

## **Understanding Perception of Weight Stigma: Development and Validation of Perceived Weight Stigmatization Scale**

**Atiqa Rafeh and Rubina Hanif**

Quaid-i-Azam University

The present study was intended to develop a scale to measure perceived weight stigmatization among people with obesity. The study was conducted in five steps. In first step, three focus group discussions were conducted with female obese university students to get the first-hand information related to weight stigmatization. Step two involved four interviews which were conducted with male obese university students to collect detailed information about weight stigmatization experiences of men. Step three included content analysis of qualitative data for item generation. In step four, judge's opinion was taken, and a committee approach was carried out to select the items for the initial form of the scale. Items for final form of the scale were selected through exploratory factor analysis and confirmatory factor analysis in step five. For exploratory factor analysis, 150 university students (men = 61, women = 89) were included in the sample, whereas, for confirmatory factor analysis, another group of students (men = 78, women = 72) participated in the study. Principal Component Factor Analysis revealed three meaningful structures including Self-Perception, Perceived Social Rejection, and Perceived Impact containing 43 items. Confirmatory factor analysis confirmed this factor structure and all 43 items possessed factor loadings greater than .40. Moreover, results indicated that perceived weight stigmatization had high internal consistency (Cronbach's alpha = .96) with three subscales having internal consistency .95, .83, and .92 respectively. Therefore, Perceived Weight Stigmatization Scale turned out to be a reliable and valid instrument for measuring perception of weight stigma in adults with obesity.

*Keywords.* Weight stigma, obesity stigma, perceived social rejection, self-perception, weight discrimination

---

Atiqa Rafeh and Rubina Hanif, National Institute of Psychology, Quaid-i-Azam University, Islamabad, Pakistan.

Correspondence concerning this article should be addressed to Atiqa Rafeh, National Institute of Psychology, Centre of Excellence, Quaid-i-Azam University, Islamabad, Pakistan. Email: [atiqarafay786@gmail.com](mailto:atiqarafay786@gmail.com)

Weight stigma refers to demonstration of prejudiced attitudes (such as giving negative labels like unclean, lazy, and dumb) and discriminatory behaviours (such as teasing, delivering low quality health, educational, & other services) toward a person just because of their body size and weight alone (Brownell, Puhl, Schwartz, & Rudd, 2005). Goffman (2009) pointed out that there are three forms of stigma including stigma related to character traits, physical stigma, and group identity stigma. Stigma of character traits are weaknesses of individual perceived as weak will, oppressing, unnatural passions, harmful, and rigid beliefs, and dishonesty; which is evident from a record of mental disorder, addiction, imprisonment, etc. Physical stigma involves the physical distortions of the body. Group identity stigma initiates from being part of a specific nation, ethnicity or religion.

Weight stigma can be manifested in different forms including verbal comments, physical abuse, and overt discrimination. Stigmatization through verbal comments is demonstrated by teasing, ridiculing, stereotyping, insulting, and calling degrading names. Physical abuse is depicted by grabbing, touching, and showing other hostile behaviours. In addition, barriers and hurdles faced by people with obesity in public setting such as providing medical equipment to obese patients which are too small for them, size of the seats or chairs in public places which fail to accommodate obese people, and inability of shopping malls to provide clothing in large sizes. Moreover, stigma can take the form of overt discrimination such as visible discrimination in employment sectors where a reputable position or promotion is denied to obese employee, despite having required qualification (Obesity, Bias, & Stigmatization, 2016).

Certain forms of stigma are more prevalent than others. Puhl and Brownell (2006) found that the most common types of stigma encountered by obese people were negative suppositions made by other people, negative remarks from peers, experiences of physical barriers; and inappropriate comments from doctors and family members, that were persistent for both men and women. In their study, participants reported that they are stigmatized by number of people with whom they had close relationships; the most common being family members, doctors, peers, and sales persons.

Weight bias can significantly affect social, psychological, economic, and physical health of an individual. Social and economic hazards include unhealthy relationships, social rejection, inadequate academic results, and lower socio-economic standing (Aime, Villatte, Cyr, & Marcotte, 2017; Ciciurkaite & Perry, 2018; Jung & Luck-Sikorski, 2019). Health outcomes involve behaviours like binge

eating, adopting unhealthy practices for controlling weight, eating more to cope with stigma, unwillingness to diet and avoiding any kind of physical activity (Alberga, Russell-Mayhew, von Ranson, & McLaren, 2016; Puhl & Suh, 2015). Weight bias can also result in increased stress, high blood pressure, and generally poor quality of life (Friedman & Puhl, 2012; Wu & Berry, 2018).

People with obesity face weight bias in different settings. Puhl and Heuer (2009) reported that obese individuals are vulnerable to weight bias in medical, educational, and job settings. They also experience stigma in close relationships. A study conducted in Sweden on 700,000 men stated that individuals who were obese at the age of 18 had a less probability of acquiring higher education as compared to their peers who were normal weight, even after adjusting parental socioeconomic status and intelligence (Karnehed, Rasmussen, Hemmingsson, & Tynelius, 2006).

Weight bias stigma is widespread in our society and obese people are aware that being overweight is devalued culturally and subjected to negative stereotyping. This awareness leads to weight-related social identity threat in overweight people. Social identity threat is activated when obese people directly experience situations in which discrimination is being done (Hunger, Major, Blodorn, & Miller, 2015; Major, Tomiyama, & Hunger, 2018). This activation also occurs when faced with messages and behaviours that belittle or rationalize devaluation of overweight individuals. People who do not classify themselves as overweight still face stigmatization, that is, they may encounter mistreatment, devaluation, and negative judgment. However, social identity threat is less likely to be experienced in these types of individuals (Hunger et al., 2015).

Friedman and Puhl (2012) pointed out that weight bias originates from certain underlying beliefs such as stigmatizing and shaming obese people will motivate them to lose weight, overweight people are responsible for their increased weight, and any failure to lose weight is the consequence of lack of will power or self-discipline. The existence of weight stigma is also the result of cultural values as certain cultures endorse visible expression of weight bias, appreciate thinness, and support the notion that people with obesity are defective. Furthermore, victims are blamed for their obesity instead of environmental conditions responsible for it and many cultures allow media to present obese persons in a stereotypical way. A study examining the effects of the labels, that is, fat in comparison to overweight, in expressing weight bias revealed that participants' attitudes were less favourable towards people labelled as fat as compared to the people labelled as overweight (Brochu & Esses, 2011).

Weight stigma significantly influence individuals' perceptions about themselves. Same notion is supported by Ogden and Clementi (2010) who reported that being obese had negative impact on the perceived self-identity of individuals, as they used the terms ugly and horrible for describing themselves. The participants in their study stated variety of ways in which being obese had affected their lives. It was revealed how it had affected their mood, self-identity, self-perception, dissociative feelings, and their health (Hayward, Vartanian, & Pinkus, 2018; Romano, Haynes, & Robinson, 2018; Tomiyama et al., 2018). People with obesity explained the emotional outcomes of their weight using such terms as depressed, miserable, ashamed, disgust, hate, and killing themselves (Salas, Forhan, Caulfield, Sharma, & Raine, 2019; Westermann, Rief, Euteneuer, & Kohlmann, 2015). Some also mentioned the feelings of anger toward themselves as they were unable to stop themselves, from eating. Some participants explained the negative effects of being obese on their perceived self-identity by using such terms as abnormal, ugly, horrible, insecure, less confident, and having poor self-esteem (Murakami & Latner, 2015; O'Hara, Tahboub-Schulte, & Thomas, 2016).

Friedman et al. (2005) revealed that the most common situations related to stigmatization experienced by obese individuals were negative suppositions made about them (e.g., low expectations of other people from them), physical obstacles, and social rejection due to their weight. It was also found that rate of stigmatizing experience was positively associated with depression, general psychiatric symptoms, body image disturbance, and negatively associated with self-esteem. Moreover, participant's negative attitudes about their weight problems were found to be associated with psychological distress. A qualitative study on impact of weight-related stigmatization revealed that obese people had feelings of loneliness, as others could not fully understand the fact, how being obese was negatively impacting their lives (Griffiths & Page, 2008).

