



Original Research

Evaluation of the reach and impact of a UK campaign highlighting obesity as a cause of cancer among the general public and Members of Parliament

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ABSTRACT

Objectives: 'Overweight and obesity' is the second biggest preventable cause of cancer after smoking. In 2018, Cancer Research UK launched an awareness raising campaign about the link between overweight and obesity and cancer risk. This study aimed to evaluate the reach and impact of the campaign.

Study design: This study was a repeated cross-sectional online survey.

Methods: The campaign consisted of six elements including the main message that 'Obesity is a cause of cancer'. UK adults and Members of Parliament (MPs) were surveyed before the campaign (W1; $n = 2124$ and $n = 151$), 1 month (W2; $n = 2050$ and $n = 151$) and 3 months after the campaign (W3; $n = 2059$ and MPs not surveyed). Outcome measures were campaign reach, awareness of overweight and obesity as risk factors for cancer, attitudes towards individuals who are overweight or obese, support for policies to reduce obesity and reactions to the campaign.

Results: Overall, 76.2% of MPs and just under half of the public (47.5% in W2 and 36.8% in W3) reported having seen the campaign. Unprompted awareness of obesity as a risk factor increased among the public from 17.1% at W1 to 43.3% in W2 (odds ratio 3.71, 95% confidence interval 3.18–4.33) and 30.3% in W3 (odds ratio 2.11, 95% confidence interval 1.80–2.47). A similar pattern was seen for prompted awareness and among MPs. There were no consistent changes in attitudes towards overweight individuals or support for policies to reduce obesity.

Conclusions: This evaluation suggests that the campaign achieved the primary objective of increasing awareness of the link between obesity and cancer without increasing negative attitudes towards individuals who are overweight or obese.

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Introduction

'Overweight and obesity' is the second biggest preventable cause of cancer after smoking.^{1,2} In 2019, 63.8% of all adults in the United Kingdom were overweight or obese, and a recent report by Cancer Research UK and the UK Health Forum report predicts that three in four adults in the United Kingdom will be overweight or obese by 2035.³ Overweight and obesity together increase the risk of 13 different types of cancer, with around 23,000 cases of cancer each year in the United Kingdom currently attributable to being overweight or obese.⁴

Despite overweight and obesity being the second biggest preventable causes of cancer, public awareness of this link is relatively low: in 2014, only 10.3% of a sample of the UK public were able to recall obesity as a factor that might affect a person's chance of developing cancer,⁵ and in 2017, this had only risen to 14.9%.⁶ This low level of public awareness, along with evidence that increased awareness of specific risk factors for cancer, can lead to increased public support for related policy measures that could improve health,⁷ led Cancer Research UK to launch a campaign in 2018 to increase awareness of overweight and obesity as a cause of cancer. Shortly after launch, the campaign generated controversy within the medical community⁸ and media⁹ and was criticised for being 'fat shaming',¹⁰ failing to respect the British public's autonomy and

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stigmatising those who are overweight or obese while failing to acknowledge the complex causes of obesity.¹¹

The aims of this study were to evaluate the reach of the campaign; changes in awareness of overweight or obesity as a risk factor for cancer; any unintended changes in attitudes towards overweight or obese individuals; and reactions to the campaign, including intention to change health behaviours and support for a range of government and manufacturer actions to reduce obesity.

Methods

Design and sample

The campaign evaluation was a repeated cross-sectional study. Approximately 2000 adult members of the general public, nationally representative by age, gender, social grade and region, were recruited by YouGov, a Market Research Society company partner, at three time points from across the United Kingdom.

- 1) Precampaign (wave 1 [W1]; 9 February 2018 to 20 February 2018; $N = 2124$)
- 2) Immediately postcampaign (wave 2 [W2]; 27 March 2018 to 4 April 2018; $N = 2050$)
- 3) 2 months postcampaign (wave 3 [W3]; 21 May 2018 to 29 May 2018; $N = 2059$).

