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CLINICAL & BASIC RESEARCH

Stigmatisation of Obesity and its Relation to the Perception of Controllability in Riyadh, Saudi Arabia

A cross-sectional study

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abstract: ***Objectives:*** This study assessed the stigmatisation of obesity among a sample of the general population in Riyadh and its association with the perception of controllability. ***Methods:*** A cross-sectional analytical study was conducted in Riyadh, Saudi Arabia, during January–February 2021. The data were collected through a self-administrated online questionnaire. Statistical analysis was performed using John's Macintosh Project, Version 16.0.0. ***Results:*** A total of 525 participants were recruited via convenience sampling. The majority of the participants exhibited a low level of stigma towards obesity (72.8%), and gender and BMI were significantly associated with the level of stigma (P = 0.0023 and 0.0360, respectively). The association between the perception of controllable factors and the level of stigma was also significant (P = 0.0001). ***Conclusion:*** A significant association was found between the stigmatisation of obesity and the perception of controllability among the general population in Riyadh. Recommendations should be based on joint international consensus statements for ending obesity stigmatisation in different settings and categories; healthcare service providers and obese patients should be educated on the relationships demonstrated in these findings.

Keywords: Obesity; Social Stigma; Perception; Saudi Arabia.

Advances in Knowledge

- *A low level of obesity stigmatisation is found among the general population of Riyadh, Saudi Arabia.*
- *Gender has a statistically significant association with the level of obesity stigmatisation.*
- *The stigmatisation of obesity is significantly associated with the perception of controllability.*

Application to Patient Care

- *Policies are required to prevent weight stigmatisation in different settings, including healthcare.*
- *Promoting better healthcare services for obese patients should include educating healthcare providers on obesity stigmatisation in relation to controllability perceptions.*
- *The healthcare service provided to obese patients should include educational sessions on tackling stigmatisation incidents and the relation of stigmatisation to controllability perceptions in the attitudes of those holding the stigmatised views.*

Obesity is one of the most common and preventable public health issues affecting individuals of both genders and all ages worldwide.[1] The global prevalence of obesity has increased almost three-fold in the previous four decades. In 2017, the World Health Organisation (WHO) estimated that 39% of adults are overweight and 13% are obese, while 18% of children and adolescents are affected by being either overweight or obese.[2] Being overweight or obese is defined by WHO as "abnormal or excessive fat accumulation that presents a risk to health. A body mass index (BMI) over 25 is considered overweight, and over 30 is obese".[2]

In Saudi Arabia, the shift away from a traditional way of living to a Westernised lifestyle and the reduction in the level of physical activity have been recognisable risk factors contributing to the growing numbers of individuals who are obese or overweight.[3] In 2014, 3.6 million Saudis aged ≥15 years were obese; the prevalence was approximately 24.1% for men and 33.5% for women.[1] Being overweight and obese is associated with several health issues that lead to the development of other non-communicable diseases such as diabetes, heart diseases and cancer, that increase mortality rates.[2,4] Therefore, obesity management is essential for non-communicable disease prevention and the promotion of quality of life.[5]

Historically, overweight or obese individuals were positively perceived in Saudi culture, as excess body

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weight was an indicator of high income and wealth for men and good fertility in women.[1] However, in recent years, obese people have been challenged by stigmatisation at a personal level because of their excess weight and shape.[6] Stigma can be defined as "the co-occurrence of labeling, stereotyping, separation, status loss, and discrimination in a context in which power is exercised".[7] More than 60 years ago, racial and ethnic discrimination was more prevalent in the world than obesity stigmatisation; however, current statistics have demonstrated that obesity stigma is becoming more prevalent compared with similar attitudes towards race and ethnicity.[8] This shift has been attributed to Westernisation and the idolisation of 'thinness', which is associated with the recent social changes in Saudi Arabia.[9]

The stigmatisation of obesity exerts multiple negative effects on obese individuals, such as further weight gain and a deteriorated health status. Some medical ethicists believe that exercising weight stigmatisation and socially pressuring overweight and obese individuals to lose weight might discourage their attempts at weight management.[8] Overweight and obesity stigmatisation can create obstacles to an individual's daily activities, in turn leading to depression, shame and guilt, social isolation and lower work produtivity.[5] In a study conducted in the United States with 13,692 heavy adults, 5,079 adults exhibited dangerous consequences of weight stigma that can lead to increased mortality. People who reported experiencing weight discrimination had a 60% increased risk of dying for several reasons, including poor healthcare services or alcohol and substance abuse.[8]

