

Research Article

Psychosocial predictors of weight bias among undergraduate students of Karachi, Pakistan

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Background

Weight bias refers to negative attitudes towards individuals based on their body weight perceived from their physique. The rising prevalence of this kind of discrimination has raised concerns about its effects on the physical and mental health of its victims. Overweight individuals are especially affected leading to a higher incidence of depression and anxiety among them. While there is an abundance of data concerning this problem in the west, barely any data exists in Pakistan.

Methods

In January 2018, we conducted a cross-sectional study to assess both the psychological and social reasons for weight bias prevalent in the undergraduate students of Karachi. Undergraduate students from Karachi were included in the study, primarily medical students. Data was collected using a pre-specified questionnaire. Data were analyzed using Statistical Package for the Social Sciences program.

Results

Out of the 399 individuals who were included in the study, 68.4% (n=273) were females. An overwhelming majority (72.2%, n=288) believed overweight people were lazy while 57.1% (n=228) admitted to having been body-shamed. One-third (33.3%, n=133) believed physique is important for success, yet, only 20.6% (n=82) idolized physical features of media personalities. Females were more likely to be criticized for their weight ($P=0.037$) and to be pressurized to lose weight by their families ($P=0.04$). On the other hand, males were more likely to mock people for their weight ($P<0.001$), keep a record of their exercise ($P=0.002$) and to experience euphoric feelings during exercise ($P=0.025$).

Conclusions

Reductions in weight bias at the population level is a necessity since weight-related issues have found to be associated with the population's mental and physical well-being. Studies that test the impact of new strategies eradicating negative attitudes towards overweight individuals are needed.

Weight bias or weight stigma refers to negative attitudes and discrimination against individuals based on their apparent body weight and size.¹ Body weight and size being highly visible personal characteristics, if not within the range that is generally perceived as ideal and attractive, can evoke strong reactions from others.² For instance, it is commonly perceived that overweight people are generally lazy, ill-disciplined and weak-willed. This is further reinforced by societal constructs which tend to associate thinness with desirable traits such as elegance, youthfulness, success and better health.³⁻⁵ As a result, overweight or obese people become victims of low self-esteem, depression and hence; are more prone to a variety of pathological eating disorders such as bulimia and anorexia nervosa.^{6,7} On the contrary, there are those who are shamed for being too thin and are

incidentally seen as weak or as recipients of poor health. However, there is barely any literature available which discusses the impact of such bias on its victims.

Body image is becoming an increasingly popular source of interest worldwide. With mass media projecting a particular image of the perfect physique, coupled with peer pressure, weight bias has become a common practice in our society. This phenomenon is no longer limited to the developed world but has now seeped into the developing world as well, which has also adopted the western ideals of beauty.

Despite this, the number of overweight people is rising daily, and we are experiencing an epidemic of obesity.⁸ Extended work hours and a sedentary lifestyle have also contributed to this epidemic as people find it difficult to make time for physical activities. Because most people, partic-

ularly women, are more likely to be critical of their body weight as a result of increased peer-pressure. Therefore, they are highly likely to internalize weight bias and perceive themselves to be overweight even if they are of the average weight for their age.⁹ This can often lead to them taking drastic measures to reduce weight such as crash diets, intensive exercise, starvation and developing eating disorders such as Anorexia Nervosa which, according to a study, has a 67% chance of leading to life-threatening complications.¹⁰

Weight bias and its associated problems are universal; however, they are influenced by social norms. In Karachi, hardly any research has been conducted regarding this topic despite its significant social, mental and physical implications. Even lesser data is available for underweight people even though they are at an increased risk for multiple health problems such as low immunity, irregular menstruation and osteoporosis.¹¹⁻¹³ Western media and its norms easily influence Pakistan, and therefore it is easier for both men and women to fall into the race for the ideal physique.¹⁴

Additionally, there is also a culture of associating overweight and obese individuals with an affluent background making it difficult for overweight people to identify and admit weight problems, and therefore take measures to counter it. Our study aimed to bridge the gap in the literature and provide an insight into the minds of an average undergraduate student residing in

Karachi. We also aimed to find out the prevalence of internalized self-bias so that we may be able to ascertain how it influences a person's perception of their body image so that preventive strategies can be devised accordingly.

METHODS

In January 2018, we conducted a three-week cross-sectional study to assess both the psychological and social reasons for weight bias prevalent in the undergraduate students of Karachi, primarily studying medicine.