Those who took part in the survey were awarded with points for their participation that could be saved and exchanged for a voucher. Two thousand participants were estimated to give 90% power to detect an increase in prompted and unprompted awareness of overweight/obesity as a risk factor for cancer of $\pm 5\%$.

A pragmatic sample of Members of Parliament (MPs) were recruited from across the United Kingdom by Savanta (formally ComRes) at two time points.

- 1) Precampaign (wave 1 [W1]; 31 January 2018 to 28 February 2018; $N = 151$)
- 2) Postcampaign (wave 2 [W2]; 16 April 2018 to 14 May 2018; $N = 151$).

Intervention

The campaign ran from 26 February 2018 to 25 March 2018 and consisted of six elements: a poster, a radio advert, two Facebook static adverts, and two video clips. The messaging across all elements aimed to raise awareness of obesity as a cause of cancer and included the main message of 'Obesity is a cause of cancer' ([Supplementary File 1](#)). The target was all adults in the United Kingdom of all weights, and the campaign had been pilot tested in 2016 as a regional campaign in the West Midlands.¹²

Measures

In all three waves of the survey for the general public, unprompted free-text and prompted awareness of overweight and obesity as a risk factor for cancer were assessed using questions from the Cancer Awareness Measure.¹³ Attitudes towards individuals who are overweight or obese, views on whether tackling obesity is the responsibility of individuals or the government and agreement with policies to reduce obesity were assessed with a series of questions adapted from a previous campaign evaluation.¹⁴

In W2 and W3, participants were shown each element of the campaign in turn and asked if they had seen it before. The survey

ended with questions asking how they felt about the campaign, and for those who had reported seeing at least one element, what, if anything, they had done as a result. Full details on the survey questions are given in [Supplementary Files 2 and 3](#).

Unprompted free-text and prompted awareness of overweight and obesity were similarly assessed among MPs. MPs were then shown three elements of the campaign and asked if they had seen any before and a series of questions about their views and actions or potential actions. Full details are given in [Supplementary Files 4 and 5](#).

Analysis

Responses to questions about awareness of the association between obesity and cancer were dichotomised into 'Yes' vs 'No'/'Don't know'. Responses to all questions based on a Likert scale were dichotomised into 'strongly agree' and 'agree' vs 'neither agree nor disagree'/'disagree'/'strongly disagree'/'don't know'.

For analysis of awareness of the association between obesity and cancer, attitudes towards overweight individuals and views on responsibility for tackling obesity, we compared responses between pre- and post-campaign surveys using logistic regression. We then compared responses postcampaign between those who reported having seen at least one element of the campaign with those who had reported not having seen the campaign.

To enable us to identify characteristics of participants associated with having seen the campaign and with different responses to the campaign, we performed multivariable logistic regression across both W2 and W3. Finally, we compared the actions respondents reported to have taken following the campaign stratified by self-reported weight status (underweight/healthy weight/overweight).

We report all regression analysis results as odds ratios (ORs) with 95% confidence intervals (CIs), and the results presented from the general population data are weighted to be representative of the United Kingdom in respect of age, sex and region based on the census 2011 and estimated social grade (ABC1C2DE) by the National Readership survey. All questions were compulsory; therefore, there were no missing data. STATA version 14 was used for analysis with statistical significance set at $P < 0.05$.

Results

General population surveys

The characteristics of the populations for the three surveys of the general public are shown in [Table 1](#). Overall, 51.3% were female, and 54% were in social class ABC1. The education levels, smoking status and body mass index were similar across the three waves.

Exposure and reach of campaign

Just less than half of respondents in both postcampaign waves (47.5% in W2 and 36.8% in W3) reported having seen any elements of the campaign. The poster was the most frequently seen with 36.9% and 27.5% of respondents recalling seeing it. In multivariable regression, being older (OR 0.97 [0.97–0.98] for each increasing year) and being in lower social classes (C2DE) compared with higher classes (ABC1; OR 0.80 [0.69–0.94]) were associated with reduced odds of seeing the campaign. There were no differences by sex, smoking status, weight status or region of the country ([Supplementary Table 1](#)).

