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Changing the narrative around obesity in the UK: a survey of people with obesity and healthcare professionals from the ACTION-IO study

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ABSTRACT

Objectives: To investigate the perceptions, attitudes, behaviours and potential barriers to effective obesity care in the UK using data collected from people with obesity (PwO) and healthcare professionals (HCPs) in the ACTION-IO study (NCT03584191).

Design: UK PwO (body mass index of ≥ 30 kg/m² based on self-reported height and weight) and HCPs who manage patients with obesity completed an online survey.

Results: In the UK, 1500 PwO and 306 HCPs completed the survey. Among the 47% of PwO who discussed weight with an HCP in the past 5 years, it took a mean of 9 years from the start of their struggles with weight until a discussion occurred. Most PwO (85%) assumed full responsibility for their own weight loss. The presence of obesity-related comorbidities was cited by 76% of HCPs as a top criterion for initiating weight management conversations. The perception of lack of interest (72%) and motivation (61%) in losing weight were reported as top reasons by HCPs for not discussing weight with a patient. Sixty-five percent of PwO liked their HCP bringing up weight during appointments. PwO reported complex and varied emotions following a weight loss conversation with an HCP, including supported (36%), hopeful (31%), motivated (23%), and embarrassed (17%). Follow-up appointments were scheduled for 19% of PwO after a weight discussion despite 62% wanting follow-up.

Conclusions: The current narrative around obesity requires a paradigm shift in the UK to address the delay between PwO struggling with their weight and discussing weight with their HCP. Perceptions of lack of patient interest and motivation in weight management must be challenged along with the blame culture of individual responsibility that is prevalent throughout society. While PwO may welcome weight-related conversations with an HCP, they evoke complex feelings, demonstrating the need for sensitivity and respect in these conversations.

Trial registration: ClinicalTrials.gov NCT03584191

Strengths and limitations of this study:

- Strengths include the scientific rigour in the study design and implementation, the large number of UK PwO and HCP respondents and the ability to directly compare the UK data to the equivalent global dataset
- Limitations of this study include possible response bias from the population sampled and recall bias

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BACKGROUND

The causes of obesity are complex and multifaceted, encompassing biological, genetic, environmental, economic, social, and psychological factors.¹⁻³ The chronic and relapsing nature of obesity is associated with many serious physical and psychological comorbidities, reduced quality of life and increased healthcare costs.^{2 4-8} The World Health Organization (WHO) has recognised obesity as a disease, and the National Institute for Health and Care Excellence (NICE) provides guidance on its assessment and treatment.⁹ More recently it has been recognised as a risk factor for severity of COVID-19 infection.^{5 6} The prevalence of overweight and obesity among adults in the UK has been increasing and was 63% in 2018.⁷ This increase is thought to be primarily caused by people's latent biological susceptibility interacting with a changing environment that includes more sedentary lifestyles and increased dietary abundance.¹ The prevalence of adiposity in the UK population is approaching similar levels to those reported in the US (71%), Chile (74%), and Mexico (75%), which are among the highest recorded adult overweight and obesity levels in the world.⁸ The number of people with obesity (PwO) in the UK continues to rise, and severe and complex obesity increased from fewer than 1% in 1993 to nearly 4% in 2017.¹⁰ The UK-wide National Health Service (NHS) costs attributable to overweight and obesity are projected to reach £9.7 billion by 2050, with wider societal costs estimated to reach £49.9 billion per year.¹¹ The significant increase in the prevalence of obesity has not been matched by a proportionate expansion of continuing education on the biological basis and clinical management of obesity and training provision for healthcare professionals (HCPs), irrespective of their discipline.¹² Moreover, little effort has been made to address weight stigma and societal effects of weight bias, which continue to be experienced in a consistently negative way by those who have excess weight or obesity. Current evidence demonstrates that weight stigma is widespread in the UK,¹³ that weight stigma is experienced in many settings,^{14 15} and that experience of stigma is associated with negative

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3 psychosocial outcomes, increased eating, reduced engagement with physical activity, and
4 weight gain.¹⁶
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9 The variability of causal pathways of weight gain is inherently unsuited to a 'one size fits all'
10 treatment approach.¹ There is a range of existing guidance to support practice and care
11 throughout the obesity care pathway in the UK.^{9 17} However, the extent and range of the
12 provision of weight management services is inconsistent and geographically dependent.¹⁸ The
13 obesity care pathway has an important role within the whole systems approach to tackling
14 obesity, as outlined in the Foresight report,¹ and endorsed in the Department of Health and
15 Social Care (DHSC) Call to Action¹⁹ and the Public Health England paper on a whole systems
16 approach to obesity.²⁰ The DHSC clinical policy outlines a tiered system of obesity care with a
17 focus on public health and community advice in tier 1; primary care, community interventions
18 and pharmacotherapy in tier 2; multi-disciplinary weight management service in tier 3; and
19 secondary care and bariatric surgery in tier 4.²¹
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35 Despite its wide global prevalence, obesity remains poorly understood by the general public and
36 HCPs, and this contributes to the high levels of stigma associated with obesity.²² Society is
37 continually informed through intense media coverage that obesity is simple and easily
38 manipulated.²³ This attitude contributes to greater perceptions of individual responsibility,
39 contrary to evidence that suggests that many factors outside of a person's control influence
40 obesity.^{22 23} To improve the quality and accessibility of obesity care, a better understanding of
41 the disease and the gaps between current and optimal obesity management strategies is
42 required. The Awareness, Care, and Treatment In Obesity maNagement – International
43 Observation (ACTION-IO) study (NCT03584191) assessed the perceptions, attitudes, and
44 behaviours of PwO and HCPs.²⁴ The global dataset²⁴ revealed a need to increase
45 understanding of obesity and improve education concerning its aetiology. The aim of this sub-
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3 analysis was to identify the perceptions, attitudes, behaviours, and potential barriers to effective
4 obesity care in the UK.
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9 **METHODS**

10 **Study design and participants**

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12 The ACTION-IO study was a cross-sectional, non-interventional study that collected data via an
13 online survey in Australia, Chile, Israel, Italy, Japan, Mexico, Saudi Arabia, South Korea, Spain,
14 the UK, and the United Arab Emirates. The full methods for the ACTION-IO study have been
15 reported previously.²⁴ Eligible PwO in the UK were 18 years or older, with a current BMI of at
16 least 30 kg/m² based on self-reported height and weight. The PwO sample was targeted for
17 demographic representativeness based on gender, age, income, race/ethnicity, and region.
18 Therefore, PwO were excluded if they declined to provide any of these variables. Respondents
19 were also excluded for non-obesity reasons for high BMI or dramatic weight loss, i.e. if they
20 were pregnant, participated in intense fitness or body building programmes, or had significant,
21 unintentional weight loss in the past 6 months. Eligible UK HCPs were in practice for 2 years or
22 more, with at least 70% of their time spent in direct patient care, and who had seen 100 or more
23 patients in the past month, at least 10 of whom had a BMI of at least 30 kg/m². HCPs
24 specialising in general, plastic, or bariatric surgery were excluded. Respondents were recruited
25 via online panel companies (via e-mail) to whom they had given permission to be contacted for
26 research purposes, and completed the survey in English. All respondents provided electronic
27 informed consent prior to initiation of the screening questions and survey. Preceding
28 participation, PwO were only informed of the purpose of the study, and were blinded to the
29 specific study goals.
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55 **Survey development and procedures**

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3 The study was designed by an international steering committee of obesity experts (representing
4 primary care, endocrinology, and psychology, and including three medical doctors employed by
5 Novo Nordisk), with support from KJT Group (Honeoye Falls, NY, US), and based on the
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7 ACTION US and Canada questionnaires.^{25 26} KJT Group managed the acquisition and analysis
8
9 of data; UK responses were collected between September and October 2018. Questionnaire
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11 items were carefully phrased and presented in identical order for each respondent. Items in a
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13 list were displayed in alphabetical, categorical, chronological, or random order as relevant for
14
15 each response. Respondents accessed the survey using a unique web link, details regarding
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17 the digital fingerprinting system used to assess unique site visitors has been previously
18
19 described.²⁴ To prevent duplicate survey entries, unique site visitors were recorded via a user ID
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21 that was passed along the unique web link that respondents used to access the site. The
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23 system checked every respondent entering the survey against previous user IDs logged in its
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25 database. Respondents who began the survey and suspended were able to re-enter the survey
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27 while it was still open and finish the survey where they left off. Respondents who had already
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29 received a terminal status (complete, over-quota, or terminate) were blocked from re-entering
30
31 the survey. Following closure of the survey, no users were able to gain access. The user ID and
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33 data of suspended respondents were stored until the survey was closed and were then
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35 eliminated from the data analysis. The study was conducted in accordance with the Guidelines
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37 for Good Pharmacoepidemiology Practices²⁷ and is registered with ClinicalTrials.gov, number
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39 NCT03584191.
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47 To ensure representativeness to the general population, the final PwO sample was weighted to
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49 demographic targets within each country for age, gender, income, race/ethnicity, and region.
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51 The HCP data were not weighted. Only data from those who completed the survey were
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53 included in the analyses.
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Patient and public involvement

No patients or members of the public were involved in the design or conduct of the study. A patient representative was involved in the analysis and interpretation of the UK data and is an author on this article. She will also be involved in disseminating these findings to a wider audience.

RESULTS

Demographics

A total of 69,676 PwO and 2,508 HCPs, in the UK, were invited. The response rate to the survey was 14% for PwO and 35% for HCPs, as expected for this type of study and in line with the target sample size.²⁴ Of those who responded to the survey, the eligibility rate was 22% for PwO and 53% for HCPs. The final UK sample for the ACTION-IO survey was 1500 PwO and 306 HCPs, of whom 156 were primary care professionals (PCPs) and 150 were secondary care professionals (SCPs) (table 1). Some differences were observed in the survey outcomes between PCPs and SCPs, which will be reported in full at a later date.

Table 1 Sample demographics and characteristics

	UK PwO (n=1500)	HCPs (n=306)
Recruitment and qualification*		
Total survey invitations sent	69,676	2508
Respondents	9786	886
Respondents who qualified	2146	387
Respondents who qualified and completed validated survey	1500	306
Age, years (range)	55.7 (19–88)	48.9 (28–68)
Gender, n (%)		

Male	687 (45.8%)	225 (73.5%)
Female	811 (54.1%)	81 (26.5%)
Other	2 (0.1%)	-
BMI classification, n (%)		
Respondents	1500 (100%)	236 (77.1%)
Underweight or healthy range (<25 kg/m ²)	-	152 (64.4%)
Overweight (25–29.9 kg/m ²)	-	72 (30.5%)
Obesity Class I (30–34.9 kg/m ²)	883 (56.2%)	7 (3.0%)
Obesity Class II (35–39.9 kg/m ²)	333 (22.4%)	2 (0.9%)
Obesity Class III (≥40 kg/m ²)	284 (21.4%)	3 (1.3%)
Number of comorbidities, n (%)		
0	264 (16.9%)	-
1	360 (25.0%)	-
2	330 (22.2%)	-
3	257 (16.0%)	-
≥4	289 (20.0%)	-
HCP category, n (%)		
PCP	-	156 (51.0%)
SCP	-	150 (49.1%)
Endocrinologist	-	43 (14.1%)
Cardiologist	-	51 (16.7%)
Obstetrician-gynaecologist	-	16 (5.2%)
Other	-	40 (13.1%)
Obesity specialist, [†] n (%)		
Yes	-	162 (52.9%)
No	-	144 (47.1%)

All N sizes for PwO are from unweighted data. Demographic percentages (age, gender) are also from unweighted data. All non-demographic percentage results are for PwO weighted data. HCP data were not weighted, therefore N sizes and percentages are all unweighted data.

