Obesity Facts

Research Article

Obes Facts
DOI: 10.1159/000540635

Received: February 7, 2024
Accepted: July 26, 2024
Published online: August 8, 2024

Discrimination and Stigma Associated with Obesity: A Comparative Study between Spain and Egypt – Data from the OBESTIGMA study

Enric Sánchez[a] Noha M. Elghazally[b] Rania M. El-Sallamy[b] Andreea Ciudin[c] Ana Sánchez-Bao[d] Mohamed S. Hashish[b] Hosam Barakat-Barakat[b] Sonsoles Gutiérrez-Medina[e] Nuria Valdés[f] Lilliam Flores[g] Amelia Marí-Sanchis[h] Fernando Goñi[i] Marta Sánchez[j] Joana Nicolau[k] Concepción Muñoz[l] Olaia Díaz-Trastoy[m] Guillem Cuatrecasas[n, o] Silvia Cañizares[p] Albert Lecube[a]

on behalf of the Spanish Society for the Study of Obesity (SEEDO)

[a]Endocrinology and Nutrition Department, Obesity Unit, University Hospital Arnau de Vilanova de Lleida, Obesity, Diabetes and Metabolism (ODIM) Research Group, IRBLleida, University of Lleida, Lleida, Spain; [b]Faculty of Medicine, Tanta University, Tanta, Egypt; [c]Endocrinology and Nutrition Department, Obesity Unit, Hospital Universitari Vall d'Hebrón, Vall d'Hebron Research Institute, Autonomous University of Barcelona, CIBERdem-ISCIII, Barcelona, Spain; [d]Endocrinology and Nutrition Department, Obesity Unit, Complejo Hospitalario Universitario de Ferrol, Ferrol, Spain; [e]Endocrinology and Nutrition Department, Obesity Unit, Hospital Universitario Rey Juan Carlos, Madrid, Spain; [f]Endocrinology and Nutrition Department, Obesity Unit, Hospital Universitario de Cruces, Bilbao, Spain; [g]Endocrinology and Nutrition Department, Obesity Unit, Hospital Clínic Barcelona, CIBERdem-ISCIII, Barcelona, Spain; [h]Endocrinology and Nutrition Department, Obesity Unit, Hospital Universitario de Navarra, Pamplona, Spain; [i]Endocrinology and Nutrition Department, Obesity Unit, Hospital Universitario de Basurto, Bilbao, Spain; [j]Endocrinology and Nutrition Department, Obesity Unit, Hospital Universitario Doctor Negrín, Las Palmas de Gran Canaria, Spain; [k]Endocrinology and Nutrition Department, Obesity Unit, Hospital Universitario Son Llàtzer, Palma, Spain; [l]Endocrinology and Nutrition Department, Obesity Unit, Hospital Universitario Reina Sofia de Córdoba, Córdoba, Spain; [m]Endocrinology and Nutrition Department, Obesity Unit, Complejo Hospitalario Universitario de Pontevedra, Pontevedra, Spain; [n]Endocrinology and Nutrition Department, Obesity Unit, Clínica Sagrada Familia-CPEN, Barcelona, Spain; [o]Health Science Department, UOC University, Barcelona, Spain; [p]Psychiatry and Psychology Department, Obesity Unit, Hospital Clínic Barcelona, Universitat de Barcelona, Barcelona, Spain

Keywords
Bariatric surgery · Discrimination · Obesity · Stigma · Weight

Abstract
Introduction: This study explores the under-investigated area of obesity-related discrimination and stigmatization across different countries, specifically comparing Spain (Europe) and Egypt (Middle East). ***Methods:*** We conducted a

karger@karger.com
www.karger.com/ofa

Correspondence to:
Albert Lecube, alecube@gmail.com

cross-sectional observational study involving 2,090 participants from both countries. Participants completed three well-validated questionnaires to assess their attitudes toward obesity, experiences of weight-related stigma, and internalization of weight bias: Antifat Attitudes Scale (AFA), Stigmatizing Situations Inventory (SSI), and Weight Bias Internalization Scale (WBIS). Participants were categorized into four groups based on body mass index (BMI) and history bariatric surgery. ***Results:*** Egyptian participants (BMI = 30.2 ± 6.7 kg/m^2 [range: 18.5–69.0 kg/m^2]) showed significantly higher aversion toward obesity, as indicated by higher AFA score, compared to their Spanish counterparts (BMI = 35.4 ± 10.1 kg/m^2 [18.5–71.9 kg/m^2]). In contrast, Spanish participants reported higher levels of weight bias internalization with increasing BMI, while in Egypt, this association was negative. The association of bariatric surgery on stigma reduction also differed between the countries. Multivariate analysis revealed that residing in Egypt was an independent risk factor for higher scores in AFA and WBIS (odds ratio 8.20 [95% confidence interval: 6.78–9.62], $p < 0.001$ and odds ratio (OR) 6.28 [95% CI: 4.78–7.78], $p < 0.001$, respectively). In contrast, Spaniards experienced more stigmatizing situations than Egyptians (OR −2.54 [95% CI: 6.78–9.62], $p < 0.001$). ***Conclusion:*** Our study underscores the complex and diverse nature of obesity-related attitudes across cultures. Understanding these cultural differences is crucial for developing effective, culturally sensitive strategies to tackle weight stigma. This research opens avenues for further studies and interventions tailored to cultural contexts.

Introduction

The overall projection for global levels of overweight and obesity (body mass index [BMI] ≥25 kg/m^2) suggests that by 2035, over 4 billion people may be affected, compared to over 2.6 billion in 2020. This marks an increase from 38% of the world's population in 2020 to over 50% by 2035. However, this substantial rise will not be uniform across the globe, exhibiting variations based on world regions and countries. For instance, the expected 37% of adults with obesity in Spain by 2035 contrasts with the projected 49% in Egypt by the same year [1]. This discrepancy is reflected in the Global Preparedness Ranking, where Spain ranks 51 and Egypt 103 out of 183 [1].

Obesity is a multifaceted, chronic, and relapsing disease that cannot be solely attributed to an individual's choices regarding food and physical activity. Its roots extend to a broader consideration of living conditions and context. Various economic, political, commercial, and sociocultural determinants of health, coupled with resulting health inequalities, contribute significantly to the onset and persistence of obesity [2]. Distinct daily living conditions characterize each region, where factors such as birthplace, living environment, education, job income, financial capacity, recreational activities, and aging play pivotal roles in shaping opportunities for accessing healthy foods and engaging in sufficient physical activity for maintaining health or preventing obesity [3]. Similarly, environmental factors such as the availability of parks, recreational facilities, and healthy food outlets can vary significantly by geographic location, affecting individuals' opportunities for physical activity and healthy eating independently of their socioeconomic status [4, 5]. These critical elements also encompass aspects like family structures and traditions, available resources, employment conditions, and proximity to essential services [6].