Weight stigma leads individuals to develop a distorted and dysfunctional self-image, especially when they are unable to manage their weight. Therefore, this discrimination can create various mental health issues, including affecting attitudes and increasing the risk of an individual experiencing depression, low self-esteem and low quality of life.[8,10] A study conducted at a university in Northeastern United States discovered that people had negative feelings, such as disgust, towards overweight and obese people.[11] Furthermore, new scientific evidence estimates that there are increases in weight gain and reductions in metabolic rate due to weight stigma.[6] Over the last 10 years, the United States has reported higher incidents of weight discrimination. Unfair treatment owing to weight stigmatisation has been reported in employment, educational and even healthcare settings. Employers have exhibited multiple stereotypical attitudes against overweight and obese workers, such as in hiring, salary levels and promotions. In 2006, a study conducted in the United States with more than 2,000 participants reported that 25% of overweight individuals had faced job discrimination.[6] Furthermore, another study highlighted that more than half (54%) of employees were subject to weight stigmatisation from their colleagues at work, whereas 43% reported weight stigmatisation from their supervisors.[12]

In healthcare settings, patients who are obese or overweight can also be affected by situations that involve a weight bias. In addition, negative attitudes from healthcare professionals, such as physicians, nurses, psychologists and medical students, towards their obese patients have been registered. These healthcare professionals have commonly stereotyped obese patients as lazy, uncommitted and lacking the power to control their weight.[6]

Research in educational environments in the context of this topic is less prominent than what has been conducted in healthcare and employment environments. Overweight or obese students in educational settings are often stigmatised by their peers, teachers or even their parents.[6] A nationwide study conducted in Saudi Arabia that included 4,709 participants revealed that the prevalence of obesity stigmatisation is 46.4%.[13] Another study involving 1,459 participants indicated that obese people in Saudi Arabia face stigmatisation manifested in different forms, including primarily negative behaviours (25.6%), bad comments (25.4%) and physical barriers (25.2%).[14] Interestingly, a recent study explored weight self-stigma in Jazan (southern region of Saudi Arabia) and demonstrated that weight self-stigma was positively associated with BMI.[15]

The attribution theory developed by Weiner 16 may provide a plausible explanation for the stigmatisation of a person or group of people.[16] Weiner 17 suggested that antipathy towards a specific group is the result of believing that, that specific group can control their behaviours.[17] In the context of overweight and obese individuals, evidence has confirmed that weight stigma has increased rates of association with attributions of attempting to control a person's weight.[18] Attribution theory seeks to explain why people behave in a certain manner against a specific group based on their perceptions of the controllability of that group.[17] To manage the problem of the obesity epidemic, addressing this other aspect of the epidemic, which is weight stigma attitudes, is obligatory.[8] Indeed, decreasing stigmatisation will improve the overall quality of life and minimise mental health issues among obese people by removing stereotypes, discrimination and prejudices.

The existing literature centred on Saudi Arabia regarding the stigmatisation of obesity with a focus on body image and preferences and the effect of stigma

is scarce despite obesity being recognised as a public health problem that has been exhaustively investigated in Saudi Arabia. The current study's hypothesis is that a significant association exists between the stigmatisation of obesity and the perception of controllability among the general population in Riyadh City.

Methods

This cross-sectional study was conducted in Riyadh City, Saudi Arabia, from January to February 2021. The inclusion criteria included Saudi and non-Saudi individuals of both genders who were residents of Riyadh City and aged ≥18 years. A non-probability, convenient sampling technique was utilised. A brief introduction about the aim of the research and the target population, in addition to a link to the first page of the electronic questionnaire, was distributed through messaging applications such as WhatsApp (Meta Platforms, Inc., Menlo Park, California, USA) and Telegram (Telegram FZ LLC, Tortola, British Virgin Islands). The sample size was calculated manually with a 95% confidence interval multiplied by a design effect of one. The prevalence of stigma was estimated to be 50% and the total population under study was >10,000. After 10% was added to account for any incomplete data, the necessary sample size was calculated to be 422 participants.