Perceived weight discrimination does not motivate individual to lose weight rather it enhances risk for obesity. Sutin and Terracciano (2013) found that individuals who had encountered discrimination related to weight were about 2.5 times more vulnerable to become obese when follow-up was done, and individuals who were obese at baseline were three times more vulnerable to remain obese at follow up than those who had not faced such discrimination. Finally, it was reported that association between discrimination related weight and threat of becoming and remaining obese did not differ with sex, age, education, or ethnic associations. Apart from poor mental health

outcomes, weight discrimination also made individuals more prone to becoming and remaining obese.

While, systematically analyzing biopsychosocial impact of stigma in adults with overweight and obesity, Papadopoulos and Brennan (2015) found that weight stigma is steadily linked with factors like non adherence to medication, mental well-being, anxiety, perception of stress, antisocial behaviour, substance use, employment of coping techniques, and social support. There were some evidences in certain studies that relationships were much stronger when stigma was internalized. The common direction between weight stigma and psychological factors depicted that stigmatization of overweight and people with obesity was linked with unhealthy behaviours, which had become part of one's lifestyle such as binge eating, avoidance of exercise etc. and negative emotions such as depression (Stevens, Herbozo, Morrell, Schaefer, & Thompson, 2017; Vartanian & Porter, 2016). While exploring the association between weight stigma and social variables, results depicted that people considered obese people as less wanted, and obese people reported that the quality of their relationships with their loved ones was deteriorating (Boyes & Latner, 2009; Papadopoulos & Brennan, 2015). A systematic review conducted by Sikorski, Luppá, Luck, and Riedel-Heller (2015) stated that stigma and discrimination can be regarded as persistent stressors, as they profoundly affect psychological well-being of the victimized individuals.

Weight stigma experiences differently affect men and women. Gender difference was found in experiences of weight stigmatization as women reported more recurrent experiences of weight stigmatization as compared to men (Sattler, Deane, Tapsell, & Kelly, 2018). Even though both men and women are being exposed to discrimination, women generally face higher levels of weight bias than men. Middle aged women with lower levels of education were found to experience weight stigmatization significantly higher than their male counterparts. Furthermore, women reported that they face weight discrimination at lower levels of surplus weight as compared to men. For instance, women reported rise in weight stigmatization experiences even at a Body Mass Index (BMI) of 27. On the other hand, men reported increase in weight stigmatization experiences at a BMI of 35 or more (King & Puhl, 2015).

Himmelstein, Puhl, and Quinn (2018) explored characteristics of men who faced weight stigma as compared to men who did not. Results indicated that 40 % of men were experiencing weight stigma. Most common form of weight stigma, which was affecting men across their life span, was found to be verbal mistreatment. The most

frequent sources of weight stigma were family members, peers, and strangers. Moreover, younger men having higher BMIs who were less likely to be married and tried to lose weight in the past, reported experiences of weight stigmatization.

Theories explaining stigmatization related to obesity have pointed out different psychological processes underlying different occurrences of stigmatization. Certain stigmas result from inferences drawn on the basis of inadequate psychological character, such as people regarded as untrustworthy. While others are developed on perceptions of inadequate physical appearance such as people with physical disfigurement (van Leeuwen, Hunt, & Park, 2015). The modern concept of stigma has its base in the work of Goffman (2009) who considered stigma as a process that has its foundation in social construction of identity. He affirmed that people who are linked with a stigmatized condition move from a normal to a discredited social status (Kleinman & Hall-Clifford, 2009). Goffman (2009) considered stigmatized people as those who are not fully socially accepted, and they are continuously making effort to adjust their social identities.

Rates of obesity were found to be quite high in Asian countries. Pakistan was placed 9th among 180 nations, approximately, which were facing problem of obesity (Ng et al., 2014). Epidemic of obesity is affecting all age groups in Pakistan. Urban population was found to have higher rates of obesity as compared to rural population. Furthermore, women in urban population possessed higher rates of obesity in comparison to men and women in rural population (Tanzil & Jamali, 2016). A study conducted on 2114 students of medicine revealed that 27.1% of participants reported feeling stigmatized because of their weight (Mahmood, Freeman, & Relton, 2013).

A study was carried out to examine and compare obesity among different socioeconomic classes in Karachi. The results demonstrated that obesity was found in all socio-economic classes regardless of the education, income, and occupation of the respondents, with sedentary lifestyle being the major causal factor. Uneducated category was found to be more obese than educated ones. The study showed a positive relationship between obesity and family history of obesity. Women and married people were found to be more obese regardless of the socioeconomic status (Nur, Shah, & Zehra, 2013).

Literature discussed has highlighted that advancement in weight stigmatization research emphasized the need to address obesity as a psychosocial risk factor and not simply a physical health risk factor (Major, Eliezer, & Reik, 2012). Weight-based stigmatization is highly recognized as affecting various aspects of life of overweight and obese

people, and negative attitudes towards them are becoming increasingly apparent (Phelan et al., 2015; Sikorski et al., 2015). Similarly, in Pakistan, rates of obesity are increasing day by day (Siddiqui et al., 2015) leading towards serious concerns about psychosocial impact of obesity. Pakistani researchers had mostly explored physical consequences of obesity (Nazli et al., 2015; Raza, Doak, Khan, Nicolaou, & Seidell, 2013) whereas, psychological impact of obesity related issues such as perceived weight stigmatization is highly ignored area. Therefore, keeping in view the extensive empirical evidence on psychosocial impact of weight stigmatization, it is essential to study this construct in indigenous settings.

### **Rationale of the Study**

In the light of literature explored, it was found that there are few studies in Pakistan which is catering the problem of obesity and stigmatization. In Pakistan, researchers usually focused on studying prevalence rates, effect of demographic variables on obesity, risk factors associated with obesity, and relation of obesity with physical diseases (Asif, Iqbal, Ikramullah, & Nadeem, 2009; Asif et al., 2016; Aslam, Saeed, Pasha, & Altaf, 2010; Nur et al., 2013; Raza et al., 2013). In addition, the study of relationship of obesity with psychological constructs is highly ignored area. Moreover, the trend is globally changing as attention is now being drawn towards studying the impact of obesity and weight stigmatization on mental health of obese individuals. The psychological, social and emotional experiences of obese individuals are being considered as an important area to study as they are greatly affecting the lives of obese individuals. In Pakistan, extent of weight stigmatization was measured in one study in which men reported more experiences of weight stigmatization as compared to women (Mahmood et al., 2013) which supported the need of inclusion of both men and women in the present study. Moreover, in depth exploration of construct of weight stigmatization in Pakistani culture is not carried out yet. Therefore, there is a great need to explore the experiences of weight stigmatization of Pakistani obese people and its impact on their lives.

To date, most studies assessed attitudes and behaviours of people towards obese individuals, and they highly ignored the stigmatization experiences of target individuals (Holub, Tan, & Patel, 2011; Puhl & Heuer, 2009; Teachman & Brownell, 2001). There is more literature on evaluating the stigmatizer's perspective

because it is quite easy to work with normal weight individuals than exploring the personal experiences of weight stigmatization among people with obesity (Ruggs, King, Hebl, & Fitzsimmons, 2010).

Number of scales were previously developed which assessed different aspects of weight stigmatization. For example, Stigmatizing Situations Questionnaire-Extended which measures emotional impact of stigmatizing situation experiences in childhood, adolescence, and adulthood (Annis, Cash, & Hrabosky, 2004); Weight-Related Criticism from Romantic Partners that assesses frequency of teasing and criticism related to weight from romantic partners (Befort, Hull-Blanks, Huser, & Sollenberger, 2001); Weight-Related Stigma that measures feelings and frequency of weight discrimination experiences (Polk & Hullman, 2011), and Perceived Weight Discrimination that evaluates frequency of discrimination experiences related to weight in 12 months duration (Hatzenbuehler, Keyes, & Hasin, 2009).