Table 1
Demographics of participants within the three public surveys.

Characteristic	Unweighted			Weighted		
	Precampaign (n = 2124)	Wave 2 (n = 2050)	Wave 3 (n = 2059)	Precampaign (n = 2124)	Wave 2 (n = 2050)	Wave 3 (n = 2059)
Age (years)						
18–24	8.52	11.61	12.53	11.3	11.3	11.3
25–34	16.29	16.44	13.74	17.2	17.2	17.2
35–44	17.28	15.41	16.85	16.1	16.1	16.1
45–54	18.97	18.39	18.94	17.9	17.9	17.9
55–64	16.29	15.61	15.78	14.7	14.7	14.7
65+	22.65	22.54	22.15	22.8	22.8	22.8
Sex						
Male	45.81	43.46	45.60	48.8	48.7	48.7
Female	54.19	56.54	54.40	51.2	51.3	51.3
Region of country						
East	9.60	9.41	8.21	9.3	9.3	9.3
London	10.92	10.24	10.83	14.6	14.6	14.6
Midlands	15.77	15.76	15.93	15.7	15.7	15.7
North	24.29	24.29	25.01	22.8	22.8	22.8
Northern Ireland	2.40	2.05	3.11	2.8	2.8	2.8
Scotland	8.57	10.15	9.28	8.4	8.4	8.4
South	23.21	22.78	22.68	21.9	21.9	21.9
Wales	5.23	5.32	4.95	4.5	4.5	4.5
Social class^a						
ABC1	57.86	57.51	60.76	54.00	54.00	54.00
C2DE	42.14	42.49	39.24	46.00	46.00	46.00
Education level						
High	36.06	38.29	38.37	34.21	36.16	36.14
Medium	40.44	41.02	39.29	41.45	41.65	39.61
Low	23.49	20.68	22.34	24.34	22.19	24.25
Smoking status						
Never smoker	50.66	53.46	54.44	50.76	52.39	52.98
Ex-smoker	35.03	32.00	32.73	34.37	33.15	33.20
Current smoker	14.31	14.54	12.82	14.87	14.46	13.82
Weight status (BMI in kg/m²)						
<18.5 (underweight)	3.05	3.64	2.67	3.31	3.50	2.75
18.5 to <25 (healthy weight)	39.60	42.53	43.00	39.83	42.55	42.09
≥25 (overweight)	57.35	53.83	54.33	56.86	53.95	55.16

All data presented as percentages.

^a Social class grouped based on the NRS social grades where A = upper middle class, B = middle middle class, C1 = lower middle class, C2 = skilled working class, D = working class, E = non-working, BMI, body mass index; NRS, National Readership Survey.

Awareness of obesity and being overweight as risk factor for cancer

In unprompted free text, 17.1% listed obesity or being overweight as a risk factor precampaign (Fig. 1a). This increased to 43.3% in W2 and 30.3% in W3. Compared with precampaign, participants in W2 were 3.71 (3.18–4.33) times more likely to mention obesity and participants in W3 2.11 (1.80–2.47) times more likely. A similar pattern of increase was seen in those who listed being overweight or obese in their top three risk factors for cancer (8.1% W1, 28.6% W2 and 16.5% W3).

When asked directly if being overweight or obese is associated with cancer risk, 66.6% strongly agreed/agreed before the campaign. This increased to 78.9% in W2 (OR 1.87 [1.61–2.18] compared with W1) and 74.0% in W3 (OR 1.43 [1.24–1.65] compared with W1) among all respondents and 88% in W2 and 84% in W3 for those who had seen the campaign.

There was a corresponding increase in those who strongly agreed/agreed that it is equally important to tackle obesity as smoking (62.4% at baseline, 69.1% at W2 and 67.3% at W3, OR 1.35 [1.17–1.55] for W2 compared with baseline and OR 1.24 [95% CI 1.08–1.43] for W3 compared with baseline).