Using a confidence level of 95% and a frequency of outcome factor of 50%, a sample size of 384 was calculated. We interviewed 421 students using convenience sampling, out of which 18 (4.3%) refused to participate in the study and a further 4 (0.95%) did not fill out the questionnaire completely. We discarded incomplete responses. Thus, the cooperation rate came out to be 94.8%. Written consent was taken only after ensuring anonymity. All undergraduate students were considered for participation in the study. We did not place any age and socioeconomic restrictions such as household income and enrollment in private or public-sector Universities. The only restrictions placed were the subject's academic status and the city of residence which had to be Karachi.

Our questionnaire was constructed based on a previous study conducted in the United States.¹⁵ It was modified according to the objective of our study. A structured standardized questionnaire was used to collect the data. The questionnaire, which consisted of three sections, contained 43 questions. Questions aimed at assessing knowledge were whether the subjects knew about the recommended calorie intake and dietary disorders such as bulimia and anorexia nervosa. Attitudes and practices were assessed by using five and four-point Likert scales respectively. Attitude questions

were mostly related to the idealization of the models appearing on the television and associated satisfaction or dissatisfaction towards the participant's weight or body shape. Practice-related questions focused primarily on the exercise routines, with or without its association with diet alterations and involvement in the criticism towards those considered overweight or unhealthy.

Person to person interviews were conducted. The interviewer's approach to the students was altered to avoid possible biases. Interviewers spent the same amount of time with each participant, had prepared explanations for questions and avoided engaging in mundane conversations. This approach aimed to reduce interviewer and instruction bias. Ensured anonymity helped minimize response bias. Recall bias was limited by the practice-related questions considering the time frame of up to two months.

Data were analyzed using Statistical Package for the Social Sciences program (SPSS Ver. 23) (IBM Inc, Armonk, NY, USA). Descriptive Statistics was used to report frequencies and proportions for the categorical responses. Chi-squared test was used to compare the responses with gender while one-way Analysis of Variance was used to compare the weight with the various responses to find possible statistical correlations. *P*-values less than 0.05 were considered significant in all cases.

RESULTS

BASELINE CHARACTERISTICS

Out of the 399 individuals who completed the questionnaire, the majority (n=273, 68.4%) were females. Mean age of individuals was 20.8±1.6 with one-third (n=145, 36.3%) being 21 years old with the mean height being 64.9±3.8 inches. Most of them (n=287, 71.9%) were enrolled at medical schools with mean weight being 57.2±13.3 kg ([Table 1](#)).

KNOWLEDGE OF THE PARTICIPANTS REGARDING PSYCHOSOCIAL PREDICTORS OF WEIGHT BIAS

With reference to [Table 2](#), a majority (n=216, 54.1%) knew the recommended daily intake of calories while almost everyone (n=341, 85.5%) knew about the eating disorders such as anorexia and bulimia nervosa. Furthermore, a majority (n=264, 66.2%) had known someone who was obese due to disorders such as metabolic or endocrine.

ATTITUDES OF THE PARTICIPANTS REGARDING PSYCHOSOCIAL PREDICTORS OF WEIGHT BIAS

[Table 2](#) shows that most individuals (n=215, 53.9%) mentioned that they did not binge-eat when they were feeling sad. The majority (n=336, 84.2%) believed that diet works and more than half (n=257, 64.4%) also believed that both diet and exercise were equally important. Individuals who had coupled diet and exercise believed that the combination was effective (n=150, 37.6%). However, about one-third (n=167, 41.9%) said that they do not feel too concerned about their body getting out of shape when they miss their exercise sessions, and a similar number (n=153, 38.3%) said they do not experience feelings of euphoria during or after exercise ([Table 3](#)).

Table 1. Weight of the individuals in the sample population compared with gender

Question	Answers (%)	Gender P-value	Weight P-value
Choose the weight group you are in (in kilograms)		<0.001	-
<35	7 (1.8)		
36-40	21 (5.3)		
41-45	38 (9.5)		
46-50	57 (14.3)		
56-60	84 (21.1)		
61-65	47 (11.8)		
66-70	49 (12.3)		
71-75	36 (9.0)		
76-80	22 (5.5)		
81-85	17 (4.3)		
86-90	9 (2.3)		
91-95	2 (0.5)		
96-100	1 (0.3)		
101-105	7 (1.8)		
>105	0 (0)		