Despite efforts to develop scales which could measure weight stigmatization experiences comprehensively, various limitations were found in existing measures. Most common of them was inadequate sampling as present scales lack ethnic and racial diversity, and most of them were just appropriate for general use or they were validated only on women. Few of them could assess weight stigmatization experiences in different settings. Moreover, only general sources of stigmatization were explored ignoring the fact that stigmatization from loved ones and from strangers might have different affect. Subjective terms for weight, such as heavy, were used in items of previously developed scales which increased ambiguity, and weights were not assessed using weight measuring instruments. In addition, time frame regarding weight stigmatization experiences was not specified. Hence, frequency and nature of various forms of weight stigmatization are still unknown due to lack of comprehensive and consistent measures which can assess weight stigmatization experiences of obese persons. Most of the present scales usually measure only one kind of weight stigma (i.e., verbal mistreatment and teasing) and fail to differentiate between distinct settings of stigma or different perpetrators (DePierre & Puhl, 2012).

Previous scales measured different aspects of weight stigmatization and discrimination experiences, however, perception of weight stigma was not assessed by the scales which would have different psychological implications. Therefore, to get clear understanding of challenges being faced by obese people and



to have correct assessment of frequency and range of perceived stigmatization experiences, present study was designed to develop and validate a scale which can assess perceived weight stigmatization among people with obesity.

## Method

For measuring perceived weight stigmatization among obese people, a Likert-type indigenous scale was developed. Scale development was carried out in five steps. Following is a detail of all the steps.

### Step 1: Focus Group Discussions (FGDs)

In Pakistan, there is less empirical evidence on the construct of weight stigmatization, which led to the decision for conducting FGDs to get the direct details about the perception of weight stigmatization in an interactive process. Total three FGDs and four interviews were conducted. Firstly, it was decided to include only normal weight individuals in FGDs. But later, it was felt that the intensity and frequency of weight stigmatization might be under reported by normal weight individuals. Therefore, decision was taken to include obese individuals in FGDs to have more reliable information regarding perception of weight stigmatization. Two FGDs were conducted with normal weight university students and one FGD was conducted with female obese university students. The methodology adopted for conducting FGDs is as follows.

**FGDs with normal weight university students.** Variables were pointed out on the basis of literature review that could create meaningful differences, in participant's responses. Two variables that is, age and gender, were recognized as important for selection of sample. Purposive convenient sampling technique was utilized for selecting participants. Two focus group discussions were carried out with mixed groups including both male and female students.

Focus Group 1 was conducted at National Institute of Psychology, Quaid-i-Azam University, Islamabad. It involves 5 university students (4 females and 1 male) with mean age of 24.6 years. Reportedly, they all were unmarried and were MPhil students. Focus group 2 was conducted at University of Wah, Wah Cantt. It

comprised of 7 participants (4 females and 3 males) with mean age of 20.4 years. Reportedly, they all were unmarried and were BS students.

**FGD with female obese university students.** For the purpose of having more valid and reliable information regarding perception of weight stigmatization, FGD with female obese university students was conducted at University of Wah. It comprised of 5 female obese university students with mean age of 19.6 years. Reportedly, they were all unmarried and were BS students.

**Focus group guide.** On the basis of literature review, a guide was prepared related to the topic that consisted of 10 questions. For instance, what are your perceptions and ideas about obese people and obesity? What do you think are the major sources of stigmatization? How do you think obese people react to and deal with weight stigmatization? Certain questions for probing were also formulated under each question to have in depth information. At the end of each FGD topic guide was modified and new categories were produced based on the issues mentioned by the participants that were relevant to the research objectives. The questions which did not turn out to be significant or asking about similar things were eliminated from the focus group guide. At the end of the last focus group 18 probing questions based on 6 broad categories were developed.

The categories were 1) *Ways of stigma* that contained probing questions covering verbal, non-verbal and physical cues related to weight stigmatization. 2) *Stereotypes* that included probing questions related to competency in different areas of life like academic, professional, and sports. 3) *Attitudes* that included probing questions regarding criticism, ignorance, and cultural differences. 4) *Sources of stigmatization* that included the questions related to friends, family, relatives, general public and media. 5) *Feelings/Responses* that contained questions related to being less confident, conscious, feeling inferior, and individual differences. 6) *Coping/dealing with stigmatization* that included probing questions related to use of humour, being used to stigmatization, answering verbally to people who are stigmatizing and ignoring weight stigmatization.

**Procedure.** Each focus group consists of 5-7 individuals. It was taken into consideration that groups should be as homogenous as possible. A focus group guide was prepared in the light of literature review. Many FGDs were conducted in succession until new information had stopped generating and saturation point was achieved. The sequence of asking the question was changed in each focus group in order to decrease the order effect on the responses of the

participants. Totally three focus groups were carried out and every focus group took 45 minutes to one hour.

The approach adopted for conduction of focus group in a structured format was non-directive moderating. To record the happenings of the focus group discussion, verbal statements were noted down as well as recording was done via voice recorder. The role of moderator was played by the researcher during discussion. The place selected for each focus group was easily reachable for the members. All focus groups discussions were carried out in the institutions where the participants were getting education. Refreshments were ensured during each focus group. By the end of each focus group, debriefing was done with the participants to clear any ambiguity in their minds related to research topic.

### **Step 2: Interviews with Male University Students with Obesity**

Four interviews were conducted with male obese university students. FGD with male obese students was not possible as most of them refused to participate in group discussion. So, finally the decision of taking interviews was taken to have their point of view.

**Sample.** For the purpose of exploring gender differences in perception of weight stigmatization, interviews with male obese university students were conducted at University of Wah, Wah Cantt. It comprised of 4 participants with age range from 19-24 years. Reportedly, they were all unmarried and students of BS and MSc.

**Procedure.** Interview guide was prepared for asking questions from the interviewees. Semi-structured interview approach was adopted as it was more appropriate for exploring the construct under study. Different probing and specifying questions were asked according to the requirement of the interview phase. All interviews took 30-45 minutes for its completion. After the interviews the interviewees inquiries about the research were addressed.

**Findings.** Themes were generated through content analysis of all the data gathered by FGDs and interviews. Six themes were identified, that were, ways of stigma, stereotypes, attitudes, feelings/responses, coping/dealing with stigmatization, and sources of stigmatization.

### **Step 3: Item Generation**

The verbatim of the responses were transcribed. Items were generated through content analysis. Items showing overlapping

responses in both FGDs and interviews were retained. Some of the items showing gender differences were also retained to have more in depth information related to weight stigmatization.

#### **Step 4: Judge's Opinion and Committee Approaches**

Opinion of 8 judges (M.Phil degree holder in Psychology) was pursued for proclaiming the items as measuring stigmatization. For inclusion criteria, if 50% of the judges agreed that the item is appropriately measuring stigmatization, it was considered in the initial form of Perceived Weight Stigmatization Scale (PWSS). Based on judge's opinions, 68 items were finally selected from the pool of 142 questions. Some suggestions were given related to the questionnaire, which were also incorporated.

For finally selecting the items, a committee constituting three subject matter experts (SMEs) was consulted. Three PhD holders in Psychology, evaluated 68 items. Based on literature review, FGDS and interviews conducted in first phase, 48 items were kept in the initial form of the scale. Five response options ranging from *strongly disagree* to *strongly agree* were suggested to measure perceived weight stigmatization, as Likert-type scale is more appropriate for measuring latent constructs (Vonglao, 2017).

#### **Step 5: Final Selection of Items**

Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were carried out for final selection of items.