Attitudes towards people who are overweight and responsibility for tackling obesity

While one-third of the public respondents believed that people who are overweight are to blame for their health problems, no changes were observed in the percentage of respondents who held this belief between pre- and post-campaign.

There were small increases between precampaign and W2 in the percentages strongly agreeing/agreeing that people who are overweight tend to have less energy or tend to be less successful than people with a healthy weight, but these were not seen at W3 (Table 2) and were not dependent on having seen the campaign (Supplementary Table 2). Similarly, no consistent changes between waves or between those had or had not seen the campaign were observed in the percentage of participants agreeing with certain government or manufacturer controls (Supplementary Tables 3 and 4).

Reactions to the campaign

Fig. 2a shows responses after being shown all the components of the campaign. The most common reactions across both waves combined were either feeling neutral (29.8%) or surprise (25.3%), with a further 13.6% not thinking any of the options reflected their view. Notably 2.8% felt anger, 2.0% felt contempt and 1.7% felt disgust, with odds of such feelings decreasing with increased age (OR per 1 year 0.986 [0.976–0.995]; Supplementary Table 5).

More than 75% strongly agreed/agreed that the campaign was believable, informative, an important message and responsible advertising (Fig. 2b). Notably, however, 64% had found the campaign worrying, and 8% had found the campaign offensive. Those in lower social classes (C2DE) were more likely to have found the campaign offensive (OR 1.41 [1.05–1.89]), and women, current smokers and those underweight were less likely to find the campaign worrying. No associations were seen with finding the