The experience of living with excess weight is intricately tied to facing discrimination, prejudice, negative societal attitudes, and self-stigma, resulting in structural exclusions, embodied stress, and an overall detriment to health and well-being [7, 8]. Individuals living with obesity are often burdened with derogatory labels such as "clumsy," "lazy," "lonely," "rejected," and "vulgar" [9]. Notably, psychological consequences linked to obesity, including anxiety and depression, are particularly prevalent among females [10–12]. Addressing these social and psychological aspects is essential to fostering a more empathetic and inclusive environment, recognizing the impact of societal attitudes on the well-being of those affected by obesity.

In a surprising turn, our recent research in Spain has revealed that individuals with obesity exhibit a higher level of aversion toward the condition compared to the normal-weight population [13]. This study also displayed a concerning increase in the experience of stigmatizing encounters among younger individuals [13]. In addition, weight loss following bariatric surgery (BS) was unable to reduce social stigma scores to levels equivalent to those observed in individuals with normal weight.

However, discrimination and stigmatization faced by individuals with obesity in Spain have not been previously compared with populations from other countries. Therefore, our objective was to address this gap by comparing the levels of rejection and experiences of stigma related to obesity between Spanish and Egyptian populations. This study encompasses individuals across a diverse spectrum of weights, including those who have undergone BS. To achieve this goal, we administered

three well-validated questionnaires – the Antifat Attitudes Scale (AAS), Stigmatizing Situations Inventory (SSI), and the Weight Bias Internalization Scale (WBIS) – to both populations [14–16]. Furthermore, our study aimed to identify the primary factors associated with the extent to which both societies engage in social discrimination and rejection toward individuals with obesity.

Materials and Methods

Study Design

In this cross-sectional observational study, a total of 2,268 adults were invited to participate between January 2019 and December 2022. Participants were concurrently recruited in both countries and included males and females aged 18 years or older and a BMI equal or greater than 18.5 kg/m^2 who were attending medical check-ups for obesity, along with their companions. Thirteen obesity units in Spain participated in the recruitment, while only one obesity unit in Egypt was involved. A total of 93 individuals were excluded due to various reasons: serious illnesses determining a life expectancy of less than 6 months (7 in Spain, 10 in Egypt), intellectual disability (6 in Spain, 4 in Egypt), severe psychiatric illnesses (schizophrenia, schizoaffective disorder, bipolar disorder, anorexia nervosa, bulimia nervosa, and major depressive disorder; n = 13 in Spain, n = 8 in Egypt), and failure to report BMI (31 in Spain, 14 in Egypt). Additionally, 51 participants in Spain and 34 in Egypt declined participation in the study. Consequently, the final cohort comprised data collected from 2,090 participant: 1,018 from Spain and 1,072 from Egypt. The project protocol received approval from both the Arnau de Vilanova University Hospital Ethics Committee (CEIC-2190) and the Tanta University Research Ethics Committee (34005/8/20). All individuals who agreed to participate in the research provided written informed consent.

Anthropometric data, including weight and height, were collected from all participants on the same day of the interview. BMI was calculated, and subjects were categorized into the following groups: (i) individuals with normal weight (≥18.5–24.9 kg/m^2); (ii) overweight individuals (≥25.0–29.9 kg/m^2); and (iii) individuals with obesity (≥30.0 kg/m^2). Additionally, participants who reported having undergone previous BS at least 12 months before completing the questionnaires were classified into a fourth group. The study also collected information on age, sex, marital status, ethnicity, employment status, educational level, and annual income.

Assessment of Negatives Attitudes toward People with Obesity

Three questionnaires were completed by all participants. The AFA is an instrument developed by Crandall CS to assess prejudice against individuals with obesity [14]. It consists of 13 questions divided into three subscales: (i) dislike or rejection toward people with overweight or obesity (e.g., "I tend to think that people who are overweight are a little untrustworthy"); (ii) fear of being fat or gaining weight (e.g., "One of the worst things that could happen to me would be if I gained 25 pounds"); and (iii) willpower or the belief that weight is controllable (e.g., "People who weigh too much could lose at least some part of their weight through a little exercise"). Responses are recorded on a numerical scale ranging from 1 ("not at all agree") to 7 ("strongly agree"). The average of all responses for each subscale and the overall score were calculated, with higher scores indicating stronger attitudes against obesity. The validated Spanish version of the AFA demonstrates good reliability results (Cronbach's alphas of 0.78, 0.87, and 0.81 for dislike, fear of being fat, and willpower, respectively) [17, 18].

The SSI is a prominent method for measuring stigmatizing experiences associated with being overweight, which may have occurred at least once in a person's life [16, 19]. Consequently, items are assessed on a 10-point scale, ranging from 0 ("never") to 9 ("daily"). Due to the impractical length of its full version (50 items), a concise version (10 items) of the SSI has been created. This condensed version proves to be a more time-efficient tool for evaluating experiences with weight-related stigma, exhibiting high reliability (Cronbach's alphas in different samples ranging from 0.94 to 0.98) [19]. The final score is determined by computing the average of all responses, with a higher score indicating a greater frequency of encounters with stigmatizing experiences.

The WBIS questionnaire is a valuable tool for identifying patients in need of medical assistance to address weight stigma, demonstrating high internal consistency (Cronbach's alphas = 0.90) [15]. Consisting of 11 items (e.g., "I hate myself for being overweight"), it gauges the extent to which respondents believe that negative stereotypes and self-statements about individuals with overweight and obesity apply to themselves. Responses are on a scale from 1 ("strongly disagree") to 7 ("strongly agree"), with items 1 and 9 requiring reverse scoring. The final score is derived by computing the average of all responses, where elevated scores on the WBIS indicate strong anti-obesity attitudes.