The majority (n=297, 74.4%) believed that green tea was also an effective way in losing weight, and almost a similar majority (n=288, 72.2%) believed that overweight people were lazy and less healthy. Interestingly, only a small amount (n=24, 6%) considered being thin to being synonymous with healthy whereas, most (n=171, 42.9%) believed being extremely thin was unhealthy. Almost all (n=373, 93.5%) believed that people are discriminated against based on their weight. Out of those who had criticized others for their weight, a majority (n=83, 20.8%) stated that they believed it would motivate the individual criticized to lose weight. Additionally, a majority believed that losing weight slowly was more critical (n=307, 76.9%) rather than losing weight quickly. Moreover, most (n=255, 63.9%) answered maybe when asked whether people who lost weight usually kept it off or not (Table 2).

When individual attitudes were assessed to evaluate the severity of weight bias (Table 4), some respondents (n=82, 20.6%) chose one when asked if their own body goals aspire to personalities projected on media. However, a greater number of participants (n=102, 25.6%) chose four when asked if clothes look better on thin models and whether they wish to look like models in magazines (n=98, 24.5%). Furthermore, the first choice was the one most chosen (n=129, 32.3%) when interviewees were asked if overweight people are regarded as attractive in society, although at the same time (n=133, 33.3%) chose four when asked if physique is important for success. One-fourth of individuals (n=109, 27.3%) chose two when asked whether being thin and looking better was not synonymous and chose four (n=149, 37.3%) when asked if they compare their bodies to that of fit people.

PRACTICES OF THE PARTICIPANTS REGARDING PSYCHOSOCIAL PREDICTORS OF WEIGHT BIAS

Almost two-thirds (n=269, 67.4%) of the participants stated that they had not criticized someone for their weight, and an almost a similar number (n=223, 55.9%) also specified that they had never criticized someone for being too thin. An overwhelming majority (n=343, 86%) said they did not monitor their calorie intake (Table 2).

Table 3 shows that over one-third of the participants (n=153, 38.3%) chose never when asked if they worked out three times a week or more. Most (n=150, 37.6%) individuals said they do not try to make up for exercising after over-eating and even more (n=225, 56.4%) chose never when asked if they keep logs of their exercise programs. Most of the individuals (n=254, 63.7%) had never gone on a diet whereas, those who did (n=150, 37.6%) had coupled diet and exercise (Table 2).

SOCIETY'S PERCEPTION ON THE PARTICIPANTS

An overwhelming majority (n=228, 57.1%) admitted to having been body-shamed before, but an even higher majority (n=260, 65.2%) said they had not been pressurized to gain weight to look more appealing. More than half of the participants (n=212, 53.1%) mentioned that they had been pressurized to lose weight and most of them (n=108, 51%) stated family as being the primary reason for this pressure (Table 2).

COMPARISONS WITH GENDER

When the Chi-squared test was applied, and responses were compared with gender, females were more likely: to know about anorexia and bulimia nervosa ($P<0.001$), to know someone who is obese due to a disorder ($P=0.018$), to be criticized for their weight ($P=0.037$) and to be pressurized to

Table 2. Knowledge, attitudes and practices of individuals compared with gender and weight

Question	Answers	Gender P-value	Weight P-value
Do you know the recommended daily intake of calorie?		0.076	0.506
Yes	216 (54.1)		
No	183 (45.9)		
Do you monitor your calorie intake?		0.078	0.727
Yes	56 (14.0)		
No	343 (86.0)		
Do you find yourself binge eating when you're sad/depressed?		0.375	0.012*
Yes	184 (46.1)		
No	215 (53.9)		
Do you know about the different eating disorders such as anorexia/bulimia?		<0.001*	0.007*
Yes	341 (85.5)		
No	58 (14.5)		
Have you known anyone being genuinely obese because of some metabolic/ endocrine disorder?		0.018*	0.222
Yes	264 (66.2)		
No	135 (33.8)		
Have you ever gone on a diet?		0.532	<0.001*
Yes	145 (36.3)		
No	254 (63.7)		
Do you think diet works?		0.184	0.274
Yes	336 (84.2)		
No	63 (15.8)		
When compared, which one do you think is more important, diet or exercise?		0.274	0.623
Both	257 (64.4)		
Diet	37 (9.3)		
Exercise	102 (25.6)		
Don't know	3 (8)		
Have you coupled diet with exercise? If yes, did you think it was effective or not?		0.821	<0.001*
Yes	150 (37.6)		
No	84 (21.1)		
Do you think Green tea is effective in reducing weight?		0.659	0.150
Yes	297 (74.4)		