A self-administrated online questionnaire was hosted by Microsoft Forms (Microsoft Corporation, Redmond, Washington, USA), which was utilised for data collection. The questionnaire was distributed in both Arabic and English. The questionnaire was developed and guided by the Obese Stereotypes and Causes of Obesity Scale and the Anti-fat Attitudes Test.[14,15] The tool comprised three sections. The first included nine questions about sociodemographic characteristics including gender, age, nationality, level of education, marital status, monthly income, workplace, height in meters and body weight in kg. The last two questions were used for BMI calculations. The participants were then categorised on the basis of the WHO guidelines: underweight (<18.50 kg/m^2), normal (18.50–24.99 kg/m^2), overweight (≥25.00 kg/m^2) and obese (≥30.00 kg/m^2).[16] BMI could not be calculated for 14 of the participants as they did not provide the required information.

The second section assessed obesity stereotypes and social appearance/status, character/personality, physical and romantic aspects, and attractiveness aspects in addition to weight control. It comprised 20 questions assessed on the basis of a five-point Likert scale. The highest score of 5 was given to 'strongly agree' and the lowest of 1 was given to 'strongly disagree'. One question was scored in reverse ('obese people are just as competent in their work as anyone else'), for which a score of 1 was given to 'strongly agree' and a score of 5 to 'strongly disagree'. The highest possible score was 100 and the lowest was 20. The data were interpreted based on percentages, in which the respondents with scores between 20.0 and 46.6 were categorised as having a low level of stigma. The respondents who scored between 46.7 and 73.3 were categorised as having moderate stigma. Finally, those who scored 73.4 or higher were categorised as having high stigma.

The last section assessed the perceptions concerning the controllability of obese individuals. It consisted of six questions, assessed on a five-point Likert scale. The first three questions were scored with 5 as 'strongly agree' and 1 as 'strongly disagree'. The last three questions were reversed, that is, 'strongly agree' was scored as 1 and 'strongly disagree' was scored as 5. The highest possible score for this section was 15 and the lowest was 3. The scores were divided into high, moderate and low levels of controllability. The respondents with a score between 3 and 6 were categorised as having low levels of controllability. The respondents who scored between 7 and 10 were categorised as having moderate levels of controllability, and those with scores of 11–15 were categorised as having high levels of controllability.

A pilot study was conducted involving 10% of the estimated sample size (n = 43) but was completed by more individuals (n = 45). The pilot took place in January 2021 to test the clarity and feasibility of the questionnaire. Three questions were reported as vague by the pilot participants and were subsequently modified for clarity. The face validity was tested in terms of layout, feasibility and clarity of wording. Moreover, the questionnaire was validated by experts in the fields of nutrition and public health. Reliability was assessed using Cronbach's alpha. Section two of the questionnaire showed high reliability with a score of $\alpha = 0.8500$. Section three showed acceptable reliability with a score of $\alpha = 0.6519$ after excluding three questions.

The data were coded and analysed using John's Macintosh Project, Version 16.0.0 (SAS Institute Inc., Cary, North Carolina, USA). The descriptive data were presented as numbers and frequencies. The data were analysed according to the type of measure; categorical variables were presented in frequency tables and graphs. Associations between two categorical data variables were tested using the Chi-squared test of independent samples t-test. A P value of <0.05 was considered to be statistically significant.

Table 1: Characteristics of the studied sample from Riyadh, Saudi Arabia (N = 525)

Characteristic	n (%)
Gender	
Female	329 (62.7)
Male	196 (37.3)
Age in years	
18–28	220 (41.9)
29–39	156 (29.7)
≥40	149 (28.4)
Nationality	
Saudi	503 (95.8)
Non-Saudi	22 (4.2)
Marital status	
Married	278 (53.0)
Not married	247 (47.0)
Level of education	
Less than high school	16 (3.0)
High school or diploma	87 (16.6)
Bachelor's degree	360 (68.6)
Higher education	62 (11.8)
Workplace	
Unemployed	196 (37.3)
Government sector	165 (31.4)
Private sector	120 (22.9)
Freelance	13 (2.5)
Retired	31 (5.9)
Monthly income in SAR	
<8,000	250 (47.6)
8,000–16,000	180 (34.3)
>16,000	95 (18.1)
BMI categories (n = 510)*	
Underweight	26 (5.1)
Normal weight	188 (36.9)
Overweight	170 (33.3)
Obese	126 (24.7)

SAR = Saudi Riyals; BMI = body mass index.