*Participation rate (those who completed the screener) was 99.9% for PwO and 84.7% for HCPs; completion rate was 100% for PwO and 85.8% for HCPs.

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3 †A physician who meets at least one of the following criteria: at least 50% of their patients are seen for obesity/weight
4 management; or has advanced/formal training in treatment of obesity/weight management beyond medical school; or
5 considers themselves to be an expert in obesity/weight loss management, or works in an obesity service clinic.
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8 BMI, body mass index; HCP, healthcare professional; PCP, primary care professional; PwO, people with obesity;
9 SCP, secondary care professional.
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15 **Pre-consultation and initiation of weight management discussion**

16 **People with obesity**

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18 Only about half (47%) of all PwO had discussed excess weight or losing weight with an HCP in
19 the past 5 years. It took a median of 6 years and mean of 9 years (range 0.0–56.0 years;
20 interquartile range 13) between the time when PwO said they first started struggling with excess
21 weight or obesity and when they first had a weight management conversation with an HCP
22 (figure 1A). In comparison, globally it took a median of 3 years and mean of 6 years (range 0.0–
23 68.0 years; interquartile range 8 [figure 1A]).²⁴ Forty-seven percent of PwO who discussed
24 weight with an HCP reported that they initiated the conversation themselves. When PwO were
25 asked to name the top five reasons why they may not discuss weight management with their
26 HCP, the most common reason was the belief that it was their own responsibility to manage
27 their weight (51% of PwO) (figure 1B). Indeed, when asked whether they agreed with the
28 statement “my weight loss is completely my responsibility”, 85% of PwO agreed with the
29 statement. Thirty-four percent of PwO said that they were motivated to lose weight, and 36%
30 provided a neutral response (neither agreed nor disagreed that they were motivated). Only 4%
31 of PwO reported an indifference to losing weight as a reason for not discussing managing their
32 weight with an HCP. Sixty-five percent of PwO who had previously had a weight conversation
33 with their HCP liked that their HCP discussed their weight with them, and 58% who had not
34 previously had a conversation would have liked their HCP to bring up weight during their
35 appointments. Most PwO (81%) believed that obesity has a large impact on overall health,
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3 similar to other chronic diseases such as diabetes (82%), stroke (88%), cancer (82%), or
4 chronic obstructive pulmonary disease (COPD [84%]). The internet was cited as a source of
5 information used by 31% of PwO for managing weight (figure 2A). Other sources of information
6
7 were reported as family and friends (27%), weight loss programmes (26%), information from an
8
9 HCP (23%), and media (books/magazines 21%, television programmes 20%) (figure 2A).
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16 Healthcare professionals

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18 Those HCPs who discussed weight with their patients reported that 35% of the time the patient
19 initiated the conversation. Compared with PwO (85%), a smaller proportion of HCPs (33%)
20 placed the responsibility for weight loss on PwO. Only 13% of HCPs thought their patients were
21 motivated to lose weight, and 42% provided a neutral response (neither agreed nor disagreed
22 that their patients were motivated). The most commonly selected reason for not discussing
23 weight management with a patient (selected by 72% of HCPs) was the perception that the
24 patient was not interested in losing weight, and 61% of HCPs selected lack of patient motivation
25 (figure 1C). Other reasons provided for not discussing obesity with a patient were that the
26 appointments were not long enough and that they felt rushed (selected by 68% of HCPs), and
27 that more important health issues/concerns were an impediment to discussing obesity with a
28 patient (selected by 58% of HCPs). In addition, almost one third of HCPs (31%) reported that
29 the good health of a patient and absence of weight-related comorbidities would be a reason for
30 not discussing weight management. The most important criterion for initiating weight
31 management conversations with a patient was the presence of obesity-related comorbidities,
32 cited by 76% of HCPs. Only 68% of UK HCPs (vs 76% of global HCPs²⁴) recognised the impact
33 of obesity on health, and it was rated as less serious than diabetes, cancer, stroke, or COPD by
34 40%, 65%, 62%, and 43% of UK HCPs, respectively.
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56 Consultation

People with obesity

Eighty-one percent of the PwO who had discussed weight with an HCP had had a discussion with a PCP, 42% with a nurse, 18% with a dietitian/nutritionist, and 17% with a diabetes educator. PwO reported a complex mixture of feelings following a weight loss conversation with an HCP (figure 2B). PwO cited a combination of feelings such as supported 36%, hopeful 31%, motivated 23%, embarrassed 17%, indifferent 16%, discouraged 11%, relieved 10%, blamed 10%, rushed 10%, offended 4%, and confused 4% (figure 2B).

Healthcare professionals

Fifty-nine percent of HCPs reported that they were extremely or very comfortable discussing weight, 30% were neither comfortable nor uncomfortable, and 11% were a little or not at all comfortable discussing weight. On average, HCPs reported that they spent 10 minutes interacting with their patients when discussing weight (range 1–20 minutes).

Consultation outcomes and follow-up

People with obesity

Among the 47% of PwO who had discussed their weight with an HCP in the past 5 years, 49% reported that they had been diagnosed with obesity in the past by an HCP (24% of all PwO, figure 3). Only 19% of PwO who had discussed their weight with an HCP had a follow-up appointment scheduled (9% of all PwO) (figure 3). However, 62% of PwO would have liked a follow-up appointment and 96% reported attending or planning to attend a follow-up appointment if scheduled. The most frequent methods for managing weight tried by PwO were general improvements in eating habits/reducing calories (reported by 61% of PwO) and general increases in physical activity (55%), which were reported at a greater frequency than by global PwO (51% and 39% for general eating habits and physical activity, respectively; ACTION-IO study steering committee, personal communication). Bariatric surgery and behavioural therapy

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3 referral rates were reported in small numbers by UK PwO (1% and 2%, respectively). Visits to a
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5 nutritionist/dietician and obesity specialist were reported less frequently by UK PwO than global
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7 PwO (nutritionist/dietician: 11% UK, 24% global; obesity specialist: 2% UK, 9% global; ACTION-
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9 IO study steering committee, personal communication).
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11 12 13 Healthcare professionals

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15 On average, HCPs scheduled follow-up appointments with 33% of their patients for obesity and
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17 46% of HCPs said patients kept these follow-up appointments always or most of the time. HCPs
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19 most frequently recommended general improvements in eating habits/reducing calories
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21 (reported by 61% of HCPs) and general increases in physical activity (65%). Referrals to obesity
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23 specialists were recommended less frequently by UK HCPs (12%) compared with the global
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25 dataset (23%).²⁴
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31 32 DISCUSSION

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34 PwO are faced with biological predispositions, and societal and environmental conditions that
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36 contribute to obesity, weight stigma, and discrimination. Obesity prevention and management
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38 are key health priorities and require a whole systems approach. However, the national response
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40 for obesity focuses on individual responsibility regarding nutrition and lack of physical activity. In
41
42 this study, multiple barriers to effective weight management were identified, which are
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44 summarised in figure 4 and discussed below.
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49 50 **Initiation of weight management discussion with healthcare professionals**

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52 Fewer than half of PwO in the UK (47%) had a discussion with an HCP about their weight in the
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54 past 5 years,²⁴ despite HCPs being the gateway to weight management care in the NHS.
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3 Moreover, for the PwO who did have a weight discussion, it took a mean of 9 years after they
4 first started struggling with their weight before having the discussion (compared with 6 years
5 globally).²⁴ This delay is particularly important as it may create an opportunity for significant
6 obesity-related complications to develop. Reducing the time gap by initiating earlier weight
7 management discussions may be an effective strategy for improving obesity treatment and
8 preventing the development of comorbidities.
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18 From the PwO perspective, a delay in seeking help could be linked to the high percentage
19 (85%) of PwO who perceived their weight loss as completely their responsibility. From the HCP
20 perspective, a delay in discussing obesity with a patient could be linked to reported perceptions
21 that the patient was not interested or motivated in losing weight, consistent with previous
22 research.^{28 29} Other impediments to the discussion were HCPs' views that there were more
23 important health issues to discuss and that a weight management discussion is only required
24 when weight-related comorbidities are present, as supported by other studies.^{29 30} Moreover,
25 HCPs in the UK underestimated the effect of obesity on health to a greater extent than UK PwO
26 and global HCPs.²⁴ For PwO this will likely require a change in the narrative around obesity to
27 lessen focus on individual responsibility, and for HCPs a need to increase the understanding of
28 the health consequences of obesity and the desire of PwO for help and support. The internet,
29 media, and family and friends formed a substantial source of information for PwO for managing
30 weight. We need to change this from personal responsibility to recognising the aetiology of
31 obesity and its implications for PwO.
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50 **Consultation**

51 Primary care is the gateway to obesity treatment, and most weight management discussions
52 were held with a primary care physician or nurse. While many PwO welcomed weight
53 discussions with HCPs, they also reported experiencing complex and varied emotions after
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3 these discussions. It is important to acknowledge the complexity of the experience for PwO.
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5 Studies have previously reported patients feeling that their obesity had been ignored, dismissed,
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7 distorted, or attributed as the explanation of all their health problems by HCPs.³¹⁻³³ Negative
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9 experiences can contribute to depression, anxiety, low self-esteem, and body dissatisfaction.³⁴
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11 ³⁵ Dissatisfactory conversations with an HCP may discourage PwO from seeking further weight
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13 management help in the future and reinforce feelings of personal responsibility for weight
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15 management. The attitudes of health professionals towards obesity and its management have
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17 been generally reported to be negative, and knowledge and skills in managing obesity have
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19 been noted to be inconsistent.³⁶⁻⁴¹ Even well-intended acts can cause offence and humiliation,⁴²
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21 and PwO often experience their weight in profoundly negative ways as a result of the pervasive
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23 stigmatisation of obesity. Patient experiences are valid indications of the strengths and
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25 shortcomings of the services they receive.⁴³ It is important to ensure that the narrative around
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27 obesity resonates with the lived experiences of those affected by it and encourages patients to
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29 engage with an HCP.⁴³ HCPs in turn should aim to provide compassionate care that is free of
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31 bias and use supportive communication and language to facilitate successful and meaningful
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33 conversations.⁴³
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39 HCPs often have limited time and resources, and lack of time has previously been reported as a
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41 barrier to discussing obesity.^{44 45} More HCPs in the UK (68%) than globally (54%) indicated that
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43 the limited appointment time would be a factor in not having a weight loss conversation.²⁴ This
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45 may be a reflection of the average primary care consultation time in the UK, which is 10 minutes
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47 and considerably shorter than in many other countries.^{46 47} Other potential barriers described in
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49 the literature have included uncertainty about appropriate language,⁴⁴ concerns about
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51 compromising rapport,⁹ and concerns discussing a potentially upsetting and stigmatising topic.²²
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53 ^{46 48} However, in this study relatively few HCPs reported discomfort with weight discussions.
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Consultation outcomes and follow-up

Obesity diagnoses, follow-up appointments, and referrals to specialists were infrequently reported by PwO, which could incorrectly reinforce the feeling of individual responsibility. Indeed, methods for managing weight reported by PwO, which relied largely on general improvements in eating habits and physical activity, suggest a lack of knowledge of effective treatment methods and/or a consequence of the availability of therapeutic options (see below).