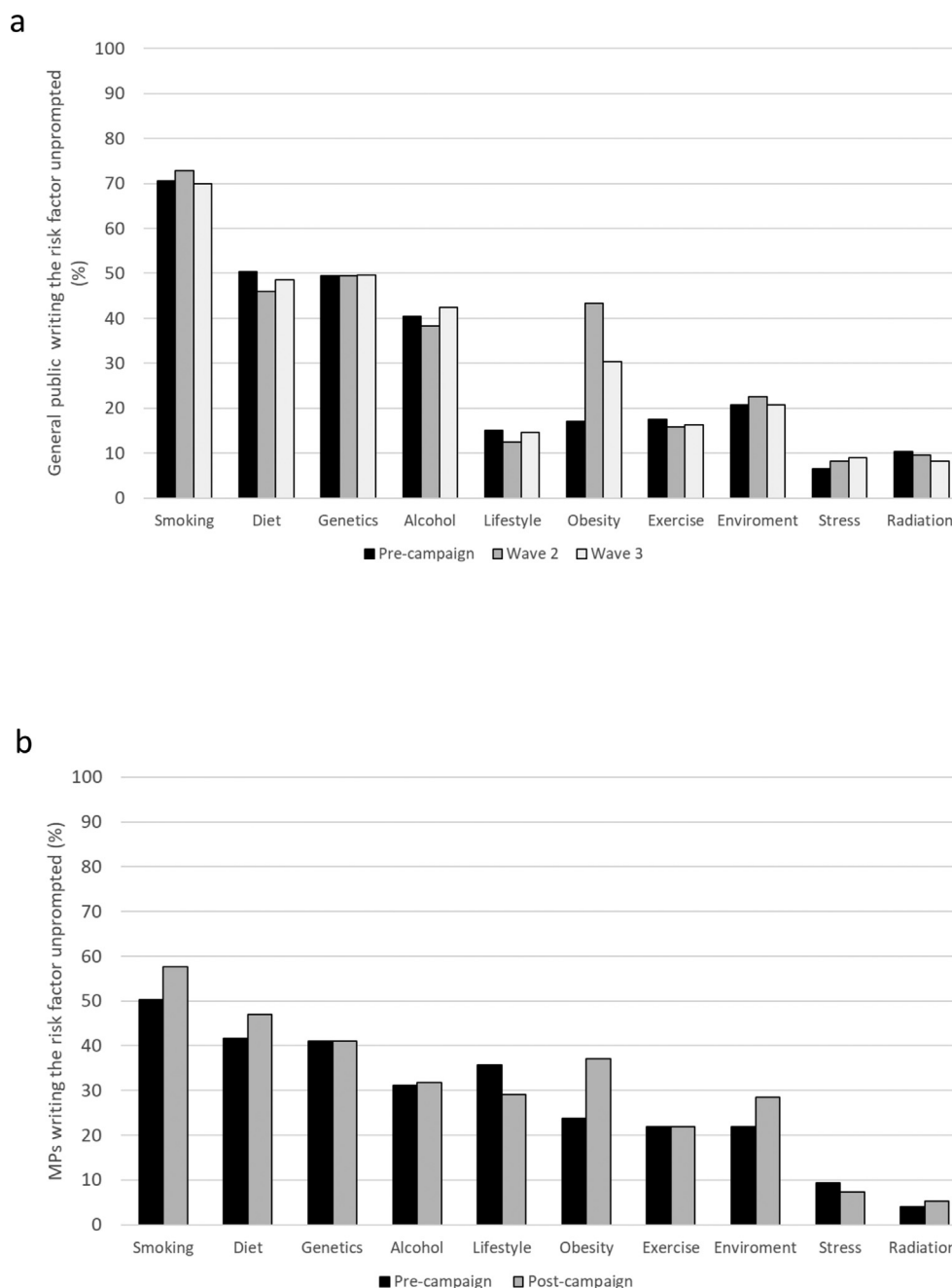


Fig. 1. Frequency of mentioning risk factors in response to an unprompted question about risk factors associated with cancer amongst (a) the public and (b) MPs before and after the campaign.

campaign worrying or offensive and age, education level or region of the country (Supplementary Table 5).

Table 3 presents the actions those who recalled seeing at least one element of the campaign had taken. Across both waves, 30% had thought about changing their eating behaviours and 20% had thought about changing their physical activity behaviours. In multivariable analysis (Supplementary Table 6), participants who were overweight or obese were more likely to have thought about changing their eating behaviours or physical activity behaviours than those of a healthy weight (OR 1.97 [1.53–2.54] for eating behaviours and OR 1.71 [1.27–2.30] for physical activity).

MP surveys

A total of 151 MPs took part in both the precampaign and postcampaign surveys. Most were within the labour (49.7% and 53%) or conservative (37.8% and 34.4%) parties.

Exposure and reach of campaign

When asked if they had seen elements of the campaign, 51.0% ($n = 77$) recalled seeing the poster, 59.6% ($n = 90$) recalled seeing newspaper coverage and 7.3% ($n = 11$) recalled seeing a still image. Moreover, 23.8% ($n = 36$) had not seen any of the elements, with

Table 2

Attitudes towards overweight individuals and responsibility for tackling obesity amongst members of the public.

Wave	Strongly agreeing/agreeing (%)	Odds ratio (95% CI)
People who are overweight are to blame for their health problems		
Precampaign	34.6	1 (Ref)
Wave 2	35.6	1.04 (0.91–1.20)
Wave 3	34.9	1.01 (0.88–1.16)
People who are overweight or obese tend to have less energy		
Precampaign	71.2	1 (Ref)
Wave 2	75.4	1.24 (1.07–1.45)
Wave 3	73.5	1.12 (0.97–1.30)
People who are overweight or obese tend to lack will power		
Precampaign	40.9	1 (Ref)
Wave 2	42.8	1.08 (0.95–1.24)
Wave 3	45.0	1.18 (1.03–1.35)
People who are overweight or obese tend to be less successful		
Precampaign	25.7	1 (Ref)
Wave 2	30.2	1.25 (1.08–1.45)
Wave 3	28.2	1.14 (0.98–1.32)
People who are overweight or obese tend to have less friends		
Precampaign	12.0	1 (Ref)
Wave 2	14.1	1.21 (0.99–1.47)
Wave 3	13.6	1.16 (0.95–1.42)
Authorities exaggerate the harmful effects of being overweight		
Precampaign	18.0	1 (Ref)
Wave 2	16.4	0.90 (0.75–1.07)
Wave 3	15.9	0.87 (0.73–1.03)
Tackling obesity is the responsibility of the individual rather than the government		
Precampaign	67.5	1 (Ref)
Wave 2	66.8	0.97 (0.84–1.12)
Wave 3	65.3	0.91 (0.79–1.04)

Bold values indicate statistically significant differences.