To the best of our knowledge, there are currently no measures available in the Arabic language to assess the AFA, WBIS, and SSI constructs in Arabic-speaking

Table 1. Main clinical data of the study population according to their origin country

	Spain (n = 1,018)	Egypt (n = 1,072)	p value
Female, n (%)	730 (71.7)	742 (69.2)	0.212
Age, years	46.9±12.5	35.7±14.3	<0.001
BMI, kg/m^2	35.4±10.1	30.2±6.7	<0.001
Married, n (%)	208 (20.4)	304 (28.3)	<0.001
Unemployed, n (%)	188 (18.4)	644 (60.0)	<0.001
University degree, n (%)	337 (33.1)	478 (44.5)	<0.001
Caucasian, n (%)	690 (67.7)	23 (2.1)	<0.001
Egyptian, n (%)	0 (0.0)	985 (91.8)	<0.001
Normal weight, n (%)	173 (17.0)	202 (18.8)	<0.001
Overweight, n (%)	134 (13.2)	307 (28.6)	<0.001
Obesity, n (%)	572 (56.2)	363 (33.9)	<0.001
BS, n (%)	139 (13.7)	200 (18.7)	<0.001
Female, %	77.6	69.0	0.084
Age, years	50.5±10.0	39.6±12.6	<0.001
BMI, kg/m^2	33.4±6.8	31.3±3.7	0.001

Data are n (%) and mean and standard deviation; BMI, body mass index.

populations. Consequently, we undertook the translation of the original questionnaire versions into Arabic, which were then shared with medical professionals fluent in both languages to ensure accuracy. To ensure the independence, accuracy, and honesty of participants' responses, investigators furnished standardized verbal instructions, explicitly stating that there were no right or wrong answers and guaranteeing the anonymity and confidentiality of all responses. Whenever feasible, data collection occurred in the outpatient waiting room, with the majority of participants taking 10–15 min to complete the survey.

Statistical Analysis

Statistical analyses were conducted using the IBM SPSS Statistics package (Version 20.0, Armonk, NY, USA). The normal distribution of variables was assessed through the Shapiro-Wilk test. For normally distributed data, quantitative variables are presented as mean ± SD. Group comparisons utilized the ANOVA test for quantitative variables and Pearson's χ^2 for categorical variables. The correlation between continuous variables was assessed using Pearson's correlation test. Three multivariable linear regression models (enter mode) were employed to evaluate the final score (continuous variable) of each questionnaire, incorporating the following confounding factors in the analysis: age, sex, BMI, country, employment status, and educational level. Age and BMI were considered as continuous variables in this analysis. Model calibration was gauged using the χ^2 goodness-of-fit test. All "p" values were derived from a two-sided test of statistical significance. The conventional significance level of $p < 0.05$ was chosen to strike a balance between reducing false positive (type I) errors and avoiding missing real effects (type II) errors. This significance level of 0.05 was applied uniformly to all statistical analyses.

Results

The complete data for the 2,090 individuals who participated in the study are presented in Table 1. The Spanish population was older and had a higher average weight compared to the Egyptian population. Additionally, a higher percentage of Egyptians were married, with university education, unemployed, and underwent BS.

The scores obtained in the three questionnaires (AFA, SSI, and WBIS) for each country are presented in Table 2. In Spain and Egypt, a positive and significant correlation between BMI and the total AFA score was observed (Fig. 1a, b). However, when comparing both countries, the final score of the AFA questionnaire was significantly higher among participants from Egypt (46.5 ± 14.5 vs. 37.2 ± 12.0, $p < 0.001$), indicating that Egyptians exhibit

Table 2. Scoring of the questionnaires according to the country of the study population

	Spain (n = 1,018)	Egypt (n = 1,072)	p value
AFA total score	37.2±12.0	46.5±14.5	<0.001
AFA_"dislike" domain	13.5±7.0	31.9±11.1	<0.001
AFA_"fear of being fat" domain	12.5±5.6	6.5±3.9	<0.001
AFA_"willpower" domain	11.3±4.7	8.0±3.7	<0.001
WBIS	37.1±15.9	43.0±12.8	<0.001
SSI	22.0±18.6	19.7±20.3	0.007

AFA, Antifat Attitudes Scale; SSI, Stigmatizing Situations Inventory; WBIS, Weight Bias Internalization Scale. Data are mean and standard deviation.

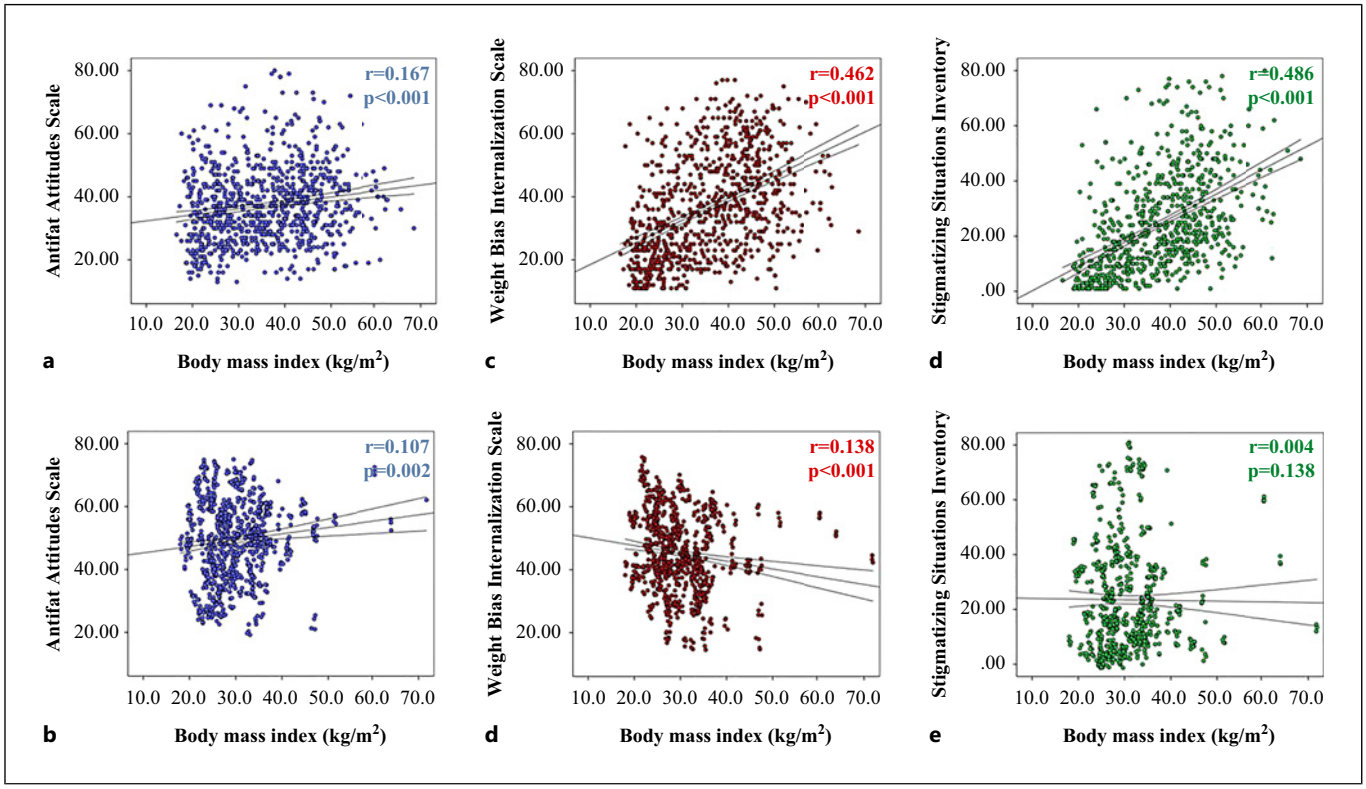

Fig. 1. Bivariate correlations between BMI and the three questionnaires in Spanish (**a**, **c**, and **d**), and Egyptian (**b**, **d**, and **e**) population free from BS.

greater aversion toward individuals with obesity compared to Spaniards (Table 2). This superiority in the overall AFA score was primarily attributed to the results in the dislike domain. In relation to the other two domains of the AFA questionnaire, Spaniards were more inclined to express a fear of being overweight and to believe that obesity is linked to a lack of willpower.