The data from HCPs on the frequency of follow-up appointments and methods for obesity management largely aligned with the data from PwO. Barriers to effective weight management cited in the literature have included lack of effective and individualised treatment and/or referral options.^{36 37 46 49} Weight management services in the UK exist as part of fragmented health and social care systems, which are geographically dependent.^{45 50 51} The range of services and treatments, including pharmacotherapy and bariatric surgery, is limited in the UK, which may restrict HCPs in what they can offer patients. Indeed, HCPs report insufficient management options and skepticism about their efficacy.^{52 53} The limited availability of weight management services, effective treatments and coherent, joined-up strategies in the UK health system are significant barriers to providing effective obesity care.⁵¹

Strengths and limitations

Strengths of this study include scientific rigour in the study design (including carefully phrased and ordered questions to prevent biased responses, blinded purpose of the survey for PwO, and determination of eligibility by initial screening questions to eradicate bias during recruitment) and implementation (including stratified sampling to provide a representative cohort of the general population and rigorous data analysis). Other strengths include the large number of UK PwO and HCP respondents and the ability to directly compare the UK data to the equivalent global dataset. Limitations include the cross-sectional design and reliance on accurate reporting

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3 from the PwO and HCP respondents, which could be perceived as recall bias. The self-reported
4 height and weight could underestimate the BMI of the PwO. The low response rates could affect
5 sample representativeness and is a known limitation for this type of study. Response bias from
6 the population sampled cannot be ruled out. However, the PwO sample was representative of
7 the demographics of the general population.
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16 **Conclusion**

17 This study demonstrates the need to change the narrative around obesity, with less stigmatising
18 focus on individual responsibility, for the government, commissioners, general public, PwO, and
19 HCPs. The findings identified areas that prevent PwO from seeking help and receiving
20 appropriate care. In addition, the attitudes of HCPs prevent them from offering the support PwO
21 require for obesity management. The consultation about weight with an HCP is the gateway to
22 treatment in the NHS and improving the frequency and quality of PwO–HCP conversations is
23 essential. Sufficient time should be given to HCPs to approach the topic of overweight and
24 obesity sensitively and effectively. The current survey did not have high numbers of people with
25 a BMI of over 40 kg/m²; further research is required to understand whether people with higher
26 BMIs have distinct experiences in the management of their obesity.
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42 To conclude, a whole systems approach is required to address and eliminate weight bias and
43 stigmatisation, to change the narrative around obesity in the UK, and to improve provision of
44 NHS services. Educating the whole population, including PwO and HCPs, about the aetiology
45 and psychology of obesity and the interaction with the obesogenic environment should help to
46 ensure that patients access and receive quality care and effective weight treatment and
47 management. Changing the narrative around obesity will allow for a more effective delivery
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framework for health service providers and greater access to effective treatment pathways and weight management services for PwO.

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Contributors

CH and JH are members of the ACTION-IO study steering committee and contributed to the design of the study. All authors participated in interpretation of the data, and drafting and revision of the manuscript. All authors reviewed and approved the final, submitted version.

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Competing interests

CH reports financial support from Novo Nordisk to attend an obesity conference during the conduct of the study, grants from the Rona Marsden Fund at Fakenham Medical Practice, and personal fees from Orexigen Therapeutics, Consilient Health, Nestlé, Ethicon, and Alva outside the submitted work. AA reports grants from UKRI Medical Research Council and National Institute for Health Research, and non-financial support from WW (formerly Weight Watchers). HK is an employee of Novo Nordisk and owns shares in Novo Nordisk. BMM reports grants paid to her institution from Novo Nordisk and personal fees (consultancy and advisory board) from Novo Nordisk, Boehringer Ingelheim, and Orexigen Therapeutics. BMM has received speaker fees for Eli Lilly, Novo Nordisk, Boehringer Ingelheim, Janssen, MSD, and Sanofi. HMP reports grants from the National Institute for Health Research and Public Health England. AV acted as a speaker for Obesity Empowerment Network and is a board member of the Clinical Advisory Committee on the All Wales Obesity Strategy. JCGH reports fees (honoraria) paid to the University of Liverpool from Novo Nordisk, Orexigen, and Boehringer Ingelheim during the conduct of the study.

Ethics approval

The National Health Service Health Research Authority (London – Central Research Ethics Committee) advised that ethical approval was not needed in the UK.

Transparency statement

CH affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as originally planned have been explained.

Data sharing

Deidentified participant data will be made available for this Article on a specialised SAS data platform. Datasets from Novo Nordisk will be available permanently after completion of data analysis. Access to data can be made through a request proposal form and the access criteria can be found online (novonordisk-trials.com). Data will be shared with bona fide researchers submitting a research proposal requesting access to data. Data use is subject to approval by the Independent Review Board.

Dissemination declaration

Dissemination of the results to study participants and/or patient organisations is not applicable for this non-interventional, survey study.

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5 Bacon from Articulate Science, Ltd, and was funded by Novo Nordisk.
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TABLE AND FIGURE LEGENDS

Table 1 Sample demographics and characteristics.

Figure 1 Number of years between when struggle with weight began and first discussed with an HCP and PwO/HCP reasons for not discussing weight management. **(A)** Approximate number of years reported by UK and global PwO (ACTION-IO study steering committee, personal communication) between the beginning of their struggle with weight and first discussion with an HCP. Calculated at respondent level from questions “Approximately how old were you when you first remember struggling with excess weight or obesity?” and “Approximately how old were you when a healthcare provider first discussed your excess weight or recommended that you lose weight?”. **(B)** Reasons reported by UK PwO for not discussing managing their weight with an HCP. **(C)** Reasons reported by UK HCPs for not discussing weight management with their patients.

HCP, healthcare professional; PwO, people with obesity.

Figure 2 Sources of information and feelings after a weight discussion. **(A)** Sources of information most frequently used by UK PwO for managing weight (reported by PwO). **(B)** Feelings reported by UK PwO after their most recent weight or weight loss discussion with an HCP in the past 5 years.

HCP, healthcare professional; PwO, people with obesity.

Figure 3 Obesity diagnoses and follow-up appointments with an HCP. Proportion of UK PwO who discussed weight or weight loss with an HCP in the past 5 years and the frequency of obesity diagnoses and follow-up appointments.

HCP, healthcare professional; PwO, people with obesity.

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5 **Figure 4** A conceptual model of the obesity treatment pathway and barriers to obesity care in
6 the UK.

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8 BMI, body mass index; HCP, healthcare professional; PwO, people with obesity.
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Figure 1

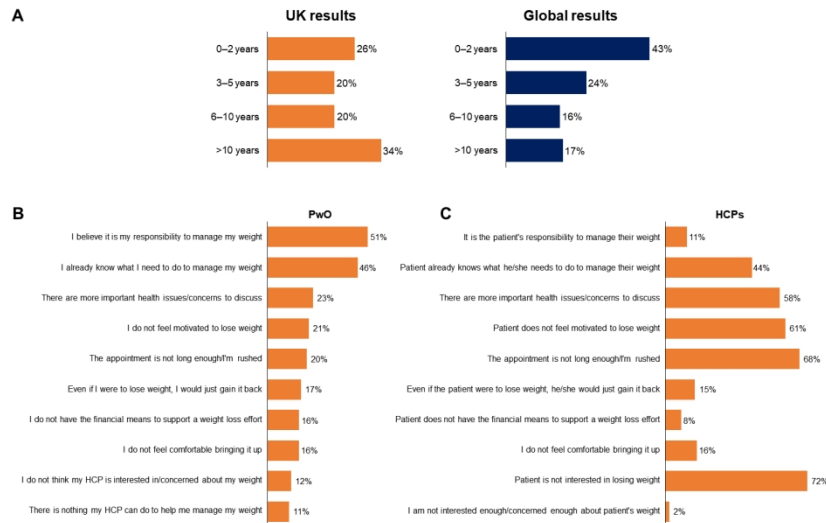


Figure 1 Number of years between when struggle with weight began and first discussed with an HCP and PwO/HCP reasons for not discussing weight management. **(A)** Approximate number of years reported by UK and global PwO (ACTION-IO study steering committee, personal communication) between the beginning of their struggle with weight and first discussion with an HCP. Calculated at respondent level from questions “Approximately how old were you when you first remember struggling with excess weight or obesity?” and “Approximately how old were you when a healthcare provider first discussed your excess weight or recommended that you lose weight?”. **(B)** Reasons reported by UK PwO for not discussing managing their weight with an HCP. **(C)** Reasons reported by UK HCPs for not discussing weight management with their patients. HCP, healthcare professional; PwO, people with obesity.

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Figure 2

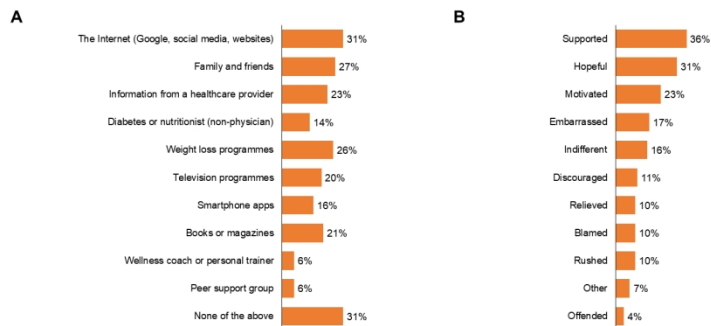


Figure 2 Sources of information and feelings after a weight discussion. **(A)** Sources of information most frequently used by UK PwO for managing weight (reported by PwO). **(B)** Feelings reported by UK PwO after their most recent weight or weight loss discussion with an HCP in the past 5 years. HCP, healthcare professional; PwO, people with obesity.