40.4% ($n = 61$) seeing one element, 29.8% ($n = 45$) seeing two elements and 6.0% ($n = 9$) seeing all three.

Awareness of obesity and being overweight as risk factor for cancer

In unprompted free-text, 23.8% listed being overweight or obese as a risk factor for cancer precampaign. This increased to 37.1% postcampaign, with MPs in the postcampaign survey 1.88 (95% CI 1.14–3.10) times more likely to mention being overweight or obese than those in the precampaign survey (Fig. 1b). There was no difference postcampaign between those who had and had not seen the campaign (OR 1.73 [0.76–3.93]).

When prompted, in the baseline survey, 86.7% ($n = 131$) strongly agreed/agreed that there was a link between obesity and cancer. In the follow-up survey, the proportion who thought that being overweight or obese can increase a person's chances of developing cancer increased to 94.7% ($n = 142$; OR 2.71 [1.15–6.36]). As for unprompted responses, there was no difference postcampaign between those who had seen the campaign and those who had not (OR 0.45 [0.05–3.82]).

Attitudes towards people who are overweight and responsibility for tackling obesity

There was no change in the percentage of MPs who strongly agreed/agreed that it was equally important to tackle obesity as smoking (70.9% at baseline, 77.5% at follow-up, OR 1.42 [0.84–2.38]) or who believed tackling obesity was the responsibility of the individual (45.0% at baseline, 52.7% at following, OR 1.36 [0.86–2.14]), and no differences between those who had seen the campaign and those who had not (OR 0.68 [0.31–1.46] for the responsibility of the individual and OR 1.46 [0.62–3.43] for equally important to tackle obesity as smoking).

Reactions to the campaign

In general, MPs were supportive of the campaign. Overall, 95.3% ($n = 144$) strongly agreed/agreed that the campaign has an

important message, 90.7% ($n = 137$) supported campaigns like it and 83.4% ($n = 126$) considered the campaign relevant to them in their role as an MP. However, only 29.1% ($n = 44$) had discussed the campaign with their colleagues or constituents, and only 43.7% ($n = 66$) intended to do so.

Discussion

Key findings

Our findings demonstrate an increased awareness of overweight and obesity as a cause of cancer among members of the public and MPs up to 2 months after an awareness raising campaign. Despite the cross-sectional design of the study, our finding that the post-campaign awareness among the public was greater in those who reported having seen the campaign and that no changes were seen in awareness of other risk factors suggests that at least some of the increase in awareness was likely related to the campaign. There is also suggestion that the campaign may have impacted some individuals' intentions to change their behaviour, and respondents who were overweight or obese were approximately twice as likely to have thought about changing their eating or physical behaviours as those of a healthy weight.

Despite the negative media coverage of the campaign, we found no consistent evidence of an increase in negative attitudes towards people who are overweight or obese after the campaign. Our findings do, however, highlight widespread negative attitudes and stigma towards overweight or obese individuals that were present from precampaign. In addition, although the majority of respondents were positive about the campaign, a significant minority (8%) of the public thought the campaign was offensive, and 6.5% felt anger, contempt or disgust in response to it. Notably, these reactions to the campaign did not differ by weight status.