When analyzing each country separately, the AFA total score and the fear domain in Spain exhibited a progressive increase across BMI groups, starting from normal weight (33.7 ± 11.9 and 8.7 ± 4.6, respectively) to participants with overweight (35.5 ± 10.9 and 10.2 ± 5.0) and obesity (38.6 ± 11.9 and 13.8 ± 5.4) (ANOVA p < 0.001) (Fig. 2). Similarly, in Egypt, the total AFA score

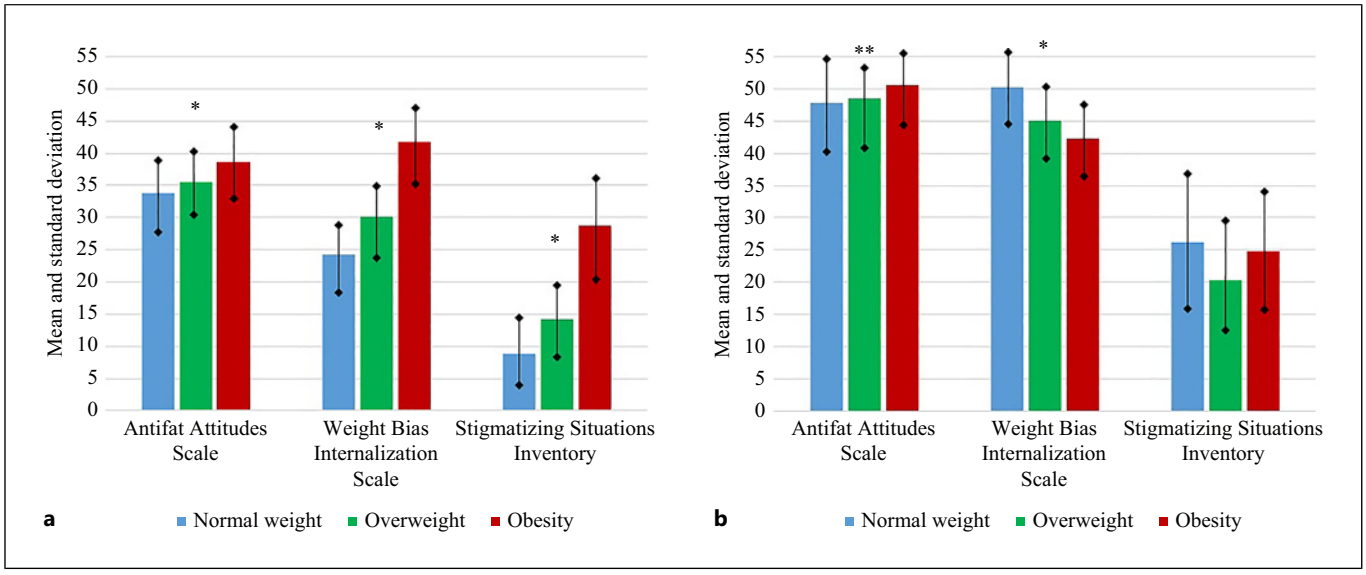

Fig. 2. Results of the questionnaires according to the BMI groups in the Spanish (**a**) and Egyptian (**b**) populations.

raised from normal weight (47.8 ± 15.1) to overweight (48.5 ± 13.0) and obesity (50.6 ± 11.5) (ANOVA = 0.023). Notably, in Egypt, the fear of being a subject with obesity significantly decreased from normal weight (7.8 ± 4.0) to obesity (6.5 ± 4.1) (ANOVA $p = 0.001$).

The total score of the WBIS questionnaire was also significantly higher in participants from Egypt (ANOVA $p < 0.001$) compared to Spanish results, indicating that Egyptians internalize weight bias more than Spaniards. However, the WBIS exhibited different tendencies in each country (Fig. 1c, d; Fig. 2). Specifically, in Egypt, the total WBIS score progressively decreased from obesity (50.2 ± 11.8) to overweight (45.1 ± 11.7) and normal weight (42.3 ± 11.9; ANOVA $p < 0.001$). Conversely, the opposite trend was observed among Spanish individuals, wherein the internalization of weight bias increases along with BMI (ANOVA $p < 0.001$).

Finally, the frequency of exposures to stigmatizing experiences, measured via the SSI questionnaire, increased progressively from normal weight (8.9 ± 11.6) to overweight (14.2 ± 12.4) and obesity (28.7 ± 17.4) in Spanish participants (ANOVA $p < 0.001$; Fig. 1e, 2). However, no relationship between SSI score and BMI was observed in the Egyptian population, with the lowest score obtained in the overweight group (26.1 ± 22.1 in normal weight, 20.3 ± 18.1 in overweight and 24.8 ± 19.5 in obesity) (Fig. 1f, 2). Interestingly, the overall SSI score was negatively associated with age in both populations, Spain ($r = -0.066$, $p = 0.050$) and Egypt ($r = -0.138$, $p = 0.011$), indicating that younger participants with obesity are exposed to more weight stigmatizing experiences than older adults.

When data were evaluated according to the gender of the population in both countries, worse results were observed in Spain for women compared to men in the AFA (38.0 ± 15.9 vs. 34.9 ± 15.8, $p < 0.001$) and WBIS (38.0 ± 15.9 vs. 34.9 ± 15.8, $p = 0.005$) questionnaires. In Egypt, higher scores were also observed in women in the AFA questionnaire (48.1 ± 14.8 vs. 42.9 ± 12.9, $p < 0.001$). In addition, when we explored the final score of the three questionnaires only in women, similar results were obtained in the AFA questionnaire (36.8 ± 11.8 in Spain vs. 48.1 ± 14.8 in Egypt, $p < 0.001$) and the WBIS questionnaire (38.0 ± 15.9 vs. 43.1 ± 13.7, $p < 0.001$). However, in (19.7 ± 20.3, $p = 0.007$) disappeared when only women were analyzed (25.4 ± 17.8 vs. 23.9 ± 19.8, $p = 0.139$).