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Figure 3

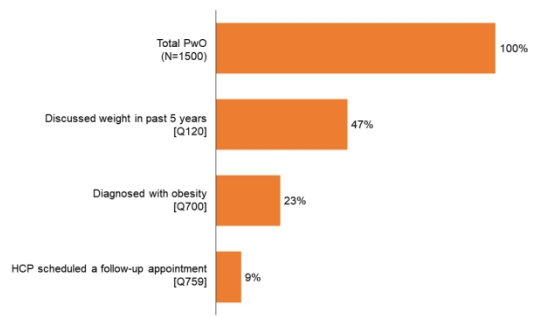


Figure 3 Obesity diagnoses and follow-up appointments with an HCP. Proportion of UK PwO who discussed weight or weight loss with an HCP in the past 5 years and the frequency of obesity diagnoses and follow-up appointments. HCP, healthcare professional; PwO, people with obesity.

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Figure 4

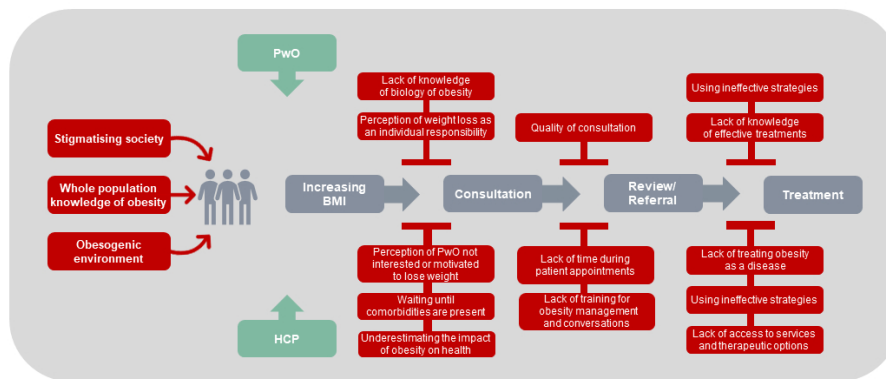


Figure 4 A conceptual model of the obesity treatment pathway and barriers to obesity care in the UK. BMI, body mass index; HCP, healthcare professional; PwO, people with obesity.

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Checklist for Reporting Results of Internet E-Surveys (CHERRIES)

Section/Topic	Checklist item	Reported on page No
Design	Describe survey design: Describe target population, sample frame. Is the sample a convenience sample? (In "open" surveys this is most likely.)	6–7
IRB (Institutional Review Board) approval and informed consent process	IRB approval: Mention whether the study has been approved by an IRB.	19
	Informed consent: Describe the informed consent process. Where were the participants told the length of time of the survey, which data were stored and where and for how long, who the investigator was, and the purpose of the study?	Previously published in Caterson et al, page 3 (left column), lines 37–40 and supplement pg. 2, lines 6–9
	Data protection: If any personal information was collected or stored, describe what mechanisms were used to protect unauthorized access.	Previously published in Caterson et al, supplement pg. 2, lines 30–38
Development and pre-testing	Development and testing: State how the survey was developed, including whether the usability and technical functionality of the electronic questionnaire had been tested before fielding the questionnaire.	In brief on pages 7 and 8. Previously published in detail in Caterson et al, pg. 3, lines 20–25 (left column)
Recruitment process and description of the sample having access to the questionnaire	Open survey versus closed survey: An "open survey" is a survey open for each visitor of a site, while a closed survey is only open to a sample which the investigator knows (password-protected survey).	Previously published in Caterson et al, pg. 3, lines 30–32 (left column) and supplement pg. 2, lines 4–5 and pg 26, 27
	Contact mode: Indicate whether or not the initial contact with the potential participants was made on the Internet. (Investigators may also send out questionnaires by mail and allow for Web-based data entry.)	6
	Advertising the survey: How/where was the survey announced or advertised? Some examples are offline media (newspapers), or online (mailing lists – If yes, which ones?) or banner ads	Previously published in detail in Caterson et al,

	(Where were these banner ads posted and what did they look like?). It is important to know the wording of the announcement as it will heavily influence who chooses to participate. Ideally the survey announcement should be published as an appendix.	supplement pg. 26, 27
Survey administration	<p>Web/E-mail: State the type of e-survey (eg, one posted on a Web site, or one sent out through e-mail). If it is an e-mail survey, were the responses entered manually into a database, or was there an automatic method for capturing responses? <i>“Respondents were recruited via online panel companies (via e-mail) to whom they had given permission to be contacted for research purposes, and completed the survey in English. All respondents provided electronic informed consent prior to initiation of the screening questions and survey.”</i></p> <p>Context: Describe the Web site (for mailing list/newsgroup) in which the survey was posted. What is the Web site about, who is visiting it, what are visitors normally looking for? Discuss to what degree the content of the Web site could pre-select the sample or influence the results. For example, a survey about vaccination on a anti-immunization Web site will have different results from a Web survey conducted on a government Web site</p> <p>Mandatory/voluntary: Was it a mandatory survey to be filled in by every visitor who wanted to enter the Web site, or was it a voluntary survey?</p> <p>Incentives: Were any incentives offered (eg, monetary, prizes, or non-monetary incentives such as an offer to provide the survey results)?</p> <p>Time/Date: In what timeframe were the data collected? <i>“KJT Group managed the acquisition and analysis of data; UK responses were collected between September and October 2018.”</i></p> <p>Randomization of items or questionnaires: To prevent biases items can be randomized or alternated.</p> <p>Adaptive questioning: Use adaptive questioning (certain items, or only conditionally displayed based on responses to other items) to reduce number and complexity of the questions.</p>	<p>In brief on pg. 6. Previously published in detail in Caterson et al, supplement pg. 2 lines 35, 36</p> <p>Not applicable</p> <p>Previously published in Caterson et al, supplement pg. 2, line 9</p> <p>Previously published in Caterson et al, pg 3, line 46 (left column) and supplement pg. 2, lines 15–17</p> <p>7</p> <p>7</p> <p>Previously published in Caterson et al, supplement pg. 2, lines 26–27</p>

1		Number of Items: What was the number of questionnaire items per page? The number of items is an important factor for the completion rate.	Previously published in Caterson et al, supplement pg. 2, lines 27–28
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5		Number of screens (pages): Over how many pages was the questionnaire distributed? The number of items is an important factor for the completion rate.	Previously published in Caterson et al, supplement pg. 2, line 27
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9		Completeness check: It is technically possible to do consistency or completeness checks before the questionnaire is submitted. Was this done, and if “yes”, how (usually JavaScript)? An alternative is to check for completeness after the questionnaire has been submitted (and highlight mandatory items). If this has been done, it should be reported. All items should provide a non-response option such as “not applicable” or “rather not say”, and selection of one response option should be enforced.	Previously published in Caterson et al, supplement pg. 2, lines 29–30
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17		Review step: State whether respondents were able to review and change their answers (eg, through a Back button or a Review step which displays a summary of the responses and asks the respondents if they are correct).	Previously published in Caterson et al, supplement pg. 2, lines 29–30
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22	Response rates	Unique site visitor: If you provide view rates or participation rates, you need to define how you determined a unique visitor. There are different techniques available, based on IP addresses or cookies or both.	Previously published in Caterson et al, supplement pg. 2, lines 18–20
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27		View rate (Ratio of unique survey visitors/unique site visitors): Requires counting unique visitors to the first page of the survey, divided by the number of unique site visitors (not page views!). It is not unusual to have view rates of less than 0.1 % if the survey is voluntary. <i>“The response rate to the survey was 14% for PwO and 35% for HCPs”</i>	8
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32		Participation rate (Ratio of unique visitors who agreed to participate/unique first survey page visitors): Count the unique number of people who filled in the first survey page (or agreed to participate, for example by checking a checkbox), divided by visitors who visit the first page of the survey (or the informed consents page, if present). This can also be called “recruitment” rate.	9 (Table 1 footnotes)
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37		Completion rate (Ratio of users who finished the survey/users who agreed to participate): The number of people submitting the last questionnaire page, divided by the number of people who agreed to participate (or submitted the first survey page). This is only relevant if there is a separate “informed consent” page or if the survey goes over several pages. This is a measure	9 (Table 1 footnotes)
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	for attrition. Note that “completion” can involve leaving questionnaire items blank. This is not a measure for how completely questionnaires were filled in. (If you need a measure for this, use the word “completeness rate”.)	
Preventing multiple entries from the same individual	Cookies used: Indicate whether cookies were used to assign a unique user identifier to each client computer. If so, mention the page on which the cookie was set and read, and how long the cookie was valid. Were duplicate entries avoided by preventing users access to the survey twice; or were duplicate database entries having the same user ID eliminated before analysis? In the latter case, which entries were kept for analysis (eg, the first entry or the most recent)?	In brief on pg. 7. Previously published in detail in Caterson et al, supplement pg. 2, lines 18–23
	IP check: Indicate whether the IP address of the client computer was used to identify potential duplicate entries from the same user. If so, mention the period of time for which no two entries from the same IP address were allowed (eg, 24 hours). Were duplicate entries avoided by preventing users with the same IP address access to the survey twice; or were duplicate database entries having the same IP address within a given period of time eliminated before analysis? If the latter, which entries were kept for analysis (eg, the first entry or the most recent)?	In brief on pg. 7. Previously published in detail in Caterson et al, supplement pg. 2, lines 18–23
	Log file analysis: Indicate whether other techniques to analyze the log file for identification of multiple entries were used. If so, please describe.	Not applicable
	Registration: In “closed” (non-open) surveys, users need to login first and it is easier to prevent duplicate entries from the same user. Describe how this was done. For example, was the survey never displayed a second time once the user had filled it in, or was the username stored together with the survey results and later eliminated? If the latter, which entries were kept for analysis (eg, the first entry or the most recent)?	In brief on pg. 7 Additional details published in Caterson et al, supplement pg. 2, lines 18–23
Analysis	Handling of incomplete questionnaires: Were only completed questionnaires analyzed? Were questionnaires which terminated early (where, for example, users did not go through all questionnaire pages) also analyzed?	Published previously in Caterson et al, supplement pg. 2, lines 28–30
	Questionnaire submitted with an atypical timestamp: Some investigators may measure the time people needed to fill in a questionnaire and exclude questionnaires that were submitted too soon. Specify the timeframe that was used as a cut-off point, and describe how this point was determined.	Previously published in Caterson et al, supplement pg. 3, lines 27–31
	Statistical correction: Indicate whether any methods such as weighting of items or propensity scores have been used to adjust for the non-representative sample; if so, please describe the methods.	In brief on page 7. Previously published in detail in Caterson et al,

		supplement pg. 4, lines 4–16
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4 Caterson ID, Alfadda AA, Auerbach P, et al. Gaps to bridge: misalignment between perception, reality and actions in obesity. *Diabetes Obes Metab* 2019;21:1914-1924.
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Changing the narrative around obesity in the UK: a survey of people with obesity and healthcare professionals from the ACTION-IO study

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Changing the narrative around obesity in the UK: a survey of people with obesity and healthcare professionals from the ACTION-IO study

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ABSTRACT

Objectives: To investigate the perceptions, attitudes, behaviours and potential barriers to effective obesity care in the UK using data collected from people with obesity (PwO) and healthcare professionals (HCPs) in the ACTION-IO study (NCT03584191).

Design: UK PwO (body mass index of ≥ 30 kg/m² based on self-reported height and weight) and HCPs who manage patients with obesity completed an online survey.