**Sample.** The overall sample of the study comprised of 300 obese university students who were taken from government and private universities of Rawalpindi, Islamabad and Wah Cantt. Sample included both men ( $n = 139$ ) and women ( $n = 161$ ). Sample for exploratory factor analysis comprised of 150 obese university students including both men ( $n = 61$ ) and women ( $n = 89$ ). Sample for confirmatory factor analysis also consisted of 150 university students with obesity having both men ( $n = 78$ ) and women ( $n = 72$ ). The inclusion criteria required that the participants should have BMI > 25 and they should be single. Convenient purposive sampling was utilized for data collection.

**Instruments.** The instruments used in the present study were digital weight machine for measuring weight of the participants and measuring tape for correct assessment of height of the participants.

**Procedure.** The sample was approached at their academic institutes. Firstly, permission regarding data collection was taken from the relevant authorities of the institutes. Before filling the questionnaires, respondents were told about the purpose of the research and consents were taken regarding their participation in the study. After that, booklet comprising the informed consent, demographic sheet and questionnaires along with written instructions were handed over to participants. The verbal instructions were also given by the researcher to read each item carefully and mark the option according to what they feel or think as there is no right and wrong answers. They were further instructed to ask questions if they faced difficulty in responding to the items. Moreover, respondents were assured about the confidentiality of the information being given by them. Recruitment of the participants was done by taking consent and only those individuals with obesity were included who had shown their willingness. Participants of the research were informed about the purpose of the research. Moreover, weights and heights of the participants were measured in isolation, as it was requirement of the research. Anonymity and confidentiality were strictly ensured. Use of the term obese was avoided, while dealing with research participants, as this term is more stigmatized. After completion of booklet, they were thanked for their cooperation and participation in research. Counseling services were also offered to the participants in need.

## Results

The initial form of the scale based on 48 items was put to exploratory factor analysis and item total correlation was estimated before final selection of items.

### Exploratory Factor Analysis (EFA)

EFA was run to find out the factor structure underlying data. Data was ensured to be three times more than the total number of items.

Initially Kaiser-Meyers-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity were utilized to check the sampling adequacy ( $n = 150$ ) to run EFA.  $KMO = .91$  illustrated that correlations compact enough to generate distinct and reliable factors with Bartlett test of Sphericity  $\chi^2(1128) = 4803.98$  significant at  $p < .001$  showed that the data was good enough for carrying out factor analysis.

Initially 9 factors with Eigen values greater than 1 were suggested. Direct Oblimin Method with Principal Component analysis was used for the extraction of meaningful factors in the scale. This is preferred method for factor extraction as latent variables in social sciences are associated with each other to some extent (Costello & Osborne, 2005). Many solutions were checked by modifying selected number of factors. Finally, three factor solution gave meaningful factor structure. Items 26 and 40 were not loaded on any factor so these items were discarded. The factor loading for item 14 was less than .30 so after analyzing it qualitatively, it was decided to remove this item. The item total correlations for item 34 and 41 were .20 which was not in acceptable range (Smith & McCarthy, 1995) and were also removed after analyzing qualitatively. It was also found that these items do not correlate with other components. All the items have item total correlations above .40 except item no. 43 which has .30 item total correlation. Item no. 43 was retained after considering its qualitative importance. The alpha reliabilities for three factors were found to be .95, .82, and .91 respectively which show good internal consistency for three factors. Inclusion criteria for item was:

1. Items with .30 or more factor loadings; not loaded on more than two factors.
2. Face validity or compatibility of the item with the content of the underlying factor was also considered.

Finally, 43 items with 3 factor structure were selected after exploratory factor analysis.

Table 1

*Factor Loadings for Perceived Weight Stigmatization Scale (PWSS) Through Principal Component Analysis by Using Direct Oblimin Rotation Method (N = 150)*

Serial No.	Item No. in Initial Form	F1	F2	F3
1	19	<b>.90</b>	-.26	-.008
2	4	<b>.83</b>	-.07	-.03
3	23	<b>.81</b>	-.17	.04
4	2	<b>.79</b>	.12	-.10
5	5	<b>.77</b>	-.09	.10
6	16	<b>.76</b>	-.03	.04
7	22	<b>.75</b>	.00	.06
8	3	<b>.71</b>	.00	.00
9	21	<b>.70</b>	-.15	.09

*Continued...*

Serial No.	Item No. in Initial Form	F1	F2	F3
10	13	<b>.69</b>	.22	-.03
11	17	<b>.64</b>	-.01	.05
12	1	<b>.64</b>	.26	-.18
13	12	<b>.63</b>	.17	.02
14	9	<b>.60</b>	-.08	.19
15	10	<b>.57</b>	-.005	.12
16	8	<b>.54</b>	.23	.14
17	18	<b>.54</b>	-.17	.28
18	32	<b>.52</b>	.24	.09
19	6	<b>.52</b>	.21	-.01
20	15	<b>.52</b>	.18	.17
21	20	<b>.48</b>	.00	.23
22	37	.43	.18	<b>.35</b>
23	24	<b>.38</b>	.30	.07
24	31	.15	<b>.58</b>	.02
25	7	.44	<b>.53</b>	-.08
26	25	.19	<b>.50</b>	.02
27	29	.09	<b>.44</b>	.24
28	11	<b>.33</b>	.44	-.024
29	27	.07	<b>.43</b>	.27
30	28	.41	<b>.42</b>	.06
31	30	.35	<b>.38</b>	.07
32	46	.08	.01	<b>.79</b>
33	42	.04	.02	<b>.76</b>
34	43	.00	-.23	<b>.60</b>
35	45	.17	.29	<b>.59</b>
36	47	.07	-.05	<b>.58</b>
37	36	-.00	.32	<b>.54</b>
38	35	.17	.29	<b>.47</b>
39	44	.41	.09	<b>.44</b>
40	38	.35	.21	<b>.42</b>
41	39	.08	.32	<b>.41</b>
42	48	.19	.23	<b>.37</b>
43	33	.03	<b>.32</b>	.36
Eigen Values		19.22	2.36	1.86
% of Variance		40.05	4.91	3.88
Cumulative %		40.05	44.97	48.85

*Note.* Factor loadings > 0.3 have been reported in each factor.

Eigen values for three components are in acceptable range. Item 11 was cross loaded on factor 1 and factor 2 but it was finally placed in factor 1, after getting opinion from subject matter experts, as it is qualitatively relevant to factor 1. Item 28 and 30 were also cross loaded on factor 1 and 2 but as they are qualitatively more relevant to factor 2 so they are placed there. Item 33 is also cross loaded on factor 2 and 3 but it was finally placed in factor 2 because of its content

relevance with that factor. Consequently, three components were obtained with number of items 23, 8 and 12 respectively. Components were labelled as Self Perception, Perceived Social Rejection and Perceived Impact after consulting subject matter experts. However, overall scale was labelled as Perceived Weight Stigmatization Scale with total number of 43 items.

### Confirmatory Factor Analysis (CFA)

Items retained through exploratory factor analysis were again analyzed through confirmatory factor analysis technique to confirm the dimensionality of the scale.

Table 2

*Factor Loadings of CFA for Perceived Weight Stigmatization Scale (N = 150)*

F 1		F2		F3	
Item No.	$\lambda$	Item No.	$\lambda$	Item No.	$\lambda$
1	.45	24	.48	32	.70
2	.76	25	.59	33	.55
3	.78	26	.74	34	.78
4	.73	27	.80	35	.74
5	.82	28	.73	36	.62
6	.72	29	.70	37	.78
7	.78	30	.49	38	.73
8	.76	31	.60	39	.78
9	.77			40	.79
10	.44			41	.82
11	.78			42	.79
12	.74			43	.56
13	.70				
14	.72				
15	.72				
16	.73				
17	.80				
18	.62				
19	.74				
20	.67				
21	.69				
22	.66				
23	.68				

*Note.* Factor loadings > .40 have been reported;  $\lambda$  = factor loadings.

