and SWF had full access to and verified the data. MC and SWF led the writing of the manuscript

which was critically reviewed by all authors (MC, ST, BL, SWF) who agreed on the final manuscript.

Data sharing statement

Data are available on request after publication of the article.

Declaration of interests

SWF reports research grants from National Institute for Health Research, the Office of Health Improvement & Disparities, Public Health England, Doncaster Council, West Yorkshire Combined Authority, Johnson and Johnson, Novo Nordisk and the University of Leeds, personal fees from the Royal College of General Practitioners, Institutional fees from Public Health England, and support for attendance at meetings from UK Parliament, Novo Nordisk Johnson & Johnson and Safefood. SWF also reports unpaid roles with Obesity UK. MC, SL, and BJL declare no competing interests.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.eclinm.2023.101855.

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