Results: In the UK, 1500 PwO and 306 HCPs completed the survey. Among the 47% of PwO who discussed weight with an HCP in the past 5 years, it took a mean of 9 years from the start of their struggles with weight until a discussion occurred. HCPs reported that PwO initiated 35% of weight-related discussions; PwO reported they initiated 47% of discussions. Most PwO (85%) assumed full responsibility for their own weight loss. The presence of obesity-related comorbidities was cited by 76% of HCPs as a top criterion for initiating weight management conversations. The perception of lack of interest (72%) and motivation (61%) in losing weight were reported as top reasons by HCPs for not discussing weight with a patient. Sixty-five percent of PwO liked their HCP bringing up weight during appointments. PwO reported complex and varied emotions following a weight loss conversation with an HCP, including supported (36%), hopeful (31%), motivated (23%), and embarrassed (17%). Follow-up appointments were scheduled for 19% of PwO after a weight discussion despite 62% wanting follow-up.

Conclusions: The current narrative around obesity requires a paradigm shift in the UK to address the delay between PwO struggling with their weight and discussing weight with their HCP. Perceptions of lack of patient interest and motivation in weight management must be challenged along with the blame culture of individual responsibility that is prevalent throughout society. While PwO may welcome weight-related conversations with an HCP, they evoke complex feelings, demonstrating the need for sensitivity and respect in these conversations.

Trial registration: ClinicalTrials.gov NCT03584191

Strengths and limitations of this study:

- Strengths include the scientific rigour in the study design and implementation
- The large number of UK PwO and HCP respondents and the ability to directly compare the UK data to the equivalent global dataset is an additional strength
- Limitations of this study include possible response bias from the population sampled and recall bias

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BACKGROUND

The causes of obesity are complex and multifaceted, encompassing biological, genetic, environmental, economic, social, and psychological factors.¹⁻³ The chronic and relapsing nature of obesity is associated with many serious physical and psychological comorbidities, reduced quality of life and increased healthcare costs.^{2 4-8} The World Health Organization (WHO) has recognised obesity as a disease, and the National Institute for Health and Care Excellence (NICE) provides guidance on its assessment and treatment.⁹ More recently it has been recognised as a risk factor for severity of COVID-19 infection.^{5,6} The prevalence of overweight and obesity among adults in the UK has been increasing and was 63% in 2018.⁷ This increase is thought to be primarily caused by people's latent biological susceptibility interacting with a changing environment that includes more sedentary lifestyles and increased dietary abundance.¹ The prevalence of adiposity in the UK population is approaching similar levels to those reported in the US (71%), Chile (74%), and Mexico (75%), which are among the highest recorded adult overweight and obesity levels in the world.⁸ The number of people with obesity (PwO) in the UK continues to rise, and severe and complex obesity (body mass index [BMI] ≥ 40 kg/m²) increased from less than 1% of the total population in 1993 to nearly 4% in 2017.¹⁰ The UK-wide National Health Service (NHS) costs attributable to overweight and obesity are projected to reach £9.7 billion by 2050, with wider societal costs estimated to reach £49.9 billion per year.¹¹ The significant increase in the prevalence of obesity has not been matched by a proportionate expansion of continuing education on the biological basis and clinical management of obesity and training provision for healthcare professionals (HCPs), irrespective of their discipline.¹² Moreover, little effort has been made to address weight stigma and societal effects of weight bias, which continue to be experienced in a consistently negative way by those who have excess weight or obesity. Current evidence demonstrates that weight stigma is widespread in the UK,¹³ that weight stigma is experienced in many settings,^{14 15} and that

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3 experience of stigma is associated with negative psychosocial outcomes, increased eating,
4 reduced engagement with physical activity, and weight gain.¹⁶
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9 The variability of causal pathways of weight gain is inherently unsuited to a 'one size fits all'
10 treatment approach.¹ There is a range of existing guidance to support practice and care
11 throughout the obesity care pathway in the UK.^{9 17} However, the extent and range of the
12 provision of weight management services is inconsistent and geographically dependent.¹⁸ The
13 obesity care pathway has an important role within the whole systems approach to tackling
14 obesity, as outlined in the Foresight report,¹ and endorsed in the Department of Health and
15 Social Care (DHSC) Call to Action¹⁹ and the Public Health England paper on a whole systems
16 approach to obesity.²⁰ The DHSC clinical policy outlines a tiered system of obesity care with a
17 focus on public health and community advice in tier 1; primary care, community interventions
18 and pharmacotherapy in tier 2; multi-disciplinary weight management service in tier 3; and
19 secondary care and bariatric surgery in tier 4.²¹
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35 Despite its wide global prevalence, obesity remains poorly understood by the general public and
36 HCPs, and this contributes to the high levels of stigma associated with obesity.²² Society is
37 continually informed through intense media coverage that obesity is simple and easily
38 manipulated.²³ This attitude contributes to greater perceptions of individual responsibility,
39 contrary to evidence that suggests that many factors outside a person's control influence
40 obesity.^{22 23} To improve the quality and accessibility of obesity care, a better understanding of
41 the disease and the gaps between current and optimal obesity management strategies is
42 required. The Awareness, Care, and Treatment In Obesity maNagement – International
43 Observation (ACTION-IO) study (NCT03584191) assessed the perceptions, attitudes, and
44 behaviours of PwO and HCPs.²⁴ The global dataset²⁴ revealed a need to increase
45 understanding of obesity and improve education concerning its aetiology. The aim of this sub-
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3 analysis was to identify the perceptions, attitudes, behaviours, and potential barriers to effective
4 obesity care in the UK.
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9 **METHODS**

10 **Study design and participants**

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12 The ACTION-IO study was a cross-sectional, non-interventional study that collected data via an
13 online survey in Australia, Chile, Israel, Italy, Japan, Mexico, Saudi Arabia, South Korea, Spain,
14 the UK, and the United Arab Emirates. The full methods for the ACTION-IO study have been
15 reported previously.²⁴ Eligible PwO in the UK were 18 years or older, with a current BMI of at
16 least 30 kg/m² based on self-reported height and weight. The PwO sample was targeted for
17 demographic representativeness based on gender, age, income, race/ethnicity, and region.
18 Therefore, PwO were excluded if they declined to provide any of these variables. Respondents
19 were also excluded for non-obesity reasons for high BMI or dramatic weight loss, i.e. if they
20 were pregnant, participated in intense fitness or body building programmes, or had significant,
21 unintentional weight loss in the past 6 months. Eligible UK HCPs were in practice for 2 years or
22 more, with at least 70% of their time spent in direct patient care, and who had seen 100 or more
23 patients in the past month, at least 10 of whom had a BMI of at least 30 kg/m². HCPs
24 specialising in general, plastic, or bariatric surgery were excluded. Respondents were recruited
25 via online panel companies (via e-mail) to whom they had given permission to be contacted for
26 research purposes, and completed the survey in English. All respondents provided electronic
27 informed consent prior to initiation of the screening questions and survey. Preceding
28 participation, PwO were only informed of the purpose of the study, and were blinded to the
29 specific study goals.
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55 **Survey development and procedures**

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3 The study was designed by an international steering committee of obesity experts (representing
4 primary care, endocrinology, and psychology, and including three medical doctors employed by
5 Novo Nordisk), with support from KJT Group (Honeoye Falls, NY, US), and based on the
6 ACTION US and Canada questionnaires.^{25 26} KJT Group managed the acquisition and analysis
7 of data; UK responses were collected between September and October 2018. Questionnaire
8 items were carefully phrased and presented in identical order for each respondent. Items in a
9 list were displayed in alphabetical, categorical, chronological, or random order as relevant for
10 each response. Respondents accessed the survey using a unique web link, details regarding
11 the digital fingerprinting system used to assess unique site visitors has been previously
12 described.²⁴ To prevent duplicate survey entries, unique site visitors were recorded via a user ID
13 that was passed along the unique web link that respondents used to access the site. The
14 system checked every respondent entering the survey against previous user IDs logged in its
15 database. Respondents who began the survey and suspended were able to re-enter the survey
16 while it was still open and finish the survey where they left off. Respondents who had already
17 received a terminal status (complete, over-quota, or terminate) were blocked from re-entering
18 the survey. Following closure of the survey, no users were able to gain access. The user ID and
19 data of suspended respondents were stored until the survey was closed and were then
20 eliminated from the data analysis. The study was conducted in accordance with the Guidelines
21 for Good Pharmacoepidemiology Practices²⁷ and is registered with ClinicalTrials.gov, number
22 NCT03584191.
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47 To ensure representativeness to the general population, the final PwO sample was weighted to
48 demographic targets within each country for age, gender, income, race/ethnicity, and region.
49 The HCP data were not weighted. Only data from those who completed the survey were
50 included in the analyses.
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Patient and public involvement

No patients or members of the public were involved in the design or conduct of the study. A patient representative was involved in the analysis and interpretation of the UK data and is an author on this article. She will also be involved in disseminating these findings to a wider audience.

RESULTS

Demographics

A total of 69,676 PwO and 2,508 HCPs, in the UK, were invited. The response rate to the survey was 14% (9786/69,676) for PwO and 35% (886/2508) for HCPs, as expected for this type of study and in line with the target sample size.²⁴ Of those who completed the screening questions, the eligibility rate was 22% (2146/9779) for PwO and 53% (387/737) for HCPs. The final UK sample for the ACTION-IO survey was 1500 PwO and 306 HCPs, of whom 156 were primary care professionals (PCPs) and 150 were secondary care professionals (SCPs) (table 1). Some differences were observed in the survey outcomes between PCPs and SCPs, which will be reported in full at a later date.

Table 1 Sample demographics and characteristics

	UK PwO (n=1500)	HCPs (n=306)
Recruitment and qualification*		
Total survey invitations sent	69,676	2508
Respondents	9786	886
Respondents who completed screening questions	9779	737
Respondents who qualified	2146	387
Respondents who qualified and completed validated survey	1500	306

Age, years (range)	55.7 (19–88)	48.9 (28–68)
Gender, n (%)		
Male	687 (45.8%)	225 (73.5%)
Female	811 (54.1%)	81 (26.5%)
Other	2 (0.1%)	-
BMI classification, n (%)		
Respondents [†]	1500 (100%)	236 (77.1%)
Underweight or healthy range (<25 kg/m ²)	-	152 (64.4%)
Overweight (25–29.9 kg/m ²)	-	72 (30.5%)
Obesity Class I (30–34.9 kg/m ²)	883 (56.2%)	7 (3.0%)
Obesity Class II (35–39.9 kg/m ²)	333 (22.4%)	2 (0.9%)
Obesity Class III (≥40 kg/m ²)	284 (21.4%)	3 (1.3%)
Number of comorbidities, n (%)		
0	264 (16.9%)	-
1	360 (25.0%)	-
2	330 (22.2%)	-
3	257 (16.0%)	-
≥4	289 (20.0%)	-
HCP category, n (%)		306 (100%)
PCP	-	156 (51.0%)
SCP	-	150 (49.1%)
Endocrinologist	-	43 (14.1%)
Cardiologist	-	51 (16.7%)
Obstetrician-gynaecologist	-	16 (5.2%)
Other	-	40 (13.1%)
Obesity specialist, [‡] n (%)		
Yes	-	162 (52.9%)
No	-	144 (47.1%)

All N sizes for PwO are from unweighted data. Demographic percentages (age, gender) are also from unweighted data. All non-demographic percentage results are for PwO weighted data. HCP data were not weighted, therefore N sizes and percentages are all unweighted data.