Table 2 shows factor loadings of the scale items. It is evident that all the items fall within the acceptable range (Hair, Anderson, Tatham, & Black, 1998) and possess factor loadings greater than .40.



In order to evaluate the overall goodness of fit for the model, several indices were tested including chi-square ( $\chi^2$ ), relative normed chi-square ( $\chi^2/df$ ), root mean square error of approximation (RMSEA), comparative fit index (CFI), incremental fit index (IFI), and Tucker-Lewis index (TLI).

Table 3

*Confirmatory Factor Analysis (Indices of Model Fit) for Perceived Weight Stigmatization Scale (N = 150)*

Indices	$\chi^2(df)$	CFI	IFI	TLI	RMSEA	$\Delta\chi^2(df)$
Model 1	1733.99(857)	.80	.80	.79	.08	
Model 2	1151.78(807)	.92	.92	.91	.05	582.21(50)

Table 3 shows good model fit indices for  $\chi^2/df = 1.42$ , CFI = .92, IFI = .92, TLI = .91 and RMSEA = .05. Thus, CFA has confirmed the factor structure as proposed by EFA. A model is considered as acceptable if the value of Normed Fit Index is greater than .90 (Byrne, 1994) or .95 (Lomax & Schumacker, 2004), the value of Goodness of Fit Index should be greater than .90 (Byrne, 1994), the value of Comparative Fit Index should be greater than .93 (Byrne, 1994), while RMSEA value should be less than .08 (Browne & Cudeck, 1993) and ideally it should be less than .05 (Steiger, 1990). Additionally, the RMSEA value should not be greater than .08 (Hu & Bentler, 1998). The relative chi-square value should be less than 2 or 3 (Kline, 1998). These results indicated that Perceived Weight Stigmatization Scale (PWSS) is statistically valid for measuring perceived weight stigmatization and it was composed of three sub-domains of Self-Perception, Perceived Social Rejection and Perceived Impact.

### Reliability Estimates

The alpha reliability coefficient of 43 items of PWSS was found to be .96. Whereas, reliability coefficients estimated for three subscales were .95, .83, and .92 respectively.

Table 4

*Reliability Estimates of Perceived Weight Stigmatization Scale (N = 300)*

Scale and Subscales	No. of Items	Alpha Coefficients
Perceived Weight Stigmatization Scale	43	.96
Self-Perception	23	.95
Perceived Social Rejection	8	.83
Perceived Impact	12	.92

Table 4 depicted the alpha coefficients for the scale and its three subscales. High values showed that scale and subscales had high reliability and internal consistency (Nunnally & Bernstein, 1994). Findings indicated that the scale (Perceived Weight Stigmatization Scale) and all sub scales (Self-Perception, Perceived Social Rejection and Perceived Impact) were highly reliable measures of the construct, they were measuring, and were internally consistent.

## Discussion

Obesity is considered as one of the biggest threat to health of people for decades. Globally, high body mass index was behind 4 million deaths in 2015 (Kushner & Kahan, 2018). Prevalence of obesity is increasing at an alarming rate. Obesity is now considered as a psychosocial risk factor and not simply a physical health risk factor. Overweight individuals face social identity threat in stigmatized situations that initiate concerns about weight stigma, making them experience increased stress and decreased self-control (Major, Eliezer, & Rieck, 2012). Weight-based stigmatization is recognized as impacting many domains of life (Puhl & Brownell, 2001) and negative attitudes toward overweight and obese people are becoming increasingly obvious (Andreyeva, Puhl, & Brownell, 2008). Weight stigma can be harmful for mental and physical health of people with obesity (Major et al., 2012).

The main objective of the present study was development and validation of perceived weight stigmatization scale. As previously discussed, the instruments measuring weight stigmatization are generally focused on measuring attitude of people towards obesity. Moreover, most of them do not take into account cultural and racial diversity. These instruments could not be used with men and women as they were validated on women only (DePierre & Puhl, 2012). Therefore, perceived weight stigmatization scale was developed to overcome shortcomings in existing instruments.

Themes generated after content analysis were found to be ways of stigma, stereotypes, attitudes, sources of stigmatization, feelings/responses and coping/dealing with stigmatization. Themes identified were consistent with highlighted factors in labeling theory, social stigma theory and Tomiyama's (2014) cyclic obesity/weight-based stigma model. Labeling theory suggests that societal reaction to obesity is more important than the behavior of individuals and people who are stigmatized are generally involved in behavior that help them in reducing weight stigma. People with obesity are called as deviant because of the stereotyping by the people (as cited in Downs, Robertson, & Harrison, 1997). Social stigma theory also supported the fact that stigmatized individuals take number of responses in reaction to stigmatization (Goffman, 2009). Whereas, Tomiyama (2014) described weight stigma as a chronic stressor that results in series of negative emotional experiences.

Good psychometric properties were demonstrated from the results of the present study in the sample of obese university students. Kaiser Meyer Olkin measure of sampling adequacy was found to be .91 which is consistent with the cut-off score given by Beavers et al. (2013) who recommended that degree of common variance is considered marvelous if it ranges between .90-1.0. After exploratory factor analysis, 43 items with 3 meaningful factor structure were selected as it is strongly suggested that multiple test runs should be conducted to gather information about number of meaningful factors present in a data set (Costello & Osborne, 2005). Previous literature supports multidimensional nature of the construct of weight stigmatization as few scales such as Weight Self-Stigma Questionnaire has two factor structure labelled as Self-Devaluation and Fear of Enacted Stigma (Lillis, Luoma, Levin, & Hayes, 2010). Another scale, measuring coping with weight stigma, having two factor structure is Brief Coping Responses Inventory. It consists of two subscales, that is, Reappraisal and Disengagement coping (Hayward, Vartanian, & Pinkus, 2017). Scales previously developed were measuring different aspects of weight stigmatization, therefore, factor structures could not be completely comparable to the factor structures of the construct perceived weight stigmatization. However, few overlapping can be observed as subscales self-devaluation and fear of enacted stigma of the questionnaire Weight Self Stigma can come under the broad category of perceived impact which is the third factor structure of Perceived Weight Stigmatization Scale. Moreover, weight related stigmatization vary between cultures (Schrimpf et al., 2019), which could lead to variation in factor structures.

Confirmatory factory analysis revealed that the factor loadings for all 43 items were above .40, hence, all the items were finally retained. These findings are consistent with the rule of thumb proposed by Garson (2010) which stated that below .40 factor loadings are weak and factor loadings greater than or equal to .60 are strong. Model testing demonstrated that the default model was not good fit but after adding error variances, it became a perfectly fit model with CFI, IFI, and TLI values greater than .9 and RMSEA value .05. According to Byrne (1994) a model is considered acceptable if CFI, IFI, and TLI values exceeds .9, in addition, RMSEA value should be less than .08 (Browne & Cudeck, 1993).

The alpha reliability coefficient for perceived weight stigmatization scale was found to be .96. The reliability estimates for the subscales Self-Perception, Perceived Social Rejection and Perceived impact were found to be .95, .83, and .92 respectively. Reliability estimates show quite high values which could be due to scale length as Yang and Green (2011) reported that alpha coefficient is directly affected by the length of the scale. The questionnaires with more items would have greater reliabilities. Scale developed in the present study has large number of items which contributed to high reliability value.

In Pakistan, previous studies generally revolve around assessing impact of body image on psychological well-being, eating disorders in medical students, impact of media on body image and gender differences in body shape satisfaction (Abbasi & Zubair, 2015; Memon et al., 2012; Khan, Khalid, Khan, & Jabeen, 2011; Najam & Ashfaq, 2012). The focus was mainly on the construct of body image, whereas, empirical evidence on the construct of weight stigma is close to none. To the researcher's best knowledge, only one study conducted by Mahmood et al. (2013) measured the magnitude of weight stigmatization and was limited to just measuring percentage of students experiencing weight stigmatization. Hence, in-depth exploration of weight stigmatization experiences of Pakistani people has provided future researchers with immense knowledge regarding this construct. Moreover, development of Perceived Weight Stigmatization Scale has given the opportunity to measure perceived weight stigmatization in obese individuals accurately.