Comparison with existing literature

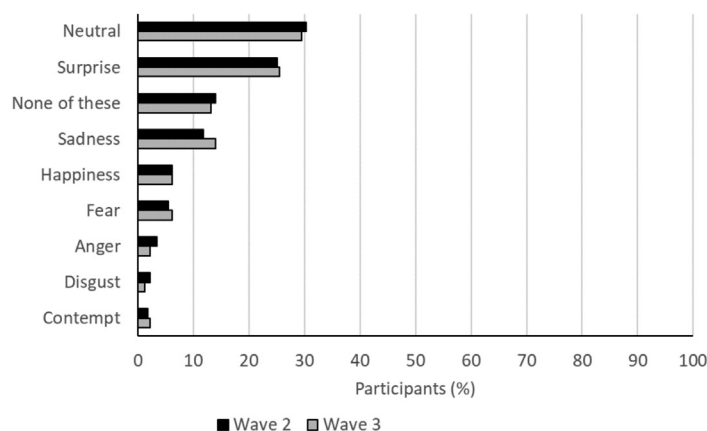
The population reach of the campaign, with approximately half of the respondents reporting that they had seen at least one element, is comparable with other obesity prevention campaigns^{14–17} and the baseline awareness in this study population consistent with other recent UK population-based studies in which prompted recall for obesity as a risk factor was between 61% and 73%.^{18,19} The increases in awareness observed in this study are also similar to those in a community-based cancer awareness roadshow in the United Kingdom, where prompted awareness increased from 72.4% at baseline to 78.8% two months post-intervention¹⁸ and following a state-wide public health intervention designed to improve awareness and knowledge of the link between alcohol and cancer in Australia.²⁰

Our finding that there was no persistent increase in negative attitudes towards people who are overweight or obese after the campaign is consistent with a similar evaluation of the 'LiveLighter' campaign in Australia in which graphic anatomical images of visceral fat were used to illustrate the negative health effects of being overweight.¹⁴ Respondents who were overweight in that study were also no more likely to experience a negative emotional response to the campaign than those of a recommended healthy weight.

Strengths and limitations

A strength of this evaluation is the use of national samples of the public and MPs before and after the campaign and the inclusion of questions to assess any potential unintended consequences of the campaign on attitudes towards individuals who are overweight or

a



b

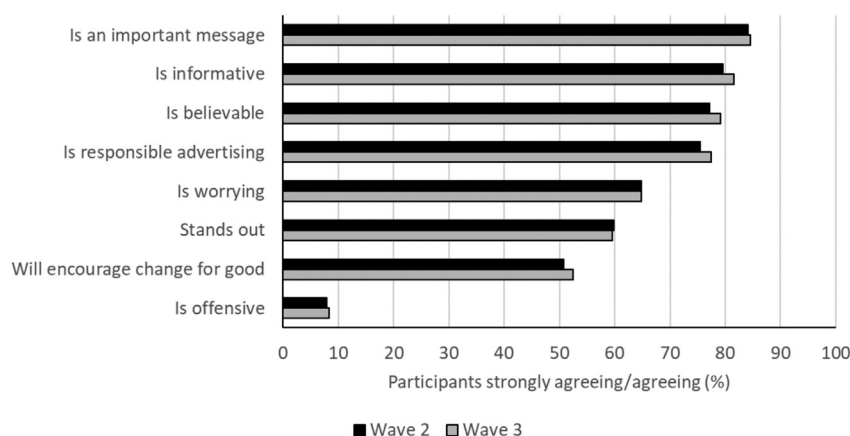


Fig. 2. Public participants' (a) emotional responses to and (b) beliefs about the campaign.

Table 3

Actions following the campaign amongst members of the public who recalled seeing at least one element of the campaign.

Action	Wave 2 (n = 934)	Wave 3 (n = 753)
Talked to friends/family about the campaign	15.5	17.7
Shared the campaign on social media	1.7	2.7
Talked about the campaign on social media	3.1	3.0
Visited the CRUK website to find out more	1.5	1.8
Looked somewhere else for information	0.1	0.6
Contacted a GP or health professional	0.7	2.0
Thought about changing physical activity behaviours	20.2	19.9
Thought about changing eating behaviours	30.3	30.7
Something else	3.5	2.4
Nothing	52.1	50.2

All data presented as percentages.

obese. The absence of a control or unexposed sample and the cross-sectional design of the study, however, mean that the changes observed cannot be attributed to the campaign. The nature of the surveys additionally relied on self-report, meaning the responses may have been affected by social desirability bias. We also did not assess internalised weight stigma, for example, body dissatisfaction,

and were unable to measure the effect of the campaign on change in health behaviours. Although the analysis was weighted to key characteristics of the UK population, those who completed the survey may also not be representative of the United Kingdom.