*Participation rate (those who completed the screener) was 99.9% for PwO and 84.7% for HCPs; completion rate was 100% for PwO and 85.8% for HCPs.

†Disclosure of height and weight was optional for HCPs. The percentages for the BMI categories were calculated using the number of respondents to this question as the denominator.

‡A physician who meets at least one of the following criteria: at least 50% of their patients are seen for obesity/weight management; or has advanced/formal training in treatment of obesity/weight management beyond medical school; or considers themselves to be an expert in obesity/weight loss management, or works in an obesity service clinic.²⁴

BMI, body mass index; HCP, healthcare professional; PCP, primary care professional; PwO, people with obesity; SCP, secondary care professional.

Pre-consultation and initiation of weight management discussion

People with obesity

Only about half (47%) of all PwO had discussed excess weight or losing weight with an HCP in the past 5 years. It took a median of 6 years and mean of 9 years (range 0.0–56.0 years; interquartile range 13) between the time when PwO said they first started struggling with excess weight or obesity and when they first had a weight management conversation with an HCP (figure 1A). In comparison, globally it took a median of 3 years and mean of 6 years (range 0.0–68.0 years; interquartile range 8 [figure 1A]).²⁴ Forty-seven percent of PwO who discussed weight with an HCP reported that they initiated the conversation themselves. When PwO were asked to name the top five reasons why they may not discuss weight management with their HCP, the most common reason was the belief that it was their own responsibility to manage their weight (51% of PwO) (figure 1B). Indeed, when asked whether they agreed with the statement “my weight loss is completely my responsibility”, 85% of PwO agreed with the statement. Thirty-four percent of PwO said that they were motivated to lose weight, and 36% provided a neutral response (neither agreed nor disagreed that they were motivated). Only 4% of PwO reported an indifference to losing weight as a reason for not discussing managing their

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3 weight with an HCP. Sixty-five percent of PwO who had previously had a weight conversation
4 with their HCP liked that their HCP discussed their weight with them, and 58% who had not
5 previously had a conversation would have liked their HCP to bring up weight during their
6 appointments. Most PwO (81%) believed that obesity has a large impact on overall health,
7 similar to other chronic diseases such as diabetes (82%), stroke (88%), cancer (82%), or
8 chronic obstructive pulmonary disease (COPD [84%]). The internet was cited as a source of
9 information used by 31% of PwO for managing weight (figure 2A). Other sources of information
10 were reported as family and friends (27%), weight loss programmes (26%), information from an
11 HCP (23%), and media (books/magazines 21%, television programmes 20%) (figure 2A).
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24 Healthcare professionals

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26 Those HCPs who discussed weight with their patients reported that 35% of the time the patient
27 initiated the conversation. Compared with PwO (85%), a smaller proportion of HCPs (33%)
28 placed the responsibility for weight loss on PwO. Only 13% of HCPs thought their patients were
29 motivated to lose weight, and 42% provided a neutral response (neither agreed nor disagreed
30 that their patients were motivated). The most commonly selected reason for not discussing
31 weight management with a patient (selected by 72% of HCPs) was the perception that the
32 patient was not interested in losing weight, and 61% of HCPs selected lack of patient motivation
33 (figure 1C). Other reasons provided for not discussing obesity with a patient were that the
34 appointments were not long enough and that they felt rushed (selected by 68% of HCPs), and
35 that more important health issues/concerns were an impediment to discussing obesity with a
36 patient (selected by 58% of HCPs). In addition, almost one third of HCPs (31%) reported that
37 the good health of a patient and absence of weight-related comorbidities would be a reason for
38 not discussing weight management. The most important criterion for initiating weight
39 management conversations with a patient was the presence of obesity-related comorbidities,
40 cited by 76% of HCPs. Only 68% of UK HCPs (vs 76% of global HCPs²⁴) recognised the impact
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3 of obesity on health, and it was rated as less serious than diabetes, cancer, stroke, or COPD by
4
5 40%, 65%, 62%, and 43% of UK HCPs, respectively.
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8 9 **Consultation**

10 11 People with obesity

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13 Eighty-one percent of the PwO who had discussed weight with an HCP had had a discussion
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15 with a PCP, 42% with a nurse, 18% with a dietitian/nutritionist, and 17% with a diabetes
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17 educator. PwO reported a complex mixture of feelings following a weight loss conversation with
18
19 an HCP (figure 2B). PwO cited a combination of feelings such as supported 36%, hopeful 31%,
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21 motivated 23%, embarrassed 17%, indifferent 16%, discouraged 11%, relieved 10%, blamed
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23 10%, rushed 10%, offended 4%, and confused 4% (figure 2B).
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28 29 Healthcare professionals

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31 Fifty-nine percent of HCPs reported that they were extremely or very comfortable discussing
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33 weight, 30% were neither comfortable nor uncomfortable, and 11% were a little or not at all
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35 comfortable discussing weight. On average, HCPs reported that they spent 10 minutes
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37 interacting with their patients when discussing weight (range 1–20 minutes).
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41 42 **Consultation outcomes and follow-up**

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46 Among the 47% of PwO who had discussed their weight with an HCP in the past 5 years, 49%
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48 reported that they had been diagnosed with obesity in the past by an HCP (24% of all PwO,
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50 figure 3). Only 19% of PwO who had discussed their weight with an HCP had a follow-up
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52 appointment scheduled (9% of all PwO) (figure 3). However, 62% of PwO would have liked a
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54 follow-up appointment and 96% reported attending or planning to attend a follow-up
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56 appointment if scheduled. The most frequent methods for managing weight tried by PwO were
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3 general improvements in eating habits/reducing calories (reported by 61% of PwO) and general
4 increases in physical activity (55%), which were reported at a greater frequency than by global
5 PwO (51% and 39% for general eating habits and physical activity, respectively; ACTION-IO
6 study steering committee, personal communication). Bariatric surgery and behavioural therapy
7 referral rates were reported in small numbers by UK PwO (1% and 2%, respectively). Visits to a
8 nutritionist/dietician and obesity specialist were reported less frequently by UK PwO than global
9 PwO (nutritionist/dietician: 11% UK, 24% global; obesity specialist: 2% UK, 9% global; ACTION-
10 IO study steering committee, personal communication).
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22 Healthcare professionals

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24 On average, HCPs scheduled follow-up appointments with 33% of their patients for obesity and
25 46% of HCPs said patients kept these follow-up appointments always or most of the time. HCPs
26 most frequently recommended general improvements in eating habits/reducing calories
27 (reported by 61% of HCPs) and general increases in physical activity (65%). Referrals to obesity
28 specialists were recommended less frequently by UK HCPs (12%) compared with the global
29 dataset (23%).²⁴
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40 DISCUSSION

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43 PwO are faced with biological predispositions, and societal and environmental conditions that
44 contribute to obesity, weight stigma, and discrimination. Obesity prevention and management
45 are key health priorities and require a whole systems approach. However, the national response
46 for obesity focuses on individual responsibility regarding nutrition and lack of physical activity. In
47 this study, multiple barriers to effective weight management were identified, which are
48 summarised in figure 4 and discussed below.
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Initiation of weight management discussion with healthcare professionals

Fewer than half of PwO in the UK (47%) had a discussion with an HCP about their weight in the past 5 years,²⁴ despite HCPs being the gateway to weight management care in the NHS. Moreover, for the PwO who did have a weight discussion, it took a mean of 9 years after they first started struggling with their weight before having the discussion (compared with 6 years globally).²⁴ This delay is particularly important as it may create an opportunity for significant obesity-related complications to develop. This long delay may also reflect a higher degree of obesity stigma in the UK²⁸ and a culture of individual responsibility for obesity.^{29 30} Indeed, a focus on individual responsibility is reflected in UK government policy on obesity.³¹ Reducing the time gap by initiating earlier weight management discussions may be an effective strategy for improving obesity treatment and preventing the development of comorbidities.

From the PwO perspective, a delay in seeking help could be linked to the high percentage (85%) of PwO who perceived their weight loss as completely their responsibility. From the HCP perspective, a delay in discussing obesity with a patient could be linked to reported perceptions that the patient was not interested or motivated in losing weight, consistent with previous research.^{32 33} Other impediments to the discussion were HCPs' views that there were more important health issues to discuss and that a weight management discussion is only required when weight-related comorbidities are present, as supported by other studies.^{33 34} Moreover, HCPs in the UK underestimated the effect of obesity on health to a greater extent than UK PwO and global HCPs.²⁴ For PwO this will likely require a change in the narrative around obesity to lessen focus on individual responsibility, and for HCPs a need to increase the understanding of the health consequences of obesity and the desire of PwO for help and support. The internet, media, and family and friends formed a substantial source of information for PwO for managing

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3 weight. We need to change this from personal responsibility to recognising the aetiology of
4 obesity and its implications for PwO.
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9 **Consultation**

10 Primary care is the gateway to obesity treatment, and most weight management discussions
11 were held with a primary care physician or nurse. While many PwO welcomed weight
12 discussions with HCPs, they also reported experiencing complex and varied emotions after
13 these discussions. It is important to acknowledge the complexity of the experience for PwO.
14 Studies have previously reported patients feeling that their obesity had been ignored, dismissed,
15 distorted, or attributed as the explanation of all their health problems by HCPs.³⁵⁻³⁷ Negative
16 experiences can contribute to depression, anxiety, low self-esteem, and body dissatisfaction.³⁸
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18 ³⁹ Dissatisfactory conversations with an HCP may discourage PwO from seeking further weight
19 management help in the future and reinforce feelings of personal responsibility for weight
20 management. The attitudes of health professionals towards obesity and its management have
21 been generally reported to be negative, and knowledge and skills in managing obesity have
22 been noted to be inconsistent.⁴⁰⁻⁴⁵ Even well-intended acts can cause offence and humiliation,⁴⁶
23 and PwO often experience their weight in profoundly negative ways as a result of the pervasive
24 stigmatisation of obesity. Patient experiences are valid indications of the strengths and
25 shortcomings of the services they receive.⁴⁷ It is important to ensure that the narrative around
26 obesity resonates with the lived experiences of those affected by it and encourages patients to
27 engage with an HCP.⁴⁷ HCPs in turn should aim to provide compassionate care that is free of
28 bias and use supportive communication and language to facilitate successful and meaningful
29 conversations.⁴⁷
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54 HCPs often have limited time and resources, and lack of time has previously been reported as a
55 barrier to discussing obesity.^{48 49} More HCPs in the UK (68%) than globally (54%) indicated that
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3 the limited appointment time would be a factor in not having a weight loss conversation.²⁴ This
4 may be a reflection of the average primary care consultation time in the UK, which is 10 minutes
5 and considerably shorter than in many other countries.^{50 51} Other potential barriers described in
6 the literature have included uncertainty about appropriate language,⁴⁸ concerns about
7 compromising rapport,⁹ and concerns discussing a potentially upsetting and stigmatising topic.²²
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14 ^{50 52} However, in this study relatively few HCPs reported discomfort with weight discussions.