In the present study, Perceived Weight Stigmatization Scale was validated on obese individuals. Using this scale, future research may involve certain obese or overweight groups such as patients seeking obesity treatment, individuals following dietary plans, persons having history of weight discrimination, and people living in rural areas. The present scale can be further validated by assessing its correlation with

scales measuring similar constructs. Other researchers can plan their studies aiming to identify prevention strategies or protective factors which can help people in dealing effectively with weight stigmatization. Factors which make people with obesity more vulnerable to the negative effects of weight stigma is another area which can be explored in future research. Relationship between perceived weight stigmatization and health outcomes need to be investigated as it can be of great interest to mental health professionals.

### **Implications**

The present study would add knowledge to the growing body of research regarding obesity and weight stigma in South Asian countries. Development of Perceived Weight Stigmatization Scale has offered a mean to measure a useful construct, that is, perceived weight stigmatization. Furthermore, availability of an indigenous instrument would contribute in the existing literature and would be useful for future studies.

Perceived Weight Stigmatization Scale has its implications in variety of settings. In clinical settings, PWSS can be of great use to screen individuals with obesity, who are highly perceiving weight stigmatization and are more likely to be affected from its negative consequences. It can be used before and after physical treatment of obesity or relevant psychological services to detect the difference achieved.

Comprehensive estimation of the perspective of target individuals is crucial to gain precise understanding of the specific challenges being faced by obese people. Additionally, it can provide guidance to mental health professionals in planning effective intervention strategies for adults and youth to enable them cope adequately with the negative consequences of weight-based stereotypes, prejudice and discrimination.

Individuals with obesity face lots of problems in professional settings. Scale developed can be used to check the resilience of the employees with obesity. In addition, it can be used to identify weight stigma practices prevailing in professional settings as perception of weight stigma may be originating from work settings. Hence, employers can utilize PWSS to ensure mental health of their workers.

For researchers, perceived weight stigmatization is a new construct which can be explored in-depth with the help of PWSS. Recently developed scale has opened new avenues for research as

future researchers can investigate perceived weight stigmatization in diverse context and settings. Identification of relationship of this construct with various other variables is another worth probing area. Moreover, the Scale was validated on both men and women which enables researchers to find out gender differences in weight stigmatization experiences and other related constructs in obese individuals. The present study can serve as the foundation for exploration of general trends and future studies can be done taking this construct as an initial step.

### **Limitations and Suggestions**

Though the present study has many strengths such as adequate sample size and inclusion of both men and women, few limitations are noteworthy. Sample was not representative as it was taken from just three cities of Pakistan which deter the generalizability of results to the whole population. Another problem regarding sample was that history of the individuals with obesity was not taken. Therefore, difference of perceived weight stigma among people who have faced or not faced weight discrimination, who have undergone or undergoing obesity treatments, and considering other strategies like following dietary plans could not be estimated. Scale was developed in Urdu language, so it cannot be used globally. Validation of scale was done on university students from urban areas, whereas, rural population was not included which suggests the need for considering more diverse groups in the future.

Future studies can validate this scale by using diverse sample to assess generalizability of the present scale. The current questionnaire is in Urdu language which can be translated to English language to make it appropriate to be used globally. In addition, association of perceived weight stigmatization with other related constructs can be explored by researchers in future.

### **Conclusion**

The study was designed to gain adequate understanding of nature, frequency and experiences of weight stigmatization, among Pakistani individuals with obesity, through the development of Perceived Weight Stigmatization Scale. Focus group discussions and interviews illustrated basic information regarding construct of perceived weight stigmatization. After exploratory factor analysis, three components were identified as self-perception, perceived social rejection, and

perceived impact. Similarly, confirmatory factor analysis has confirmed three factor structure in the construct and overall model testing showed good model fit. Therefore, the present study has confirmed that the instrument developed is a reliable and a valid measure to assess perceived weight stigmatization.

## References

- Abbasi, A., & Zubair, A. (2015). Body image, self-compassion, and psychological well-being among university students. *Pakistan Journal of Social and Clinical Psychology, 13*(1), 41-47.
- Aime, A., Villatte, A., Cyr, C., & Marcotte, D. (2017). Can weight predict academic performance in college students? An analysis of college women's self-efficacy, absenteeism, and depressive symptoms as mediators. *Journal of American College Health, 65*(3), 168-176. doi: 10.1080/07448481.2016.1266639
- Alberga, A. S., Russell-Mayhew, S., von Ranson, K. M., & McLaren, L. (2016). Weight bias: A call to action. *Journal of Eating Disorders, 4*(1), 34. doi: 10.1186/s40337-016-0112-4
- Andreyeva, T., Puhl, R. M., & Brownell, K. D. (2008). Changes in perceived weight discrimination among Americans, 1995–1996 through 2004–2006. *Obesity, 16*(5), 1129-1134. doi:10.1038/oby.2008.35
- Annis, N. M., Cash, T. F., & Hrabosky, J. I. (2004). Body image and psychosocial differences among stable average weight, currently overweight, and formerly overweight women: The role of stigmatizing experiences. *Body Image, 1*(2), 155-167. doi:10.1016/j.bodyim.2003.12.001
- Asif, S. A., Iqbal, R., Ikramullah, H. H., & Nadeem, S. (2009). Prevalence of obesity in men and its relationship with diet and physical activity. *Gomal Journal of Medical Sciences, 7*(1), 35-38.
- Asif, S., Khan, A., Aman, T., Asif, N., Aziz, S., & Manzoor, A. (2016). Prevalence of obesity and related factors among the under graduate medical students of Peshawar district. *Khyber Journal of Medical Sciences, 9*(2), 241-247.
- Aslam, M., Saeed, A., Pasha, G. R., & Altaf, S. (2010). Gender differences of body mass index in adults of Pakistan: A case study of Multan city. *Pakistan Journal of Nutrition, 9*(2), 162-166.
- Beavers, A. S., Lounsbury, J. W., Richards, J. K., Huck, S. W., Skolits, G. J., & Esquivel, S. L. (2013). Practical considerations for using exploratory factor analysis in educational research. *Practical Assessment, Research & Evaluation, 18*(6), 1-13.
- Befort, C., Hull-Blanks, E. E., Huser, L., & Sollenberger, S. (2001). Body image, self-esteem, and weight-related criticism from romantic partners. *Journal of College Student Development, 42*(5), 407-419.