**BMI categories: underweight is <18.50 kg/m²; normal is 18.50–24.99 kg/m²; overweight is ≥25.00 kg/m²; and obese is ≥30.00 kg/m².*

Ethical approval number 20-0516 was obtained from the Institutional Review Board at Princess Nourah bint Abdulrahman University (PNU). The research was performed in accordance with relevant guidelines/regulations. Informed consent was obtained on the first page of the questionnaire before the respondents provided any responses. Participation in the research was voluntary, the data were confidential and there was no expected harm or risk to the participants.

Table 2: Level of stigma and perceived controllability towards obesity in the studied sample (N = 525)

	n (%)
Level of stigma (score range)	
Low (20.0–46.6)	382 (72.8)
Moderate (46.7–73.3)	141(26.9)
High (73.4–100.0)	2 (0.4)
Level of controllability (score range)	
Low (3–6)	67 (12.8)
Moderate (7–10)	272 (51.8)
High (11–15)	186 (35.4)

Results

A total of 533 participants responded but eight were excluded because they were under 18 years of age, resulting in a final total sample size of 525. Female participants represented 62.7% of the study sample, and participants aged 18–28 years constituted 41.9% of the sample. Most of the participants were Saudis (95.8%) and almost half were married (53.0%). In terms of educational qualification and employment, 68.6% reported that they had a bachelor's degree, whereas 37.3% were unemployed. As for monthly income, 47.6% reported earning less than 8,000 SAR. Finally, on the basis of the height and weight values provided by the respondents, BMI values were calculated for 510 individuals. More than half of the study population was either overweight or obese (33.3% and 24.7%, respectively). More than one-third had a normal BMI (36.9%) and only 5.1% were underweight [Table 1].

The majority of the participants had a low level of stigma (72.8%) and only two participants showed a high level of stigma (0.4%). Slightly more than half (51.8%) and more than one-third (35.4%) of the participants had moderate or high levels of perception of controllability regarding obesity, respectively [Table 2].

Only 0.4% of the sample was categorised as having a high level of stigmatisation, which does not provide good implications for the study analysis capability. Therefore, a category of moderate to high was created, and the associations were calculated for the two categories. Characteristics significantly associated with stigma were found to be gender (P = 0.0023) and BMI (P = 0.0360) [Table 3].

Table 3: Association between the level of stigma towards obesity and the sociodemographic characteristics of the studied sample (N = 525)

Characteristic	n (%)		
	Low (n = 382)	Moderate-to-high (n = 143)	*P* value*
Gender			0.0023
Male	127 (33.3)	74 (51.8)	
Female	255 (66.8)	69 (48.3)	
Age in years			0.1558
18–28	169 (44.2)	51 (36.2)	
29–39	106 (27.8)	50 (35.0)	
≥40	107 (28.0)	42 (29.4)	
Nationality			0.1487
Saudi	366 (95.8)	137 (95.8)	
Non-Saudi	16 (4.2)	6 (4.2)	
Marital status			0.6948
Married	200 (52.4)	78 (54.6)	
Not married	182 (47.6)	65 (45.5)	
Level of education			0.9844
Less than high school	12 (3.1)	4 (2.8)	
High school/ diploma	62 (16.2)	25 (17.5)	
Bachelor's degree	263 (68.8)	97 (67.8)	
Higher education	45 (11.8)	17 (11.9)	
Workplace			0.2938
Unemployed	151 (39.5)	45 (31.5)	
Government sector	117 (30.6)	48 (33.6)	
Private sector	84 (22.0)	36 (25.2)	
Freelance	7 (1.8)	6 (4.2)	
Retired	23 (6.0)	8 (5.6)	
Monthly income in SAR			0.3372
<8,000	185 (48.4)	65 (45.5)	
8,000–16,000	129 (33.8)	51 (35.7)	
>16,000	68 (17.8)	27 (18.9)	
BMI category (n = 510)†	(n = 370)	(n = 138)	0.0360
Underweight	24 (6.5)	2 (1.4)	
Normal weight	134 (36.2)	54 (38.6)	
Overweight	115 (31.1)	52 (39.3)	
Obese	97 (26.2)	28 (20.7)	

SAR = Saudi Riyals; BMI = body mass index.