Implications for policy and research

This evaluation suggests that the Cancer Research UK (CRUK) public campaign successfully achieved the primary objective of increasing awareness of the link between obesity and cancer. Awareness of obesity as a risk factor for cancer, however, remains low: even among those who had seen the campaign, only 39.1% of the public participants in W3 included overweight or obesity as a risk factor in unprompted free-text and only 22.9% included obesity or being overweight in their top three risk factors. While the month long campaign is potentially an important first step in raising awareness, additional interventions will be needed to achieve levels of awareness of obesity similar to those for smoking.

It has been proposed previously that mass population campaigns such as this may have the greatest impact by influencing the agenda for discussion by the public and policy makers.^{14,21} We found an increase in the percentage of the public who strongly

agreed/agreed that it is equally important to tackle obesity as smoking but little evidence that the campaign had influenced support for a range of potential policy measures.

Although we found no clear evidence of a sustained increase in negative attitudes towards people who are overweight and obese, the widespread negative attitudes present both before and after the campaign, along with prior evidence that weight stigma may negatively impact weight-related health behaviours²² and body mass index,²³ support previous calls for obesity prevention efforts to include strategies to prevent weight stigma.^{22–24} Further research to identify which specific components of the campaign were perceived as offensive alongside careful communication plans may also help to mitigate against negative reactions in future campaigns.

In conclusion, this repeated cross-sectional study suggests that the CRUK campaign achieved the primary objective of increasing awareness of the link between obesity and cancer without increasing negative attitudes towards individuals who are overweight or obese. Whether these increases in awareness translate into changes in behaviour or greater support for policies to reduce obesity is not known.

Author statements

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The authors thank all the survey participants who shared their experiences and views and the research agencies who administered the surveys to their panels to collect the data.

Ethical approval

All research for this health marketing campaign evaluation was conducted in accordance to the Market Research Societies (MRS) Code of Conduct (2014 and is also compliant with superseding MRS 2019 code of Conduct). Specifically, all participants provided written consent to be contacted for participation by signing up or being a member of the research panels. Participants took part voluntarily and were provided with some basic information about the context of the survey. They could withdraw from participation at any time by choosing to discontinue the survey. Adherence to the MRS Code of Conduct was confirmed before data collection by the Cancer Research UK Cancer Intelligence and Data Governance teams. The Market Research agency used to collect the data were also members of the MRS and so bound by the MRS Code of Conduct. The data were anonymised, stored and maintained in accordance with data protection regulations (Data Protection Regulations, 1994 and superseding GDPR, 2018).

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Competing interests

C.I. and K.B. are employed by Cancer Research UK. J.U.S. has received research grants for other projects from Cancer Research UK in the previous 3 years. All authors declare that (1) they have no other support from or relationships with companies that might have an interest in the submitted work in the previous 3 years; (2) their spouses, partners, or children have no financial relationships that may be relevant to the submitted work; and (3) they have no non-financial interests that may be relevant to the submitted work.

Authors' contributions

The campaign was initiated by Cancer Research UK, and the evaluation was managed by C.I.W. J.U.S. and M.F. completed the data analysis. All authors contributed to the final analysis and interpretation of the data. J.U.S. wrote the first draft of the article with contributions from V.P.S., S.N. and C.I.W. All authors critically reviewed the article and have approved the final version.

Availability of data and materials

The data sets analysed during the present study will be made available on the UK data Archive (<https://ukdataservice.ac.uk/>) following acceptance of the present paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.puhe.2023.03.026>.

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