- Boyes, A. D., & Latner, J. D. (2009). Weight stigma in existing romantic relationships. *Journal of Sex & Marital Therapy, 35*(4), 282-293. doi: 10.1080/00926230902851280
- Brochu, P. M., & Esses, V. M. (2011). What's in a name? The effects of the labels "Fat" versus "Overweight" on weight bias. *Journal of Applied Social Psychology, 41*(8), 1981-2008. doi:10.1111/j.1559-1816.2011.00786.x
- Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long, *Testing structural equation models* (pp. 136-154). London, UK: Sage Publications.
- Brownell, K. D., Puhl, R. M., Schwartz, M. B., & Rudd, L. E. (2005). *Weight bias: Nature, consequences, and remedies* (1<sup>st</sup>ed.). New York: Guilford Publications.
- Byrne, B. M. (1994). *Structural equation modeling with EQS and EQS/windows: Basic concepts, applications, and programming*. Canada: Sage Publications.
- Ciciurkaite, G., & Perry, B. L. (2018). Body weight, perceived weight stigma and mental health among women at the intersection of race/ethnicity and socioeconomic status: Insights from the modified labelling approach. *Sociology of Health & Illness, 40*(1), 18-37. doi: 10.1111/1467-9566.12619
- Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research & Evaluation, 10*(7), 1-9. doi: 10.1.1.110.9154
- DePierre, J. A., & Puhl, R. M. (2012). Experiences of weight stigmatization: A review of self-report assessment measures. *Obesity Facts, 5*(6), 897-918. doi:10.1159/000346259
- Downs, W. R., Robertson, J. F., & Harrison, L. R. (1997). Control theory, labeling theory, and the delivery of services for drug abuse to adolescents. *Adolescence, 32*(125), 1-7.
- Friedman, R. R., & Puhl, R. M. (2012). *Weight bias: A social justice issue. A policy brief*. Retrieved from [http://www.uconnruddcenter.org/files/Pdfs/Rudd\\_Policy\\_Brief\\_Weight\\_Bias.pdf](http://www.uconnruddcenter.org/files/Pdfs/Rudd_Policy_Brief_Weight_Bias.pdf)
- Friedman, K. E., Reichmann, S. K., Costanzo, P. R., Zelli, A., Ashmore, J. A., & Musante, G. J. (2005). Weight stigmatization and ideological beliefs: Relation to psychological functioning in obese adults. *Obesity Research, 13*(5), 907-916. doi:10.1038/oby.2005.105
- Garson, D. (2010). Statnotes: Topics in multivariate analysis: Factor analysis. Retrieved from <http://faculty.chass.ncsu.edu/garson/pa765/statnote.htm>
- Goffman, E. (2009). *Stigma: Notes on the management of spoiled identity*. New York: Simon and Schuster Publications



- Griffiths, L. J., & Page, A. S. (2008). The impact of weight-related victimization on peer relationships: The female adolescent perspective. *Obesity, 16*(2), 39-45. doi:10.1038/oby.2008.449
- Hatzenbuehler, M. L., Keyes, K. M., & Hasin, D. S. (2009). Associations between perceived weight discrimination and the prevalence of psychiatric disorders in the general population. *Obesity, 17*(11), 2033-2039. doi:10.1038/oby.2009.131
- Hayward, L. E., Vartanian, L. R., & Pinkus, R. T. (2018). Weight stigma predicts poorer psychological well-being through internalized weight bias and maladaptive coping responses. *Obesity, 26*(4), 755-761. doi: 10.1002/oby.22126
- Hayward, L. E., Vartanian, L. R., & Pinkus, R. T. (2017). Coping with weight stigma: Development and validation of a Brief Coping Responses Inventory. *Obesity Science & Practice, 3*(4), 373-383. doi:10.1002/osp4.125
- Himmelstein, M. S., Puhl, R. M., & Quinn, D. M. (2018). Weight stigma in men: What, when, and by whom?. *Obesity, 26*(6), 968-976. doi: 10.1002/oby.22162
- Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate data analysis* (5<sup>th</sup> ed.). New Jersey, USA: Prentice Hall.
- Holub, S. C., Tan, C. C., & Patel, S. L. (2011). Factors associated with mothers' obesity stigma and young children's weight stereotypes. *Journal of Applied Developmental Psychology, 32*(3), 118-126. doi:10.1016/j.appdev.2011.02.006
- Hu, L. T., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to under parameterized model misspecification. *Psychological Methods, 3*(4), 424-453. doi:10.1037/1082-989X.3.4.424
- Hunger, J. M., Major, B., Blodorn, A., & Miller, C. T. (2015). Weighed down by stigma: How weight-based social identity threat contributes to weight gain and poor health. *Social and Personality Psychology Compass, 9*(6), 255-268. doi:10.1111/spc3.12172
- Jung, F. U., & Luck-Sikorski, C. (2019). Overweight and lonely? A representative study on loneliness in obese people and its determinants. *Obesity Facts, 12*(4), 440-447. doi: 10.1159/000500095
- Karnehed, N., Rasmussen, F., Hemmingsson, T., & Tynelius, P. (2006). Obesity and attained education: Cohort study of more than 700,000 Swedish men. *Obesity, 14*(8), 1421-1428. doi:10.1038/oby.2006.161
- Khan, A. N., Khalid, S., Khan, H. I., & Jabeen, M. (2011). Impact of today's media on university student's body image in Pakistan: A conservative, developing country's perspective. *BMC Public Health, 11*(1). doi: 10.1186/1471-2458-11-379
- King, K., & Puhl, R. (2015). Weight bias: Does it affect men and women differently? Obesity action coalition. Retrieved from <https://www.>

obesityaction.org/community/article-library/weight-bias-does-it-affect-men-and-women-differently/

- Kleinman, A., & Hall-Clifford, R. (2009). Stigma: A social, cultural and moral process. *Journal of Epidemiol Community Health*, 63(6), 418-419. doi: 10.1136/jech.2008.084277
- Kline, R. B. (1998). *Methodology in the social sciences: Principles and practice of structural equation modeling*. New York, US: Guilford Press.
- Kushner, R. F., & Kahan, S. (2018). Introduction: The state of obesity in 2017. *Medical Clinics*, 102(1), 1-11. doi: 10.1016/j.mcna.2017.08.003
- Lillis, J., Luoma, J. B., Levin, M. E., & Hayes, S. C. (2010). Measuring weight self- stigma: The weight self-stigma questionnaire. *Obesity*, 18(5), 971-976. doi:10.1038/oby.2009.353
- Lomax, R. G., & Schumacker, R. E. (2004). *A beginner's guide to structural equation modeling*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Major, B., Eliezer, D., & Rieck, H. (2012). The psychological weight of weight stigma. *Social Psychological and Personality Science*, 3(6), 651-658. doi:10.1177/1948550611434400
- Major, B., Tomiyama, A. J., & Hunger, J. M. (2018). The negative and bidirectional effects of weight stigma on health. In B. Major, J.F. Dovidio, & B. G. Link (Eds.), *The oxford handbook of stigma, discrimination, and health* (pp. 499-519). Retrieved from [https://www.jeffreyhunger.com/uploads/3/4/4/8/34481134/27.\\_major\\_tomiyama\\_hunger.pdf](https://www.jeffreyhunger.com/uploads/3/4/4/8/34481134/27._major_tomiyama_hunger.pdf)
- Mahmood, S., Freeman, J., & Relton, C. (2013). Weight stigmatization among undergraduate students of medicine and allied health sciences of public sector institutes. *Journal of Obesity & Weight Loss Therapy*, 3(7). doi:10.4172/2165-7904.S1.010
- Memon, A. A., Adil, S. E. E. R., Siddiqui, E. U., Naeem, S. S., Ali, S. A., & Mehmood, K. (2012). Eating disorders in medical students of Karachi, Pakistan: A cross-sectional study. *BMC Research Notes*, 5(1). doi:10.1186/1756-0500-5-84
- Murakami, J. M., & Latner, J. D. (2015). Weight acceptance versus body dissatisfaction: Effects on stigma, perceived self-esteem, and perceived psychopathology. *Eating Behaviors*, 19, 163-167. doi:https://doi.org/10.1016/j.eatbeh.2015.09.010
- Najam, N., & Ashfaq, H. (2012). Gender differences in physical fitness, body shape satisfaction, and body figure preferences. *Pakistan Journal of Psychological Research*, 27(2), 187-200.
- Nazli, R., Akhtar, T., Lutfullah, G., Khan, M. A., Lutfullah, G., & Haider, J. (2015). Prevalence of obesity and associated risk factor in a female population of rural Peshawar-Pakistan. *Khyber Medical University Journal*, 7(1), 19-24.
- Ng, M., Fleming, T., Robinson, M., Thomson, B., Graetz, N., Margono, C., ...& Abraham, J. P. (2014). Global, regional, and national prevalence of