**Using Chi-squared test; †BMI categories: underweight is < 18.50 kg/m²; normal is 18.50–24.99 kg/m²; overweight is ≥25.00 kg/m²; and obese is ≥30.00 kg/m².*

Table 4: Association between stigmatisation level and its relation to the perception of controllability (N = 525)

Level of controllability	n (%)		*P* value*
	Low	Moderate-to-high	
Low	59 (15.5)	8 (5.6)	0.0001
Moderate	215 (56.3)	57 (39.9)	
High	108 (20.6)	78 (54.6)	
Total	382 (72.8)	143 (26.9)	

**Using Chi-squared test.*

Table 5: Multiple logistic regression with gender, nationality, body mass index and controllability

Parameter estimates			
Term	**Estimate ± SE**	**Chi-squared**	**Prob > Chi-squared**
Intercept	−1.5291252 ± 0.3361126	20.07	<0.0001
Gender			
Female	−0.2397304 ± 0.1066013	5.06	0.0245
Nationality			
Saudi	0.04284096 ± 0.2654482	0.03	0.8718
BMI			
Normal weight	0.42743278 ± 0.2358471	3.28	0.0699
Overweight	0.53475875 ± 0.2387129	5.02	0.0251
Obese	0.11420282 ± 0.2561442	0.20	0.6557
Controllability			
Low	−0.7423099 ± 0.2635433	7.93	0.0049
High	0.85041049 ± 0.1707867	24.79	<0.0001

SE = standard error; Prob = probability.

More than half of the participants who had a high level of perception regarding controllability also had a low level of stigma. A significant association was observed between the perception of controllability and the level of stigma (*P* = 0.0001) [Table 4].

The multivariate logistic regression for assessing which factors successfully predict intention showed

that being a female was a negative predictor of stigma, while being overweight with a high perception of controllability positively predicted stigma [Table 5].

Discussion

This study assessed the stigmatisation of obesity and its relation to the perception of controllability among a sample from the general population in Riyadh City. The research findings support the hypothesis as a significant association (P = 0.0001) was observed between obesity stigmatisation and the perception of controllability. Slightly less than one-third of the participants showed moderate stigma and a majority exhibited a low level of stigma. This result is in concordance with previous findings that have demonstrated weight stigma of a mild form among the general public in Riyadh.[19]

Over the past decade in the United States, discrimination regarding obesity has increased by approximately 66% compared with other forms of discrimination, such as those related to race.[20] This can be attributed to weight stigma often being considered normal behaviour in society. Furthermore, some people think sharing jokes about obese individuals is humorous and acceptable. Moreover, TV and other forms of media often present negative stereotypes about obese individuals, such as them being lazy and irresponsible.[14] Therefore, it is essential to shift societal attitudes and media representations of obesity. This requires a multifaceted approach involving policy changes and enhanced education and training.[21]

The present study confirms that gender has a significant relationship with stigma, wherein males showed more stigma towards obesity compared to females. In fact, the multiple logistic regression model revealed that being female is a negative predictor of stigma. In agreement with the current study's finding, Flint *et al*. reported that males exhibited significantly more stigma towards obesity than females in the United Kingdom (P <0.05).[21] Similarly, Turkish male university students showed a higher stigma towards obese people compared to females.[22] These results might be attributed to the societal pressures females face regarding how a female's body shape should appear, which affects their emotions, in turn, making them more mindful of others' feelings when it comes to physical appearance.[24] These insights indicate the need for gender-sensitive approaches in tackling weight stigma.[21] The current study showed that 44.2% of those with low stigma were in the age range of 18–28 years. This could be explained by the fact that this young age group tends to be more knowledgeable about the negative effects of the stigmatisation of obese people. However, these findings are different from those presented by Jackson *et al*., which indicated that younger age groups exhibit higher rates of weight discrimination.[24]

This study found that BMI was significantly associated with stigma (P = 0.0360), wherein being overweight specifically positively predicted stigma. Furthermore, 38.6% of those with moderate to high stigma were of normal weight and 39.3% of those with moderate to high stigma were overweight. Only 20.7% of those with moderate to high stigma were obese. A study conducted in the United Kingdom argued that underweight or overweight individuals had higher stigmatisation rates than those from other BMI groups.[21]

According to the results of the present study, 20.6% of the participants had a high perception of controllability regarding obesity and a low level of obesity stigma. In addition, the level of stigma was significantly associated with the perceptions of controllability regarding obesity. The multiple logistic regression model revealed that being overweight was a positive predictor of stigma. This can be explained by attribution theory, which discusses how weight stigma increases when the factors are controllable and decreases when the factors are uncontrollable.[18] This result supports the study published by Khan, *et al*.[25] These authors revealed that when people know that the cause of obesity constitutes uncontrollable factors, such as genetics, they express low stigma and are highly empathetic towards obese people. However, when they know that the cause constitutes controllable factors, such as behaviour, they express high levels of stigma and have low levels of empathy towards obese people.