When the effect of BS was analyzed, contradictory, and opposite trends was observed according to each country. In Spain, the weight loss induced by the bariatric procedure does not seem to affect the total score of any of the three questionnaires (AFA: 38.6 ± 11.9 in subjects with obesity vs. 37.7 ± 12.5 after BS, $p = 0.456$; WBIS: 41.7 ± 15.2 vs. 40.8 ± 14.6, $p = 0.539$; SSI: 28.7 ± 17.4 vs. 27.5 ± 17.5, $p = 0.457$) (Fig. 3). However, in Egypt, BS was accompanied by a significant improvement in the total score of the AFA (50.7 ± 11.5 vs. 34.6 ± 14.4, $p < 0.001$) and WBIS (42.3 ± 11.9 vs. 33.7 ± 11.0, $p < 0.001$), without changes in stigmatizing situations (SSI: 24.8 ± 19.5 vs. 27.2 ± 19.8, $p = 0.185$).

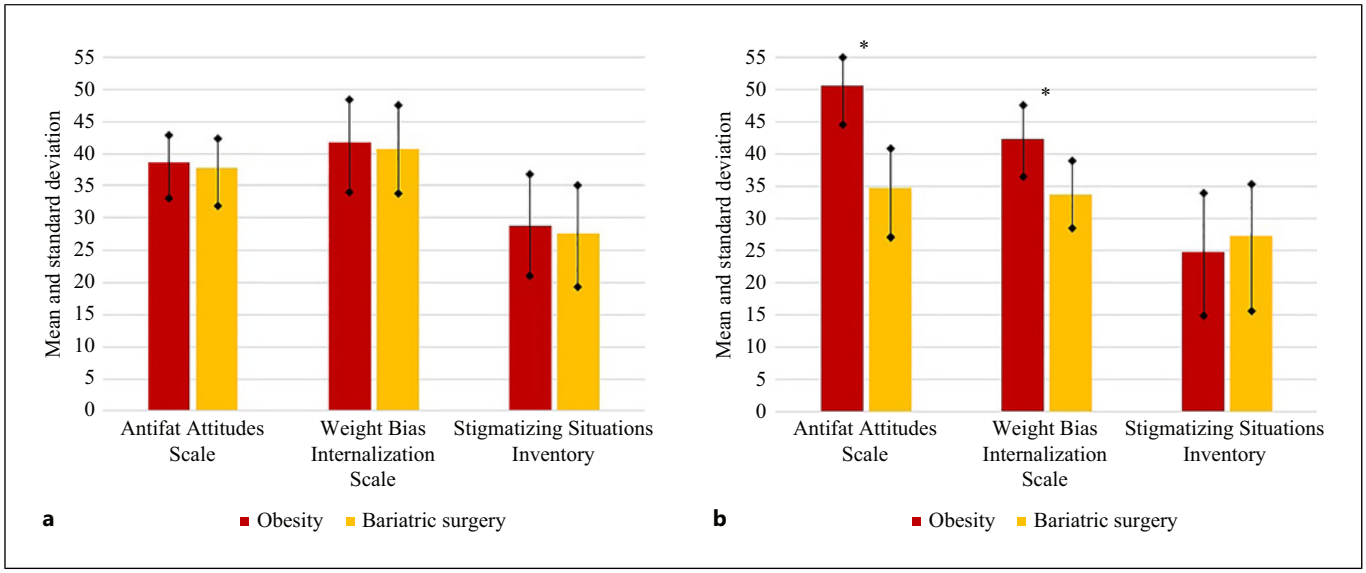

Fig. 3. Results of the three questionnaires evaluating attitudes toward obesity, internalization of weight bias, and experiences of weight-related stigma in patients with obesity and patients who are at least 1-year post-BS in Spain (**a**) and Egypt (**b**). *$p < 0.001$.

The multivariate analysis established the differential role of the country in the questionnaires (Table 3). Living in Egypt appears as an independent risk factor for higher AFA and WBIS scores {odds ratio (OR) 8.20 [95% confidence interval: 6.78–9.62], $p < 0.001$ and OR 6.28 [95% CI: 4.78–7.78], $p < 0.001$, respectively}. However, Spaniards seem to experience more stigmatizing situations than Egyptians (OR −2.54 [6.78–9.62], $p < 0.001$). Moreover, the multivariate analysis also confirmed the role of higher BMI, lower age, female sex, and university degree in relation to the final score of questionnaires. However, the employment status was not a significant variable.

Discussion

This comparative study between Spain and Egypt provides a unique insight into the discrimination and stigma associated with obesity. Although strong differences between both countries exist, data were primarily obtained from public and governmental institutions, with only a few private medical centers (Smart Life Medical Centre in Egypt and Hospital Universitario de Navarra and Clínica Sagrada Familia-CPEN in Spain), ensuring minimal differences in the selection process. Our findings reveal notable differences and similarities in attitudes and experiences concerning weight in both countries. First, the increased aversion toward individuals with obesity in Egypt, compared to Spain, as indicated by higher AFA scores, suggests a more profound cultural impact on obesity perceptions in Egypt. This could be due to specific social norms and body image expectations in the region. Traditionally, weight-related stigma has been viewed as a problem primarily in high-income, industrialized societies that historically valorize thinness, such as the USA, Australasia, and Western Europe. However, emerging evidence suggest that obesity stigma is also becoming a significant issue in middle and lower income populations [20]. This is reinforced by our study, which compares two countries, Egypt and Spain, that show dissimilar poverty rates of 7.8% and 0.4%, respectively [21].

In this study, the positive correlation between BMI and aversion to obesity in both Spain and Egypt indicates a growing perception of stigma with higher weight, mirroring a global trend toward weight-based discrimination [22]. Indeed, a comprehensive survey involving 338,121 individuals across 71 countries revealed that nations with higher obesity rates tend to show stronger implicit negativity towards overweight people compared to thin people [23]. Moreover, our findings are in line with prior research that suggests a universal model of obesity stigma, even in societies traditionally viewed as fat-positive. This points to a widespread global dissemination of negative views on obesity, where anti-fat norms are more prevalent in middle-income and developing countries, such as

Table 3. Multivariable linear regression models to assess the overall scores of the three questionnaires in the entire cohort