- overweight and obesity in children and adults during 1980–2013: A systematic analysis for the Global Burden of Disease Study 2013. *The Lancet*, 384(9945), 766-781. doi:10.1016/S0140-6736(14)60460-8
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3<sup>rd</sup> ed.). New York: McGraw-Hill.
- Nur, T., Shah, U., & Zehra, N. (2013). Majority of the population disregards obesity a health risk: Obesity among different socioeconomic strata in Karachi: A hospital case study. *Pakistan Journal of Medicine and Dentistry*, 2(3), 43-48.
- Obesity, Bias and Stigmatization. (2016). *The Obesity Society*. Retrieved from <http://www.obesity.org/obesity/resources/facts-about-obesity/bias-stigmatization>
- Ogden, J., & Clementi, C. (2010). The experience of being obese and the many consequences of stigma. *Journal of Obesity*, 1-9. doi:10.1155/2010/429098
- O'Hara, L., Tahboub-Schulte, S., & Thomas, J. (2016). Weight-related teasing and internalized weight stigma predict abnormal eating attitudes and behaviours in Emirati female university students. *Appetite*, 102, 44-50. doi:10.1016/j.appet.2016.01.019
- Papadopoulos, S., & Brennan, L. (2015). Correlates of weight stigma in adults with overweight and obesity: A systematic literature review. *Obesity*, 23(9), 1743-1760. doi:10.1002/oby.21187
- Phelan, S. M., Burgess, D. J., Yeazel, M. W., Hellerstedt, W. L., Griffin, J. M., & van Ryn, M. (2015). Impact of weight bias and stigma on quality of care and outcomes for patients with obesity. *Obesity Reviews*, 16(4), 319-326. doi:10.1111/obr.12266
- Polk, D. M., & Hullman, G. A. (2011). Weight-related stigma as a predictor of self-disclosure patterns in women. *Open Communication Journal*, 5, 1-10.
- Puhl, R., & Brownell, K. D. (2001). Bias, discrimination, and obesity. *Obesity Research*, 9(12), 788-805. doi:10.1038/oby.2001.108
- Puhl, R. M., & Brownell, K. D. (2006). Confronting and coping with weight stigma: An investigation of overweight and obese adults. *Obesity*, 14(10), 1802-1815. doi:10.1038/oby.2006.208
- Puhl, R. M., & Heuer, C. A. (2009). The stigma of obesity: A review and update. *Obesity*, 17(5), 941-964. doi:10.1038/oby.2008.636
- Puhl, R., & Suh, Y. (2015). Stigma and eating and weight disorders. *Current Psychiatry Reports*, 17(3), 552. doi:10.1007/s11920-015-0552-6
- Raza, Q., Doak, C. M., Khan, A., Nicolaou, M., & Seidell, J. C. (2013). Obesity and cardiovascular disease risk factors among the indigenous and immigrant Pakistani population: A systematic review. *Obesity Facts*, 6(6), 523-535.

- Romano, E., Haynes, A., & Robinson, E. (2018). Weight perception, weight stigma concerns, and overeating. *Obesity*, 26(8), 1365-1371. doi:10.1002/oby.22224
- Ruggs, E. N., King, E. B., Hebl, M., & Fitzsimmons, M. (2010). Assessment of weight stigma. *Obesity Facts*, 3(1), 60-69. doi:10.1159/000273208
- Salas, X. R., Forhan, M., Caulfield, T., Sharma, A. M., & Raine, K. D. (2019). Addressing internalized weight bias and changing damaged social identities for people living with obesity. *Frontiers in Psychology*, 10. doi: 10.3389/fpsyg.2019.01409
- Sattler, K. M., Deane, F. P., Tapsell, L., & Kelly, P. J. (2018). Gender differences in the relationship of weight-based stigmatisation with motivation to exercise and physical activity in overweight individuals. *Health Psychology Open*, 5(1). doi:2055102918759691.
- Schrimpf, A., McGarvey, S., Haun, D., Kube, J., Villringer, A., & Gaebler, M. (2019). Socio-cultural norms of body size in Westerners and Polynesians affect heart rate variability and emotion during social interactions. *Culture and Brain*, 7(1), 26-56. doi:10.1007/s40167-018-0071-5
- Siddiqui, M., Ayub, H., Hameed, R., Nadeem, M. I., Mohammad, T., Simbak, N., ... & Baig, A. A. (2018). *Obesity in Pakistan; current and future perceptions*. Current Trends in Biomedical Engineering and Biosciences, 17(2), 001-004. doi:10.19080/CTBEB.2018.17.5559580022
- Sikorski, C., Luppia, M., Luck, T., & Riedel-Heller, S. G. (2015). Weight stigma “gets under the skin” evidence for an adapted psychological mediation framework: A systematic review. *Obesity*, 23(2), 266-276. doi:10.1002/oby.20952
- Smith, G. T., & McCarthy, D. M. (1995). Methodological considerations in the refinement of clinical assessment instruments. *Psychological Assessment*, 7(3), 300-308.
- Steiger, J. H. (1990). Structural model evaluation and modification: An interval estimation approach. *Multivariate Behavioral Research*, 25(2), 173-180.
- Stevens, S. D., Herbozo, S., Morrell, H. E., Schaefer, L. M., & Thompson, J. K. (2017). Adult and childhood weight influence body image and depression through weight stigmatization. *Journal of Health Psychology*, 22(8), 1084-1093. doi:10.1177/1359105315624749
- Sutin, A. R., & Terracciano, A. (2013). Perceived weight discrimination and obesity. *PloS One*, 8(7). doi:10.1371/journal.pone.0070048
- Tanzil, S., & Jamali, T. (2016). Obesity, an emerging epidemic in Pakistan: A review of evidence. *Journal of Ayub Medical College Abbottabad*, 28(3), 597-600.
- Teachman, B. A., & Brownell, K. D. (2001). Implicit anti-fat bias among health professionals: Is anyone immune? *International Journal of Obesity*, 25(10), 1525-1531.

- Tomiyama, A. J. (2014). Weight stigma is stressful. A review of evidence for the cyclic obesity /weight-based stigma model. *Appetite*, *82*, 8-15. doi:10.1016/j.appet.2014.06.108
- Tomiyama, A. J., Carr, D., Granberg, E. M., Major, B., Robinson, E., Sutin, A. R., & Brewis, A. (2018). How and why weight stigma drives the obesity epidemic and harms health. *BMC Medicine*, *16*(1), 123. doi:10.1186/s12916-018-1116-5
- van Leeuwen, F., Hunt, D. F., & Park, J. H. (2015). Is obesity stigma based on perceptions of appearance or character? Theory, evidence, and directions for further study. *Evolutionary Psychology*, *13*(3). doi:10.1177/1474704915600565
- Vartanian, L. R., & Porter, A. M. (2016). Weight stigma and eating behavior: A review of the literature. *Appetite*, *102*, 3-14. doi:10.106/j.appet.2016.01.034
- Vonglao, P. (2017). Application of fuzzy logic to improve the Likert scale to measure latent variables. *Kasetsart Journal of Social Sciences*, *38*(3), 337-344. doi:10.1016/j.kjss.2017.01.002
- Westermann, S., Rief, W., Euteneuer, F., & Kohlmann, S. (2015). Social exclusion and shame in obesity. *Eating Behaviors*, *17*, 74-76. doi:10.1016/j.eatbeh.2015.01.001
- Wu, Y. K., & Berry, D. C. (2018). Impact of weight stigma on physiological and psychological health outcomes for overweight and obese adults: A systematic review. *Journal of Advanced Nursing*, *74*(5), 1030-1042. doi:10.1111/jan.13511
- Yang, Y., & Green, S. B. (2011). Coefficient alpha: A reliability coefficient for the 21<sup>st</sup> century? *Journal of Psychoeducational Assessment*, *29*(4), 377-392. doi:10.1177/0734282911406668

Received 26<sup>th</sup> December, 2018

Revision received 17<sup>th</sup> November, 2019