These findings align with the recommendations of the Joint International Consensus Statements for Ending Stigma of Obesity, which advocate for establishing strong policies to bridge the gap between public health efforts and the general population's perception of obesity. In healthcare settings, professionals should be trained to treat obese individuals with empathy and understanding, moving away from simplistic views of obesity as a matter of "calories in, calories out".[21]

The present study's uniqueness comes from its attempt to understand the root cause of stigmatisation by employing the attribution theory to assess obesity stigma and its relation to the perception of controllability. Furthermore, this study's strength lies in theoretical basis. In terms of limitations, as the sampling technique was based on a non-probability convenience technique, the results may not be generalisable. However, the study findings are of

importance, as they provide an explanation for one of the root causes of obesity stigmatisation. Another limitation of the study could be the self-reporting of anthropometric measurements by the participants, which may have affected the accuracy of the BMI categorisation. However, Allison, *et al.* indicated that categorising BMI based on such values is more precise than using continuous values of BMI when self-reported measures are used in health-related interventions.[26] This was the case in the current study.

Conclusion

This research supports the hypothesis that a significant association can be observed between obesity stigmatisation and the perception of controllability among the general population in Riyadh City on the basis of the recruited sample. The recommendations were primarily based on joint international consensus statements for ending obesity stigmatisation in different settings and categories. It is highly recommended to establish strong policies that set a primary goal of bridging the gap between public health efforts and the general population in weight discriminating settings, such as healthcare settings, education environments and workplaces. For example, in healthcare settings, individuals who are trained to treat obese people should be concerned and encourage them to seek medical help, besides shifting their attributions in messages from focusing solely on diet and exercise that can be controllable factors for people to include other attributions that can be uncontrollable. Understanding the aetiology of obesity rather than just adopting the traditional approach to obesity management is critical. Additionally, transforming media portrayals of obesity and considering gender-sensitive methods in tackling weight stigma is essential. It is also recommended to conduct additional research in other cities in Saudi Arabia to provide a more holistic insight into whether stigmatisation possibly influences obese people.

AUTHORS' CONTRIBUTION

All authors substantially contributed to the design of the study. NF, SAA and SHA collected the data and performed the statistical analysis and literature review. All authors participated in the interpretation of the results and manuscript drafting. FA, NB and MA revised the manuscript and edited the English. All authors approved the final version of the manuscript.

CONFLICT OF INTEREST

The authors declare no conflict of interests.