Question	Answers	Gender P-value	Weight P-value
No	102 (25.6)		
Do you think of overweight people as lazy or less healthy?		0.622	0.791
Yes	288 (72.2)		
No	111 (27.8)		
Do you think overweight people are discriminated/criticized based on their weight?		0.037*	0.942
Yes	373 (93.5)		
No	26 (6.5)		
Have you ever criticized/made fun of your friends because they're overweight?		<0.001*	0.188
Yes	130 (32.6)		
No	269 (67.4)		
If yes, why?		0.387	0.127
You found it funny	57 (14.3)		
You joined other people to fit in	11 (2.8)		
You prefer people in your circle to be slim	7 (1.8)		
You felt your opinion would motivate them to lose weight	83 (20.8)		
Have you ever made fun of people who are/ thin?		0.004*	<0.001*
Yes	176 (44.1)		
No	223 (55.9)		
Have you ever been body shamed (whether obese or thin) in your life?		0.828	0.396
Yes	228 (57.1)		
No	171 (42.9)		
Have you ever been pressurized to gain weight in order to look more appealing?		0.668	<0.001*
Yes	139 (34.8)		
No	260 (65.2)		
Have you ever been pressurized to lose weight? If yes, what was the source?		0.040*	0.854
Media	37 (9.3)		
Friends	67 (16.8)		
Family	108 (27.1)		
Which one do you think is healthier?		0.121	0.112
Lose weight slowly	375 (94)		
Lose weight quickly	24 (6.0)		
Do you think when someone loses their weight, they're likely to keep it off?		0.018*	0.076
Yes	76 (19.0)		

Question	Answers	Gender P-value	Weight P-value
No	68 (17.0)		
Maybe	255 (63.9)		
Do you think people who are extremely thin are unhealthy?		0.903	0.376
Yes	171 (42.9)		
No	124 (31.1)		
Maybe	104 (26.1)		
Which one do you think is more important?		0.603	0.602
Being healthy	307 (76.9)		
Being thin	4 (1.0)		
Both are equally important	85 (21.3)		

*statistically significant P-value (p<0.05)

lose weight by their families ($P=0.04$) however, males were more likely to make fun of people for their weight ($P<0.001$) (Table 2). Table 3 shows that more females chose never when asked if they worked out for more than 3 times a week ($P<0.001$) and also chose never when asked missing an exercise session makes them feel like their body is getting out of shape ($P<0.001$) whereas, males were more likely to keep a record of their exercise ($P=0.002$) and to experience euphoric feelings during exercise ($P=0.025$). Referring to Table 4, females were more likely to choose 2 when asked whether being thin and looking good is not synonymous ($P=0.006$).

COMPARISONS WITH WEIGHT

A one-way Analysis of Variance was done to compare responses with weight. To which we found that people weighing from 96-100kg were more likely to binge-eat when they felt sad ($P=0.012$) and to know about eating disorders like anorexia and bulimia ($P=0.007$). People weighing less than 80 kg were more likely to not had gone on a diet ($P<0.001$). People weighing 96-100kg were more likely to had coupled diet and exercise and had found it to be effective ($P<0.001$) and were more likely to have made fun of thin people ($P<0.001$) (Table 2). People weighing from 96-100kg were also more likely to be exercising three times a week ($P<0.001$) and felt like their body was going out of shape when they missed an exercise session ($P<0.001$), to exercise if they felt like they had over-eaten ($P=0.001$) and to keep a record of their exercise performance ($P<0.002$) (Table 3).

DISCUSSION

The principal findings of our study were related to the psychosocial aspects of weight bias considered. We found that most of the participants did not idealize models appearing on social media platforms but at the same time wished to have a similar body because of the beliefs that clothes look