18 **Consultation outcomes and follow-up**

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20 Obesity diagnoses, follow-up appointments, and referrals to specialists were infrequently
21 reported by PwO, which could incorrectly reinforce the feeling of individual responsibility.
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23 Indeed, methods for managing weight reported by PwO, which relied largely on general
24 improvements in eating habits and physical activity, suggest a lack of knowledge of effective
25 treatment methods and/or a consequence of the availability of therapeutic options (see below).
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33 The data from HCPs on the frequency of follow-up appointments and methods for obesity
34 management largely aligned with the data from PwO. Barriers to effective weight management
35 cited in the literature have included lack of effective and individualised treatment and/or referral
36 options.^{40 41 50 53} Weight management services in the UK exist as part of fragmented health and
37 social care systems, which are geographically dependent.^{49 54 55} The range of services and
38 treatments, including pharmacotherapy and bariatric surgery, is limited in the UK, which may
39 restrict HCPs in what they can offer patients. Indeed, HCPs report insufficient management
40 options and scepticism about their efficacy.^{56 57} This is further compounded by limited
41 consultation times for UK GPs.^{50 51} The limited availability of weight management services,
42 effective treatments and coherent, joined-up strategies in the UK health system are significant
43 barriers to providing effective obesity care.⁵⁵
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Strengths and limitations

Strengths of this study include scientific rigour in the study design (including carefully phrased and ordered questions to prevent biased responses, blinded purpose of the survey for PwO, and determination of eligibility by initial screening questions to eradicate bias during recruitment) and implementation (including stratified sampling to provide a representative cohort of the general population and rigorous data analysis). Other strengths include the large number of UK PwO and HCP respondents and the ability to directly compare the UK data to the equivalent global dataset. Limitations include the cross-sectional design and reliance on accurate reporting from the PwO and HCP respondents, which could be perceived as recall bias. The self-reported height and weight could underestimate the BMI of the PwO. A higher proportion of HCPs than might be expected self-identified as obesity specialists using the broad criteria specified in table 1. The low response rates could affect sample representativeness and is a known limitation for this type of study. Response bias from the population sampled cannot be ruled out. However, the PwO sample was representative of the demographics of the general population.

Conclusion

This study demonstrates the need to change the narrative around obesity, with less stigmatising focus on individual responsibility, for the government, commissioners, general public, PwO, and HCPs. The findings identified areas that prevent PwO from seeking help and receiving appropriate care. In addition, the attitudes of HCPs prevent them from offering the support PwO require for obesity management. The consultation about weight with an HCP is the gateway to treatment in the NHS and improving the frequency and quality of PwO–HCP conversations is essential. Sufficient time should be given to HCPs to approach the topic of overweight and obesity sensitively and effectively. The current survey did not have high numbers of people with a BMI of over 40 kg/m²; further research is required to understand whether people with higher BMIs have distinct experiences in the management of their obesity.

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5 To conclude, a whole systems approach is required to address and eliminate weight bias and
6 stigmatisation, to change the narrative around obesity in the UK, and to improve provision of
7 NHS services. Educating the whole population, including PwO and HCPs, about the aetiology
8 and psychology of obesity and the interaction with the obesogenic environment should help to
9 ensure that patients access and receive quality care and effective weight treatment and
10 management. Changing the narrative around obesity will allow for a more effective delivery
11 framework for health service providers and greater access to effective treatment pathways and
12 weight management services for PwO.
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Contributors

CAH and JCGH are members of the ACTION-IO study steering committee and contributed to the design of the study. CAH, ALA, HK, BMM, HMP, AV and JCGH participated in the interpretation of data, and drafting and revision of the manuscript. All authors reviewed and approved the final, submitted version.

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Competing interests

CAH reports financial support from Novo Nordisk to attend an obesity conference during the conduct of the study, grants from the Rona Marsden Fund at Fakenham Medical Practice, and personal fees from Orexigen Therapeutics, Consilient Health, Nestlé, Ethicon, and Alva outside the submitted work. ALA reports grants from UKRI Medical Research Council and National Institute for Health Research, and non-financial support from WW (formerly Weight Watchers). HK is an employee of Novo Nordisk and owns shares in Novo Nordisk. BMM reports grants paid to her institution from Novo Nordisk and personal fees (consultancy and advisory board) from Novo Nordisk, Boehringer Ingelheim, and Orexigen Therapeutics; BMM has received speaker fees for Eli Lilly, Novo Nordisk, Boehringer Ingelheim, Janssen, MSD, and Sanofi. HMP reports grants from the National Institute for Health Research and Public Health England and an honorarium from Novo Nordisk (educational grant) outside the submitted work. AV acted as a speaker for Obesity Empowerment Network and is a board member of the Clinical Advisory Committee on the All Wales Obesity Strategy. JCGH reports fees (honoraria) paid to the

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2
3 University of Liverpool from Novo Nordisk, Orexigen, and Boehringer Ingelheim during the
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5 conduct of the study.
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9 10 **Ethics approval**

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12 The National Health Service Health Research Authority (London – Central Research Ethics
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14 Committee) advised that ethical approval was not needed in the UK.
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18 19 **Transparency statement**

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22 CAH affirms that the manuscript is an honest, accurate, and transparent account of the study
23
24 being reported; that no important aspects of the study have been omitted; and that any
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26 discrepancies from the study as originally planned have been explained.
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30 31 **Data sharing**

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33 Deidentified participant data will be made available for this Article on a specialised SAS data
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35 platform. Datasets from Novo Nordisk will be available permanently after completion of data
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37 analysis. Access to data can be made through a request proposal form and the access criteria
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39 can be found online (novonordisk-trials.com). Data will be shared with bona fide researchers
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41 submitting a research proposal requesting access to data. Data use is subject to approval by
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43 the Independent Review Board.
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48 49 **Dissemination declaration**

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51 Dissemination of the results to study participants and/or patient organisations is not applicable
52
53 for this non-interventional, survey study.
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TABLE AND FIGURE LEGENDS

Table 1 Sample demographics and characteristics.

Figure 1 Number of years between when struggle with weight began and first discussed with an HCP and PwO/HCP reasons for not discussing weight management. **(A)** Approximate number of years reported by UK and global PwO (ACTION-IO study steering committee, personal communication) between the beginning of their struggle with weight and first discussion with an HCP. Calculated at respondent level from questions “Approximately how old were you when you first remember struggling with excess weight or obesity?” and “Approximately how old were you when a healthcare provider first discussed your excess weight or recommended that you lose weight?”. **(B)** Reasons reported by UK PwO for not discussing managing their weight with an HCP. **(C)** Reasons reported by UK HCPs for not discussing weight management with their patients.

HCP, healthcare professional; PwO, people with obesity.

Figure 2 Sources of information and feelings after a weight discussion. **(A)** Sources of information most frequently used by UK PwO for managing weight (reported by PwO). **(B)** Feelings reported by UK PwO after their most recent weight or weight loss discussion with an HCP in the past 5 years.

HCP, healthcare professional; PwO, people with obesity.

Figure 3 Obesity diagnoses and follow-up appointments with an HCP. Proportion of UK PwO who discussed weight or weight loss with an HCP in the past 5 years and the frequency of obesity diagnoses and follow-up appointments.

HCP, healthcare professional; PwO, people with obesity.

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5 **Figure 4** A conceptual model of the obesity treatment pathway and barriers to obesity care in
6 the UK.

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8 BMI, body mass index; HCP, healthcare professional; PwO, people with obesity.
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Figure 1

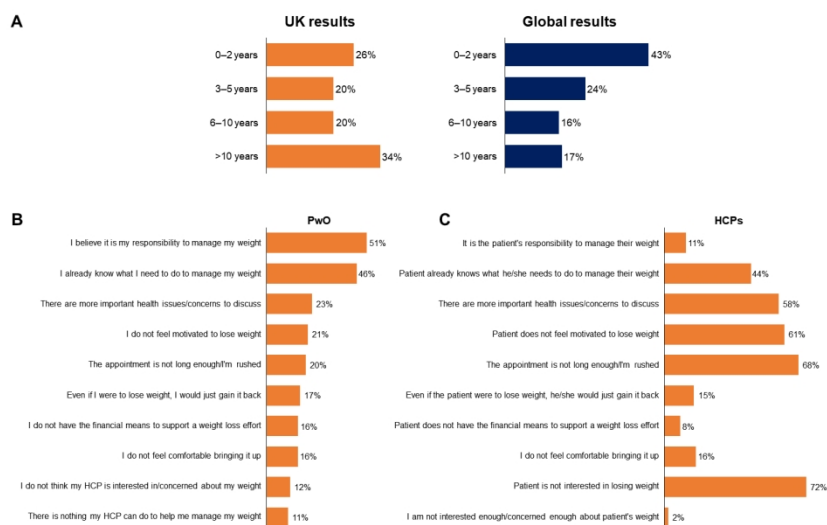


Figure 1 Number of years between when struggle with weight began and first discussed with an HCP and PwO/HCP reasons for not discussing weight management. **(A)** Approximate number of years reported by UK and global PwO (ACTION-IO study steering committee, personal communication) between the beginning of their struggle with weight and first discussion with an HCP. Calculated at respondent level from questions “Approximately how old were you when you first remember struggling with excess weight or obesity?” and “Approximately how old were you when a healthcare provider first discussed your excess weight or recommended that you lose weight?”. **(B)** Reasons reported by UK PwO for not discussing managing their weight with an HCP. **(C)** Reasons reported by UK HCPs for not discussing weight management with their patients. HCP, healthcare professional; PwO, people with obesity.

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Figure 2

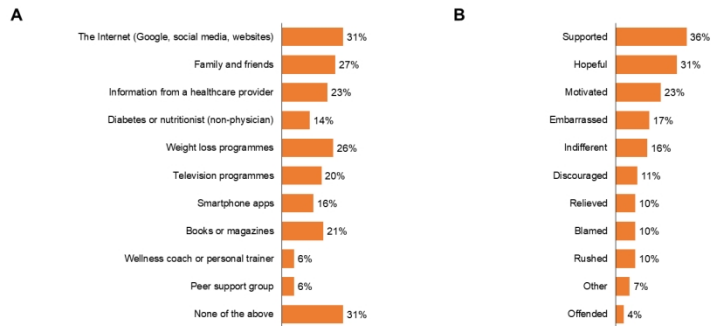


Figure 2 Sources of information and feelings after a weight discussion. **(A)** Sources of information most frequently used by UK PwO for managing weight (reported by PwO). **(B)** Feelings reported by UK PwO after their most recent weight or weight loss discussion with an HCP in the past 5 years. HCP, healthcare professional; PwO, people with obesity.