	Beta	β (95% CI)	*p* value
Antifat Attitudes Scale (AFA)			
Age	−0.02	–	0.298
Sex (male/female[a])	0.05	1.49 (0.19 to 2.78)	0.024
BMI, kg/m^2	0.12	0.19 (0.12 to 0.26)	<0.001
Country (Spain/Egypt[a])	0.29	8.20 (6.78 to 9.62)	<0.001
Employment status (unemployment/active[a])	−0.42	–	0.055
Educational level (basic/university[a])	0.10	3.29 (1.62 to 4.98)	<0.001
Constant		21.64 (16.79 to 26.50)	<0.001
R^2 = 0 0.132			
Weight Bias Internalization Scale (WBIS)			
Age	−0 0.13	−0.13 (−0.18 to −0.08)	<0.001
Sex (male/female[a])	0.02	–	0.311
BMI, kg/m^2	0.24	0.40 (0.32 to 0.47)	<0.001
Country (Spain/Egypt[a])	0.21	6.28 (4.78 to 7.78)	<0.001
Employment status (unemployment/active[a])	−0.05	−1.43 (−2.72 to −0.15)	0.029
Educational level (basic/university[a])	−0.04	–	0.871
Constant		22.55 (17.45 to 27.65)	<0.001
R^2 = 0.106		–	
Stigmatizing Situations Inventory (SSI)			
Age	−0.12	−0.17 (−0.23 to −0.10)	<0.001
Sex (male/female[a])	0.06	2.50 (0.72 to 4.28)	0.006
BMI, kg/m^2	0.36	0.79 (0.69 to 0.88)	<0.001
Country (Spain/Egypt[a])	−0.06	−2.54 (−9.62 to −6.78)	<0.001
Employment status (unemployment/active[a])	−0.41	–	0.063
Educational level (basic/university[a])	0.10	4.59 (2.28 to 6.90)	<0.001
Constant		1.11 (−5.50 to 7.74)	0.741
R^2 = 0 0.141			

BMI, body mass index. [a]The reference groups for the categorical variables are as follows: female (sex), Egypt (country), active (employment status), and university (educational level).

American Samoa, Mexico, and Paraguay, than in the USA, United Kingdom, and New Zealand [24]. Notably, in Spain, despite lower overall stigma toward obesity, there is an observed increase in weight bias internalization with higher BMI. This could reflect a heightened concern about body image among the Spanish population with overweight and obesity, aligning with trends in Western societies that emphasize thin ideals [25].

The internalization of weight stigma in Spain and Egypt exhibits unique dynamics, potentially shaped by cultural and social factors, as well as the prevalence of obesity. This phenomenon might reflect either a broader cultural acceptance of larger bodies or a resignation to obesity due to its more frequent occurrence and societal normalization [26]. In Spain, with its strong emphasis on the Mediterranean diet and active lifestyle, the internalization of weight stigma could be more pronounced. In a society that places high value on physical appearance and health, individuals with overweight or obesity may feel increased pressure to meet these ideals [27]. Such pressure can intensify stigma internalization, adversely impacting their self-esteem and mental health. Conversely, in Egypt, the decreasing internalization of weight stigma with higher BMI and the stable exposures to stigmatizing experiences regardless of weight is intriguing [28]. This may indicate cultural acceptance of larger bodies, resignation, or normalization due to the higher national prevalence, or perhaps the development of resilience and coping strategies against stigma in Egypt [29]. This assumption aligns with recent research findings by Himmelstein et al. [30] which indicate that coping responses to stigma play an important role in the pathway from stigma to health behaviors. Altogether, these observations highlight the need to consider cultural and social contexts in addressing obesity stigma [31]. They also underline the importance of developing culturally

and country sensitive intervention strategies, acknowledging that perceptions and experiences of obesity can greatly differ between countries. In fact, Spain and Egypt exhibit key contrasts in various aspects. For instance, in 2023, Egypt's unemployment rate was 7.2%, with rates nearly ten times higher for college graduates than for those with elementary education, compared to an unemployment rate of 12.1% in Spain [32]. Additionally, Egypt has one of the world's largest Muslim populations, with 90.0–94.7% of its citizens identifying as Muslim, compared to only 2.6% in Spain [33]. Regarding healthcare systems, despite Egypt's basic universal coverage, the public system suffers from chronic underfunding and high out-of-pocket payments, leading many to prefer private services [34]. In contrast, Spain's National Health System provides primarily free healthcare, ensuring equal access for all citizens. Although these disparities raise concerns about the comparability of both samples, our study captures these contrasts well, reinforcing the validity of our results. Egyptian participants were significantly younger and had higher unemployment rates, while also having a higher percentage of university degrees.

The higher frequency of weight-related stigmatizing experiences in Spain compared to Egypt might be influenced by the widespread use of social media and networks in Spain. In January 2023, Spain had 40.70 million social media users, representing 86.1% of its population, while Egypt had 46.25 million users, accounting for only 41.4% of its population [35, 36]. These platforms often perpetuate negative stereotypes about weight, which can be exacerbated by online anonymity [37]. Social media algorithms might contribute to circulating content that reinforces weight stigma [38, 39]. Such experiences of weight stigma are associated with negative health outcomes, including mental health issues like depression and anxiety, especially in societies where weight stigma is more prevalent and acknowledged, as in Spain [40].

When available, the number of surgeries performed in Egypt is slightly higher than in Spain, equating to 0.0072% of the population in Egypt and 0.0052% in Spain [41]. In our study, the association of BS with stigma reduction varies between both countries. In Egypt, the surgery is associated with improved perceptions and reduction in obesity-related stigma, potentially reflecting more positive societal views on the procedure. This may be influenced by cultural attitudes that view modern medical interventions as effective solutions for obesity [42]. Conversely, in Spain, there are no significant changes in stigma perception between subjects with obesity and those who underwent BS in stigma perception post-surgery. This disparity might stem from different societal expectations and receptions of BS. It is important to recognize that patients undergoing BS face both weight stigma and stigma related to the surgery itself [43]. These cultural and social differences in perceiving the stigma associated with BS could explain the varied outcomes observed in Spain and Egypt [44].

Finally, it is important to recognize the limitations of our study. First, the cross-sectional observational design limits our ability to establish causality between variables. Although the study identifies associations between weight discrimination and factors such as nationality or BMI, it cannot definitively establish direct causation. Second, the data collection, focused on obesity units and their companions in medical centers, may not fully represent the general population of each country, thus limiting the results' generalizability to broader contexts. Thirdly, a modified version of the WBIS questionnaire was designed to be more inclusive of a broader range of weights [45]. However, the original WBIS has also been validated in numerous populations, demonstrating its applicability across non-obesity weight categories [46–48]. Therefore, the decision to use the original WBIS in our study was based on its extensive validation and widespread use in the scientific literature, ensuring comparability of results with previous studies. Fourth, despite adjustments for variables such as age, sex, BMI, country, employment status, and education level, other unmeasured factors (e.g., mental health, information on the prevalence of anxiety and depression, previous stigmatization experiences, media exposure, cultural expectations, health differences, selection mechanisms due to variations in healthcare access and healthcare systems, surgical technique, weight loss evolution after the operation, and postoperative support) could affect who ends up in the sample, potentially introducing bias. Consequently, the reported country differences may partly reflect these selection mechanisms. Lastly, the potential impact of linguistic, cultural, and ethnicity differences on the interpretation and responses to the translated questionnaires should be considered.