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References

1. Memish ZA, El Bcheraoui C, Tuffaha M, Robinson M, Daoud F, Jaber S, et al. Obesity and associated factors--Kingdom of Saudi Arabia, 2013. Prev Chronic Dis 2014; 11:E174. https://doi.org/10.5888/pcd11.140236.
2. WHO. Obesity. From: https://www.who.int/health-topics/obesity#tab=tab_1 Accessed: Nov 2022.
3. Al-Shehri FS, Moqbel MM, Al-Khaldi YM, Al-Shahrani AM, Abu-Melha WS, Alqahtani AR, et al. Prevention and management of obesity: Saudi guideline update. Saudi Journal of Obesity 2016; 4:25–40. https://doi.org/10.4103/2347-2618.184970.
4. Waxman A; World Health Assembly. WHO global strategy on diet, physical activity and health. Food Nutr Bull 2004; 25:292–302. https://doi.org/10.1177/156482650402500310.
5. Mayo Clinic. Obesity. From: https://www.mayoclinic.org/diseases-conditions/obesity/symptoms-causes/syc-20375742 Accessed: Nov 2022.
6. Puhl RM, Heuer CA. The stigma of obesity: A review and update. Obesity (Silver Spring) 2009; 17:941–64. https://doi.org/10.1038/oby.2008.636.
7. Hatzenbuehler ML, Phelan JC, Link BG. Stigma as a fundamental cause of population health inequalities. Am J Public Health 2013; 103:813–21. https://doi.org/10.2105/AJPH.2012.301069.
8. Tomiyama AJ, Carr D, Granberg EM, Major B, Robinson E, Sutin AR, et al. How and why weight stigma drives the obesity 'epidemic' and harms health. BMC Med 2018; 16:123. https://doi.org/10.1186/s12916-018-1116-5.
9. Swami V. Cultural influences on body size ideals: Unpacking the impact of Westernization and modernization. European Psychologist 2015; 20:44–51. https://doi.org/10.1027/1016-9040/a000150.
10. AlShebali M, AlHadi A, Waller G. The impact of ongoing westernization on eating disorders and body image dissatisfaction in a sample of undergraduate Saudi women. Eat Weight Disord 2021; 26:1835–44. https://doi.org/10.1007/s40519-020-01028-w.
11. Phelan SM, Burgess DJ, Yeazel MW, Hellerstedt WL, Griffin JM, van Ryn M. Impact of weight bias and stigma on quality of care and outcomes for patients with obesity. Obes Rev 2015; 16:319–26. https://doi.org/10.1111/obr.12266.
12. Vartanian LR. Disgust and perceived control in attitudes toward obese people. Int J Obes 2010; 34:1302–7. https://doi.org/10.1038/ijo.2010.45.
13. Althumiri NA, Basyouni MH, AlMousa N, AlJuwaysim, MF, Alhamdan AA, Al-Qahtani FS, et al. Exploring weight stigma in Saudi Arabia: A nationwide cross-sectional study. Int J Environ Res Public Health 2021; 18:9141. https://doi.org/10.3390/ijerph18179141.
14. Alenazy FR, Almutairi A. The effect of obesity stigma on obese people, Saudi Arabia, 2020. Middle East J Fam Med 2021; 19:65–74.
15. Khodari BH, Shami MO, Shajry RM, Shami JA, Names AA, Alamer AA, et al. The relationship between weight self-stigma and quality of life among youth in the Jazan region, Saudi Arabia. Cureus 2021; 13:e18158. https://doi.org/10.7759/cureus.18158.
16. Weiner B. An attribution theory of motivation and emotion. Series in Clinical & Community Psychology: Achievement, Stress, & Anxiety 1982: 223–45.
17. Weiner B. An Attributional Theory of Motivation and Emotion. Berlin, Germany: Springer Science & Business Media, 2012.

18. O'Brien KS, Puhl RM, Latner JD, Lynott D, Reid JD, Vakhitova Z, et al. The effect of a food addiction explanation model for weight control and obesity on weight stigma. Nutrients 2020; 12:294. https://doi.org/10.3390/nu12020294.

19. Turki MA, Sudersanadas K, Wujd S, Tofail AA, Marshad YA, Sherbini LA, et al. Socio-demographic determinants of obesity stigma among the general public from RIYADH, KSA. Int J Current Research 2020; 12:14885–90.

20. Brandheim S. A Systemic Stigmatization of Fat People. Doctoral thesis, 2013, Karlstad University, Karlstad, Sweden.

21. Flint SW, Hudson J, Lavallee D: UK adults' implicit and explicit attitudes towards obesity: A cross-sectional study. BMC Obesity 2015; 2:31. https://doi.org/10.1186/s40608-015-0064-2.

22. Yildiz M, Yalcinoz Baysal H. Prejudice against obesity in university students studying in health-related departments. Perspect Psychiatr Care 2019; 55:170–4. https://doi.org/10.1111/ppc.12314.

23. Puhl RM, Latner J, O'Brien K, Luedicke J, Danielsdottir S, Forhan M. A multinational examination of weight bias: Predictors of anti-fat attitudes across four countries. Int J Obes 2015; 39:1166–73. https://doi.org/10.1038/ijo.2015.32.

24. Jackson SE, Steptoe A, Beeken RJ, Croker H, Wardle J. Perceived weight discrimination in England: A population-based study of adults aged >50 years. Int J Obes (Lond) 2015; 39:858–64. https://doi.org/10.1038/ijo.2014.186.

25. Khan SS, Tarrant M, Weston D, Shah P, Farrow C. Can raising awareness about the psychological causes of obesity reduce obesity stigma? Health Commun 2018; 33:585–92. https://doi.org/10.1080/10410236.2017.1283566.

26. Allison C, Colby S, Opoku-Acheampong A., Kidd T, Kattelmann K, Olfert MD, et al. Accuracy of self-reported BMI using objective measurement in high school students. J Nutr Sci 2020; 9:e35. https://doi.org/10.1017/jns.2020.28.

27. Rubino F, Puhl RM, Cummings DE, Eckel RH, Ryan DH, Mechanick JI, et al. Joint international consensus statement for ending stigma of obesity. Nat Med 2020; 26:485–97. https://doi.org/10.1038/s41591-020-0803-x.