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Figure 3

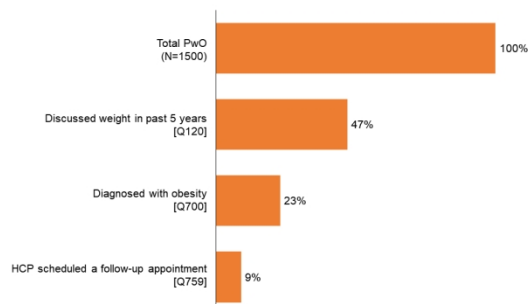


Figure 3 Obesity diagnoses and follow-up appointments with an HCP. Proportion of UK PwO who discussed weight or weight loss with an HCP in the past 5 years and the frequency of obesity diagnoses and follow-up appointments. HCP, healthcare professional; PwO, people with obesity.

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Figure 4

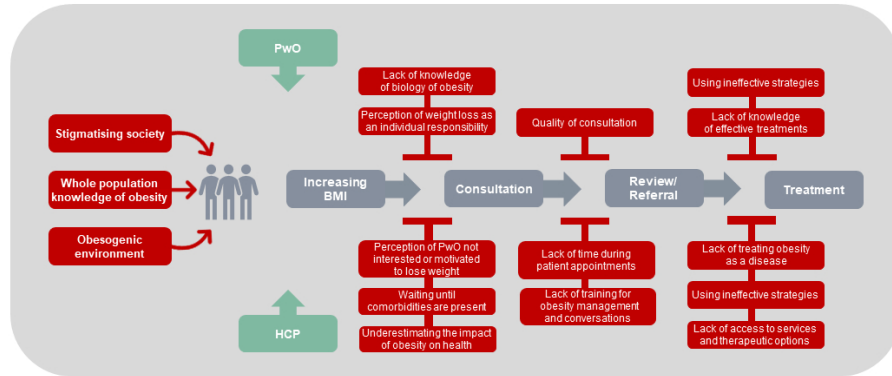


Figure 4 A conceptual model of the obesity treatment pathway and barriers to obesity care in the UK. BMI, body mass index; HCP, healthcare professional; PwO, people with obesity.

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Checklist for Reporting Results of Internet E-Surveys (CHERRIES)

Section/Topic	Checklist item	Reported on page No
Design	Describe survey design: Describe target population, sample frame. Is the sample a convenience sample? (In "open" surveys this is most likely.)	6–7
IRB (Institutional Review Board) approval and informed consent process	IRB approval: Mention whether the study has been approved by an IRB.	19
	Informed consent: Describe the informed consent process. Where were the participants told the length of time of the survey, which data were stored and where and for how long, who the investigator was, and the purpose of the study?	Previously published in Caterson et al, page 3 (left column), lines 37–40 and supplement pg. 2, lines 6–9
	Data protection: If any personal information was collected or stored, describe what mechanisms were used to protect unauthorized access.	Previously published in Caterson et al, supplement pg. 2, lines 30–38
Development and pre-testing	Development and testing: State how the survey was developed, including whether the usability and technical functionality of the electronic questionnaire had been tested before fielding the questionnaire.	In brief on pages 7 and 8. Previously published in detail in Caterson et al, pg. 3, lines 20–25 (left column)
Recruitment process and description of the sample having access to the questionnaire	Open survey versus closed survey: An "open survey" is a survey open for each visitor of a site, while a closed survey is only open to a sample which the investigator knows (password-protected survey).	Previously published in Caterson et al, pg. 3, lines 30–32 (left column) and supplement pg. 2, lines 4–5 and pg 26, 27
	Contact mode: Indicate whether or not the initial contact with the potential participants was made on the Internet. (Investigators may also send out questionnaires by mail and allow for Web-based data entry.)	6
	Advertising the survey: How/where was the survey announced or advertised? Some examples are offline media (newspapers), or online (mailing lists – If yes, which ones?) or banner ads	Previously published in detail in Caterson et al,

1 2 3	(Where were these banner ads posted and what did they look like?). It is important to know the wording of the announcement as it will heavily influence who chooses to participate. Ideally the survey announcement should be published as an appendix.	supplement pg. 26, 27
4 5 6 7 8 9 10 11 12	Survey administration Web/E-mail: State the type of e-survey (eg, one posted on a Web site, or one sent out through e-mail). If it is an e-mail survey, were the responses entered manually into a database, or was there an automatic method for capturing responses? <i>“Respondents were recruited via online panel companies (via e-mail) to whom they had given permission to be contacted for research purposes, and completed the survey in English. All respondents provided electronic informed consent prior to initiation of the screening questions and survey.”</i>	In brief on pg. 6. Previously published in detail in Caterson et al, supplement pg. 2 lines 35, 36
13 14 15 16 17 18	Context: Describe the Web site (for mailing list/newsgroup) in which the survey was posted. What is the Web site about, who is visiting it, what are visitors normally looking for? Discuss to what degree the content of the Web site could pre-select the sample or influence the results. For example, a survey about vaccination on a anti-immunization Web site will have different results from a Web survey conducted on a government Web site	Not applicable
19 20 21 22 23	Mandatory/voluntary: Was it a mandatory survey to be filled in by every visitor who wanted to enter the Web site, or was it a voluntary survey?	Previously published in Caterson et al, supplement pg. 2, line 9
24 25 26 27 28 29	Incentives: Were any incentives offered (eg, monetary, prizes, or non-monetary incentives such as an offer to provide the survey results)?	Previously published in Caterson et al, pg 3, line 46 (left column) and supplement pg. 2, lines 15–17
30 31 32 33	Time/Date: In what timeframe were the data collected? <i>“KJT Group managed the acquisition and analysis of data; UK responses were collected between September and October 2018.”</i>	7
34 35 36	Randomization of items or questionnaires: To prevent biases items can be randomized or alternated.	7
37 38 39 40 41	Adaptive questioning: Use adaptive questioning (certain items, or only conditionally displayed based on responses to other items) to reduce number and complexity of the questions.	Previously published in Caterson et al, supplement pg. 2, lines 26–27

1		Number of Items: What was the number of questionnaire items per page? The number of items is an important factor for the completion rate.	Previously published in Caterson et al, supplement pg. 2, lines 27–28
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5		Number of screens (pages): Over how many pages was the questionnaire distributed? The number of items is an important factor for the completion rate.	Previously published in Caterson et al, supplement pg. 2, line 27
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9		Completeness check: It is technically possible to do consistency or completeness checks before the questionnaire is submitted. Was this done, and if “yes”, how (usually JavaScript)? An alternative is to check for completeness after the questionnaire has been submitted (and highlight mandatory items). If this has been done, it should be reported. All items should provide a non-response option such as “not applicable” or “rather not say”, and selection of one response option should be enforced.	Previously published in Caterson et al, supplement pg. 2, lines 29–30
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17		Review step: State whether respondents were able to review and change their answers (eg, through a Back button or a Review step which displays a summary of the responses and asks the respondents if they are correct).	Previously published in Caterson et al, supplement pg. 2, lines 29–30
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22	Response rates	Unique site visitor: If you provide view rates or participation rates, you need to define how you determined a unique visitor. There are different techniques available, based on IP addresses or cookies or both.	Previously published in Caterson et al, supplement pg. 2, lines 18–20
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27		View rate (Ratio of unique survey visitors/unique site visitors): Requires counting unique visitors to the first page of the survey, divided by the number of unique site visitors (not page views!). It is not unusual to have view rates of less than 0.1 % if the survey is voluntary. <i>“The response rate to the survey was 14% for PwO and 35% for HCPs”</i>	8
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32		Participation rate (Ratio of unique visitors who agreed to participate/unique first survey page visitors): Count the unique number of people who filled in the first survey page (or agreed to participate, for example by checking a checkbox), divided by visitors who visit the first page of the survey (or the informed consents page, if present). This can also be called “recruitment” rate.	9 (Table 1 footnotes)
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37		Completion rate (Ratio of users who finished the survey/users who agreed to participate): The number of people submitting the last questionnaire page, divided by the number of people who agreed to participate (or submitted the first survey page). This is only relevant if there is a separate “informed consent” page or if the survey goes over several pages. This is a measure	9 (Table 1 footnotes)
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	for attrition. Note that “completion” can involve leaving questionnaire items blank. This is not a measure for how completely questionnaires were filled in. (If you need a measure for this, use the word “completeness rate”.)	
Preventing multiple entries from the same individual	Cookies used: Indicate whether cookies were used to assign a unique user identifier to each client computer. If so, mention the page on which the cookie was set and read, and how long the cookie was valid. Were duplicate entries avoided by preventing users access to the survey twice; or were duplicate database entries having the same user ID eliminated before analysis? In the latter case, which entries were kept for analysis (eg, the first entry or the most recent)?	In brief on pg. 7. Previously published in detail in Caterson et al, supplement pg. 2, lines 18–23
	IP check: Indicate whether the IP address of the client computer was used to identify potential duplicate entries from the same user. If so, mention the period of time for which no two entries from the same IP address were allowed (eg, 24 hours). Were duplicate entries avoided by preventing users with the same IP address access to the survey twice; or were duplicate database entries having the same IP address within a given period of time eliminated before analysis? If the latter, which entries were kept for analysis (eg, the first entry or the most recent)?	In brief on pg. 7. Previously published in detail in Caterson et al, supplement pg. 2, lines 18–23
	Log file analysis: Indicate whether other techniques to analyze the log file for identification of multiple entries were used. If so, please describe.	Not applicable
	Registration: In “closed” (non-open) surveys, users need to login first and it is easier to prevent duplicate entries from the same user. Describe how this was done. For example, was the survey never displayed a second time once the user had filled it in, or was the username stored together with the survey results and later eliminated? If the latter, which entries were kept for analysis (eg, the first entry or the most recent)?	In brief on pg. 7 Additional details published in Caterson et al, supplement pg. 2, lines 18–23
Analysis	Handling of incomplete questionnaires: Were only completed questionnaires analyzed? Were questionnaires which terminated early (where, for example, users did not go through all questionnaire pages) also analyzed?	Published previously in Caterson et al, supplement pg. 2, lines 28–30
	Questionnaire submitted with an atypical timestamp: Some investigators may measure the time people needed to fill in a questionnaire and exclude questionnaires that were submitted too soon. Specify the timeframe that was used as a cut-off point, and describe how this point was determined.	Previously published in Caterson et al, supplement pg. 3, lines 27–31
	Statistical correction: Indicate whether any methods such as weighting of items or propensity scores have been used to adjust for the non-representative sample; if so, please describe the methods.	In brief on page 7. Previously published in detail in Caterson et al,

		supplement pg. 4, lines 4–16
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4 Caterson ID, Alfadda AA, Auerbach P, et al. Gaps to bridge: misalignment between perception, reality and actions in obesity. *Diabetes Obes Metab* 2019;21:1914-1924.
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