Conclusions

In conclusion, our study highlights the complex and varied nature of attitudes towards obesity across different cultures. Understanding these cultural differences is essential in devising more effective and culturally sensitive approaches to address weight stigma. Such strategies are crucial for promoting inclusivity and improving the well-being of individuals with obesity, acknowledging the unique challenges they face in different societal contexts.

Acknowledgments

We thank the Spanish and Egyptian subjects for their participation in this study.

Funding Sources

The Spanish Society for the Study of Obesity (Sociedad Española de Obesidad, SEEDO) supported this study.

Statement of Ethics

The project protocol received approval from both the Arnau de Vilanova University Hospital Ethics Committee (CEIC-2190) and the Tanta University Research Ethics Committee (34005/8/20). Throughout this research, ethical guidelines outlined in the Declaration of Helsinki and Spanish legislation concerning the protection of personal records were strictly adhered to. Participants were invited to voluntarily contribute to the study, and no financial or additional incentives were provided. All individuals who agreed to participate in the research provided written informed consent.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Author Contributions

Conceptualization: A.L. and E.S.; data curation: N.M.E and R.M.E.-S.; formal analysis: A.C. and A.S.-B.; investigation: M.S.H. and H.B.-B; methodology: S.G-M. and L.F.; software: A.M.-S. and F.G.; project administration and supervision: A.L.; visualization: M.S., N.V., J.N., C.M., O.D-T., G.C., and S.C.,; writing – original draft: E.S.; writing – review and editing: N.M.E, R.M.E.-S., and A.L.

Data Availability Statement

The data that support the findings of this study are not publicly available due to their containing information that could compromise the privacy of research participants but are available from the corresponding author (Albert Lecube, alecube@gmail.com).

References

1 World obesity federation, world obesity atlas. 2023. https://data.worldobesity.org/publications/?cat=19
2 Naik Y, Baker P, Ismail SA, Tillmann T, Bash K, Quantz D, et al. Going upstream - an umbrella review of the macroeconomic determinants of health and health inequalities. BMC Public Health. 2019;19(1):1678. https://doi.org/10.1186/s12889-019-7895-6
3 Torraco R. Economic inequality, educational inequity, and reduced career opportunity: a self-perpetuating cycle? New Horiz Adult Educ Hum Resour Dev. 2018;30(1):19–29. https://doi.org/10.1002/nha3.20206
4 Sallis JF, Floyd MF, Rodríguez DA, Saelens BE. Role of built environments in physical activity, obesity, and cardiovascular disease. Circulation. 2012;125(5):729–37. https://doi.org/10.1161/CIRCULATIONAHA.110.969022
5 Larson NI, Story MT, Nelson MC. Neighborhood environments: disparities in access to healthy foods in the U.S. Am J Prev Med. 2009;36(1):74–81. https://doi.org/10.1016/j.amepre.2008.09.025
6 Braveman P, Gottlieb L. The social determinants of health: it's time to consider the causes of the causes. Public Health Rep. 2014;129(Suppl 2):19–31. https://doi.org/10.1177/00333549141291S206
7 Brewis A, Trainer S, Han S, Wutich A. Publically misfitting: extreme weight and the everyday production and reinforcement of felt stigma. Med Anthropol Q. 2017;31(2):257–76. https://doi.org/10.1111/maq.12309
8 Vadiveloo M, Mattei J. Erratum to: perceived weight discrimination and 10-year risk of allostatic load among US adults. Ann Behav Med. 2017;51(1):105. https://doi.org/10.1007/s12160-016-9870-0
9 Teachman BA, Gapinski KD, Brownell KD, Rawlins M, Jeyaram S. Demonstrations of implicit anti-fat bias: the impact of providing causal information and evoking empathy. Health Psychol. 2003;22(1):68–78. https://doi.org/10.1037//0278-6133.22.1.68
10 Daníelsdóttir S, O'Brien KS, Ciao A. Anti-fat prejudice reduction: a review of published studies. Obes Facts. 2010;3(1):47–58. https://doi.org/10.1159/000277067
11 Spahlholz J, Baer N, König HH, Riedel-Heller SG, Luck-Sikorski C. Obesity and discrimination - a systematic review and meta-analysis of observational studies. Obes Rev. 2016;17(1):43–55. https://doi.org/10.1111/obr.12343
12 Sikorski C, Spahlholz J, Hartlev M, Riedel-Heller SG. Weight-based discrimination: an ubiquitary phenomenon? Int J Obes. 2016;40(2):333–7. https://doi.org/10.1038/ijo.2015.165
13 Sánchez E, Ciudin A, Sánchez A, Gutiérrez-Medina S, Valdés N, Flores L, et al. Assessment of obesity stigma and discrimination among Spanish subjects with a wide weight range: the OBESTIGMA study. Front Psychol. 2023;14:1209245. https://doi.org/10.3389/fpsyg.2023.1209245
14 Crandall CS. Prejudice against fat people: ideology and self-interest. J Pers Soc Psychol. 1994;66(5):882–94. https://doi.org/10.1037//0022-3514.66.5.882
15 Durso LE, Latner JD. Understanding self-directed stigma: development of the weight bias internalization scale. Obesity. 2008;16(Suppl 2):S80–6. https://doi.org/10.1038/oby.2008.448
16 Myers A, Rosen JC. Obesity stigmatization and coping: relation to mental health symptoms, body image, and self-esteem. Int J Obes Relat Metab Disord. 1999;23(3):221–30. https://doi.org/10.1038/sj.ijo.0800765
17 Molero F, Recio P, García-Ael C, Fuster MJ, Sanjuán P. Measuring dimensions of perceived discrimination in five stigmatized groups. Soc Indic Res. 2013;114(3):901–14. https://doi.org/10.1007/s11205-012-0179-5
18 Macho S, Andrés A, Saldaña C. Anti-fat attitudes among Spanish general population: psychometric properties of the anti-fat attitudes scale. Clin Obes. 2022;12(6):e12543. https://doi.org/10.1111/cob.12543
19 Vartanian LR. Development and validation of a brief version of the stigmatizing situations inventory. Obes Sci Pract. 2015;1(2):119–25. https://doi.org/10.1002/osp4.11
20 Brewis AA, SturtzSreetharan C, Wutich A. Obesity stigma as a globalizing health challenge. Glob Health. 2018;14(1):20. https://doi.org/10.1186/s12992-018-0337-x
21 World Bank. Poverty and inequality platform. Available from: https://pip.worldbank.org/home (accessed July 21, 2024).
22 Puhl R, Heuer C. The stigma of obesity: a review and update. Obesity. 2009;17(5):941–64. https://doi.org/10.1038/oby.2008.636