better on thin models and being thin is closely related to looking better. Also, physique was considered as having a positive correlation with success. This finding is consistent with other studies. This could be due to the media projecting a certain kind of ideal body image and associating only that particular image with desirable characteristics such as attractiveness, success and contentment. In addition, obese or overweight people are perceived as lazy and unhealthy.¹⁵ Therefore they are discriminated against at multiple domains of life such as employment, education and health-care.¹⁶⁻²⁰ Although the majority of the participants believed that discrimination against both the overweight and the underweight generally exists, they refused to have been personally involved in doing that. A few did criticize someone they knew for being overweight and correlated the criticism with a possible positive outcome of the motivation to lose weight. This has, however, proven to be a false perception in the literature on obesity bias.¹⁴⁻²¹ An overwhelming majority of the interviewees were, however, body-shamed and pressurized themselves to lose weight primarily by their families, as supported by a previous study.²² These psychosocial reasons for weight bias were better understood when linked with the measures that are generally taken to get rid of the bias. Attitudes and practices towards exercise were studied explicitly in detail, and the behaviours generally turned out to be negative. Even with most of the students having the popular belief and experience that exercise is effective with or without diet in achieving an internalized perfect body shape, they did not follow and keep up with a proper exercise routine.

Secondly, statistically significant differences were found between the responses of males and females, with the general pattern of females being discriminated against more than males and had to live with the pressure of reducing and maintaining their body weight and shape. This finding is not surprising as females are generally heavily scrutinized for their weight and body shape far more than men

Table 3. Exercise habits compared with gender and weight (Responses range from 1. Never to 4. Often)

Question	Answers	Gender P-value	Weight P-value
I exercise more than three days per week.		<0.001*	<0.001*
1	153 (38.3)		
2	132 (33.1)		
3	57 (14.3)		
4	57 (14.3)		
When i miss an exercise session, I feel concerned about my body possibly getting out of shape.		<0.001*	<0.001*
1	167 (41.9)		
2	89 (22.3)		
3	81 (20.3)		
4	62 (15.5)		
If I feel overeaten, I will try to make up for it by increasing the amount I exercise.		0.275	0.001*
1	150 (37.6)		
2	127 (31.8)		
3	73 (18.3)		
4	49 (12.3)		
I keep a record of my exercise performance, such as how long I work out, how far or fast I run.		0.002*	0.002*
1	255 (56.4)		
2	92 (23.1)		
3	39 (9.8)		
4	43 (10.8)		
I have experienced a feeling of euphoria or a “high” during or after an exercise session.		0.025*	0.092
1	153 (38.3)		
2	106 (26.6)		
3	73 (18.3)		
4	67 (16.8)		

*statistically significant P-value (p<0.05)

as their worth is commonly correlated with their appearance.²³ Their exercise routines, however, did not reflect the criticism they face as they did not set up and follow a regular exercise routine. The same finding was reported in a re-

search conducted in female universities in five Arabic countries.^{5,24} Males, on the other hand, keep up with their exercise sessions more religiously even with little or no discrimination faced at all. Feelings of euphoria during ex-

Table 4. Attitudes reflecting the severity of the prevailing weight bias compared with gender and weight (responses ranging from 1. Completely disagree to 5. Completely agree)

Question	Answers	Gender P-value	Weight P-value
Women who appear in TV shows and movies project the type of appearance that I see as my goal.		0.201	0.344
1	82 (20.6)		
2	54 (13.5)		
3	78 (19.5)		
4	67 (16.8)		
5	20 (5.0)		
I believe that clothes look better on thin models.		0.289	0.965
1	63 (15.8)		
2	45 (11.3)		
3	54 (13.5)		
4	102 (25.6)		
5	40 (10)		
I do not wish to look like the models in the magazine.		0.333	0.061
1	54 (13.5)		
2	84 (21.1)		
3	89 (22.3)		
4	98 (24.6)		
5	74 (18.5)		
In our society, fat people are not regarded as unattractive.		0.463	0.059
1	129 (32.3)		
2	118 (29.6)		
3	47 (11.8)		
4	64 (16.0)		
5	41 (10.3)		
It's important for people to work out on their figures/physiques if they want to succeed in today's culture.		0.163	0.215
1	45 (11.3)		
2	41 (10.3)		
3	87 (21.8)		
4	133		

Question	Answers	Gender P-value	Weight P-value
	(33.3)		
5	93 (23.3)		
Most people do not believe that the thinner you are, the better you look.		0.006*	0.813
1	88 (22.1)		
2	109 (27.3)		
3	77 (19.3)		
4	81 (20.3)		
5	44 (11.0)		
I compare my body to that of fit/healthy people.		0.172	0.195
1	41 (10.3)		
2	38 (9.5)		
3	59 (14.8)		
4	149 (37.3)		
5	112 (28.1)		