23 Marini M, Sriram N, Schnabel K, Maliszewski N, Devos T, Ekehammar B, et al. Overweight people have low levels of implicit weight bias, but overweight nations have high levels of implicit weight bias. PLoS One. 2013;8(12):e83543. https://doi.org/10.1371/journal.pone.0083543
24 Brewis AA, Wutich A, Falletta-Cowden A, Rodriguez-Soto I. Body norms and fat stigma in global perspective. Curr Anthropol. 2011;52(2):269–76. https://doi.org/10.1086/659309
25 Swami V, Frederick DA, Aavik T, Alcalay L, Allik J, Anderson D, et al. The attractive female body weight and female body dissatisfaction in 26 countries across 10 world regions: results of the International Body Project I. Pers Soc Psychol Bull. 2010;36(3):309–25. https://doi.org/10.1177/0146167209359702
26 Musaiger AO, Al-Mannai M, Tayyem R, Al-Lalla O, Ali EYA, Kalam F, et al. Perceived barriers to healthy eating and physical activity among adolescents in seven Arab countries: a cross-cultural study. Sci Rep. 2013;2013(1):3423. https://doi.org/10.1155/2013/232164
27 Bidstrup H, Brennan L, Kaufmann L, de la Piedad Garcia X. Internalised weight stigma as a mediator of the relationship between experienced/perceived weight stigma and biopsychosocial outcomes: a systematic review. Int J Obes. 2022;46:1–9. https://doi.org/10.1038/s41366-021-00982-4
28 Puhl RM, Lessard LM, Pearl RL, Himmelstein MS, Foster GD. International comparisons of weight stigma: addressing a void in the field. Int J Obes. 2021;45(9):1976–85. https://doi.org/10.1038/s41366-021-00860-z
29 Girgis I. Protective factors and processes fostering resilience and buffering psychosocial distress among later-life Egyptian immigrants. J Gerontol Soc Work. 2020;63(1–2):41–77. https://doi.org/10.1080/01634372.2020.1715522
30 Himmelstein MS, Puhl RM, Quinn DM. Weight stigma and health: the mediating role of coping responses. Health Psychol. 2018;37(2):139–47. https://doi.org/10.1037/hea0000575
31 Puhl RM, Lessard LM, Himmelstein MS, Foster GD. The roles of experienced and internalized weight stigma in healthcare experiences: perspectives of adults engaged in weight management across six countries. PLoS One. 2021;16(6):e0251566. https://doi.org/10.1371/journal.pone.0251566
32 International Monetary Fund. World economic outlook—steady but slow: resilience amid divergence. Washington, DC: International Monetary Fund; 2024. Available from: https://www.imf.org/en/Publications/WEO/Issues/2024/04/16/world-economic-outlook-april-2024 (accessed July 21, 2024).
33 World Population Review. Countries by population. Available from: https://worldpopulationreview.com/countries (accessed July 21, 2024).
34 Gericke CA, Britain K, Elmahdawy M, Elsisi G. Health system in Egypt. In: van Ginneken E, Busse R, editors. Health care systems and policies. Health services research. New York, NY: Springer; 2018. Available from: https://doi.org/10.1007/978-1-4614-6419-8_7-1
35 DataReportal. Digital 2023: Egypt — DataReportal – global digital insights. 2023. Available from: https://datareportal.com/reports/digital-2023-egypt
36 DataReportal. Digital 2023: Spain — DataReportal – global digital insights. 2023. Available from: https://datareportal.com/reports/digital-2023-spain
37 López-Guimerà G, Levine MP, Sánchez-Carracedo D, Fauquet J. Influence of mass media on body image and eating disordered attitudes and behaviors in females: a review of effects and processes. Media Psychol. 2010;13(4):387–416. https://doi.org/10.1080/15213269.2010.525737
38 Clark O, Lee MM, Jingree M, O'Dwyer E, Yue Y, Marrero A, et al. Weight stigma and social media: evidence and public health solutions. Front Nutr. 2021;8:622875. https://doi.org/10.3389/fnut.2021.739056
39 Clark O, Lee MM, Jingree M, O'Dwyer E, Yue Y, Marrero A, et al. Weight stigma and social media: evidence and public health solutions. Front Nutr. 2021;8:739056. https://doi.org/10.3389/fnut.2021.739056
40 Sharma S, Wharton S, Forhan M, Kuk J. Influence of weight discrimination on weight loss goals and self-selected weight loss interventions. Clin Obes. 2011;1(4–6):153–60. https://doi.org/10.1111/j.1758-8111.2011.00028.x
41 Angrisani L, Santonicola A, Iovino P, Formisano G, Buchwald H, Scopinaro N. Bariatric surgery worldwide 2013. Obes Surg. 2015;25(10):1822–32. https://doi.org/10.1007/s11695-015-1657-z
42 Sarwer DB, Wadden TA, Fabricatore AN. Psychosocial and behavioral aspects of bariatric surgery. Obes Res. 2005;13(4):639–48. https://doi.org/10.1038/oby.2005.71
43 Garcia FK, Mulder BC, Hazebroek EJ, Koelen MA, Veen EJ, Verkooijen KT. Bariatric surgery stigma from the perspective of patients: a scoping review. J Adv Nurs. 2024;80(6):2252–72. https://doi.org/10.1111/jan.15994
44 Himmelstein MS, Knepp KA, Phelan SM. The role of weight stigma in weight regain in bariatric surgery. Front Endocrinol. 2022;13:1076696. https://doi.org/10.3389/fendo.2022.1076696
45 Pearl RL, Puhl RM. Measuring internalized weight attitudes across body weight categories: validation of the modified weight bias internalization scale. Body Image. 2014;11(1):89–92. https://doi.org/10.1016/j.bodyim.2013.09.005
46 Bernard M, Löbner M, Lordick F, Mehnert-Theuerkauf A, Riedel-Heller SG, Luck-Sikorski C. Cancer prevention in females with and without obesity: does perceived and internalised weight bias determine cancer prevention behaviour? BMC Womens Health. 2022;22(1):511. https://doi.org/10.1186/s12905-022-02085-2
47 Fields LC, Brown C, Skelton JA, Cain KS, Cohen GM. Internalized weight bias, teasing, and self-esteem in children with overweight or obesity. Child Obes. 2021;17(1):43–50. https://doi.org/10.1089/chi.2020.0150
48 Durso LE, Latner JD, Ciao AC. Weight bias internalization in treatment-seeking overweight adults: psychometric validation and associations with self-esteem, body image, and mood symptoms. Eat Behav. 2016;21:104–8. https://doi.org/10.1016/j.eatbeh.2016.01.011