*statistically significant P-value (p<0.05)

ercise, coupled with a relative lack of discrimination based on weight might be the contributing factor of adherence to it in males. In the context of Pakistan and other South-East Asian countries including but not limited to India and Bangladesh, this disparity in the experiences of women can be explained by a very important cultural reason that dictates female lives in these countries; the arranged-marriage system forms the back bone of South-East Asian family life. In majority of families, women are expected to get married as early as possible and owing to strong conservative beliefs held by these populations, stemming from both cultural and religious causes, creates an insurmountable amount of pressure on women to behave in a certain way and this very commonly manifests as insistence by families on young women to lose weight so that potential suitors can be wooed.^{25,26}

A surprising finding of our study was that the people weighing between 96-100 kg were more likely to exercise 3 times a week, to exercise in order to make up for overeating and to keep a record of their exercises. They were also more likely to have made changes in their diet in order to couple it with exercise in order for it to be more effective. This refutes the notion that overweight people tend to be unhealthy and lazy. Since medical students are generally aware of the fact that physical inactivity and a sedentary lifestyle carry significant risk for the development of cardiovascular diseases and all-cause mortality,²⁷ their majority may have led to the obese subjects training more in our study. On the other hand, it was also seen that people

weighing between 96-100 kg were more inclined to binge-eat when they felt sad and to know about eating disorders such as anorexia and bulimia. This finding is also consistent with that of many other studies which show that overweight people are more aware of such disorders and coincidentally also more prone to developing them. This is predominantly due to the weight bias which is prevalent in all societies and eventually leads to internalization.²⁸ Also, this group of participants formed a significant part of the group that was inclined towards criticizing thin people. On the other hand, it was unlikely for the people below 80 kg to have ever gone on a diet. The statistically significant correlation between gender and weight with the weight stigma is inconsistent with the study²¹ while being consistent with the study reporting higher rates of weight bias towards people with higher BMI²⁸ and with the studies associating gender differences with the bias.^{29,30}

Since this study covers the people of Karachi only, similar studies should be conducted in other cities of Pakistan which should also cover people from lower socioeconomic rural regions and with different academic statuses. A comparison of the responses of the people associated with medicine with those not studying medicine can be made to see if the knowledge that medicine gives about the certain obesity-related disorders affects a change in the behaviours of these people towards weight bias. However, a research conducted in Australia concluded no statistically significant difference in the weight bias levels between healthy and non-healthy students.³¹ The fact that women in the East

have a higher number of barriers to overcome to practice physical activities and other recreational activities should be taken into consideration. The difference in satisfaction levels towards body weight and body shape should be considered and elaborated separately. Studies focusing exclusively on the discrimination against thin people should be a part of the literature on weight bias. Since we live in a world of globalization, future studies should consider the effects of mass media promoting slimness when studying weight concerns.

Our study has some limitations. Since we specifically recruited undergraduate students of Karachi in the study, true prevalence of the weight bias could not be figured out as the population did not include those with different socioeconomic statuses and academic backgrounds. Furthermore, most of the participants were medical students leaving a minor proportion of non-medical students, and so behavioural changes associated with increased knowledge about logical reasons of weight gain/loss in medical students could not be assessed. This study did not highlight the effects of weight bias on the victim's mental and physical health. Also, the belief that criticism is associated with the motivation to work on body shape was not directly proven in this study. The traditional norms of preference towards slight plumpness in females were not addressed in our study. The reasons for the absence of the link between the knowledge and regular monitoring of the daily calorie intake could not be assessed. Nonetheless, our study provides the first valuable data on the prevalence of weight bias and associated psychosocial concerns in Pakistan.

CONCLUSION

This study was carried out to assess the psychosocial predictors of weight bias in Undergraduate students, and it was evident from the results of the study that negative attitudes are generally prevalent in the population towards the overweight or the underweight which were, however, more profound in females. Statistically significant correlations between participants' weight and their responses were found in our study with people within a higher weight group inclined to criticize thin people and vice versa. Reductions in the weight bias at the population level is a necessity since

weight-related issues have found to be associated with the population's mental and physical wellbeing. Studies that test the impact of new strategies eradicating negative attitudes towards overweight individuals are needed. A team of researchers and practitioners involved with nutrition, metabolism, endocrinology, eating disorders and community medicine is needed for a detailed discussion on how to move further.

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COMPETING INTERESTS

The authors have completed the Unified Competing Interest form at http://www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and declare no conflict of interest.

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