

**VILNIUS UNIVERSITY**  
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The Final thesis

The Differences of Body Image Between Obese, Overweight, and a Normal Weight Individuals

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**Summary:**

This research investigated the relationship between body image, body mass index, and depressive symptoms among people living in Lithuania, focusing additionally on factors like gender and cultural context. 167 total participants from the general population and bariatric patients were surveyed assessing body image dissatisfaction and depressive symptoms using standardized questionnaires (Body Shape Questionnaire, and the Center for Epidemiologic Studies Depression-Revised Scale). There was an observed moderate positive correlation between body mass index and body image dissatisfaction (Spearman's Rank Correlation Coefficient 0.59 and 0.27 in bariatric patients and the overall sample respectively, p-values <0.00001 and 0.0004 respectively), more pronounced in bariatric patients, indicating that factors, in addition to just weight, affect self-perception. Cultural nuances, gender disparities in body image, and mental health impact were all factors observed, with apparent societal pressures and women overall scoring higher body dissatisfaction. With results in mind, observers note more individualized approaches to weight loss and healthcare could be beneficial, with a greater understanding of societal norms, psychological factors, and cultural influences assisting in said processes. The research done provides a nuanced approach to the subject, exploring the multifactorial nature of body image, and providing a glimpse at specifically the Lithuanian cultural context. No two people are the same, and all may feel differently about themselves. However, it is one's duty to live as healthy as possible, and such research may assist in helping secure that.

**Keywords:**

1. Body image
2. Body mass index (BMI)
3. Depressive Symptoms
4. Body image dissatisfaction
5. Center of Epidemiologic Studies Depression- Revised scale (CESD-R)
6. Body Shape Questionnaire (BSQ)
7. Obesity
8. Dysphoria
9. Anhedonia

**Introduction:**

The way one is and the way one perceives oneself can be radically different given a certain context. Although there may be a stereotyped understanding that larger-sized individuals have a poorer self-image, there are conflicting societal instances where individuals, normally considered of healthy weight, do not approve of his or her outright appearance. This can be also said for the

opposite situation, where larger-weight individuals may look upon themselves favorably. The relationship between weight, more specifically body mass index, and the way one perceives himself or herself may not be as definitive as one might suspect.

### **1. Body Image Findings Globally**

When looking at body image studies across the world, previous publications have documented various outcomes. In a 2014 study, 69 obese individuals, with corresponding 69 controls (matched in age, sex, and marital status), were surveyed regarding body image, self-esteem, and personality characteristics (1). Overall, body image dissatisfaction was greater in obese persons, with an apparent negative correlation in said persons between body image and self-esteem scale scores and harm avoidance scores (1). This is not surprising, considering larger body weight is often associated with many health issues, which may lower body image satisfaction if not quality of life. However, this does not strictly apply to obese individuals. In a 2022 Oman study, 351 medical university students were asked a series of questions (Stunkard Figure Rating Scale) regarding the way one may perceive himself or herself (2). Approximately, 66% of students perceived their body image to be similar to that of what they actually weigh, with 63% being within normal weight limits (2). However, body image dissatisfaction was high (80%) among the respondents with 73.5% of those wanting to be thinner (2). Although a majority of participants in the previous study were of normal weight, a vast majority were still dissatisfied with one's weight. Therefore, poor body image is not strictly limited to heavier individuals. In 2023 a Swedish population-based study was performed, where 10,441 Swedish citizens aged 20–64 years residing in Stockholm County were randomly selected from the population on five different and evenly separated occasions over two years (3). Participants would self-report weight, height, desired weight, and other characteristics (e.g. depressive symptoms and alcohol intake) (3). Among the 10,441 individuals, people with a BMI less than 40 kg/m<sup>2</sup> desired a lower body mass index as opposed to those with a BMI greater than or equal to 40 kg/m<sup>2</sup> (3). The study also reported women with obesity had a larger discrepancy between current and desired BMI than men with obesity (3). In addition, participants with obesity and major depression had a 6.9% larger discrepancy between current and desired BMI (3). Hence, BMI and discrepancies between current, desired, and ideal BMI vary consistently with current BMI, sex, and presence of major depression (3). Here one may see a similar trend, as previously noticed in the Oman study, where individuals who are lower in weight may express greater dissatisfaction with one's body. In this study, one may also notice

women being more affected by body image as opposed to their male counterparts, something observed in other publications as well. Another example is a 2022 study, where 744 adults (patients or volunteers) were given questionnaires (Stunkards' Figure Rating Scale) regarding body size perception and body dissatisfaction (4). Observers noticed underestimating weight was significantly more common among men than women, in addition to statistically significant differences in the distribution of body dissatisfaction according to the weight in both men and women (4). Similarly, as in other surveys, observers saw normal-weight individuals being more critical towards their shape, with overweight or obese women expressing overall greater dissatisfaction with their shape as opposed to their male counterparts (4). One's body image may also play a role in determining further plans and/or goals involving one's health and exercise. In an American survey performed in 2022, 344 college students enrolled at a large, public university in the southeastern United States, completed an online survey composed of measures of body appreciation, body satisfaction, self-esteem, and frequency of engagement in preventive health behaviors (5). Observers discovered body appreciation, but not body satisfaction or self-esteem, significantly and positively predicted engagement in diet, physical activity, and weight-related health behaviors (5). Specifically, body appreciation and body satisfaction were significantly correlated (5). Similarly, in a 2022 ongoing cohort study, 4,262 university students were questioned regarding body dissatisfaction and how it may correlate with compulsive exercise (6). The study discovered that female participants on average scored higher on the BSQ (Body Shape Questionnaire) than male participants (6). Hence it was discovered, that among university-aged women, there were higher levels of body dissatisfaction than men (6). This also coincided with a significant gender difference in exercise habits, with women being more often willing to self-report exercise for weight and shape reasons than men (6). In this example, one notices that women, as previously established, tend to be more greatly affected by their body image, in addition to making choices affecting their health and well-being. Similar patterns are seen in the opposite situation. In a 2022 cross-sectional study, 438 patients with obesity (body mass index greater than 30) had to complete questionnaires (HADS, TFEQ-R21, and WEL) regarding depression, lifestyle, and eating habits (7). Results showed patients with obesity who mentioned having anxiety had lower self-confidence in managing their eating and expressed more emotional eating than patients with low anxiety symptoms (7). Overall, people of various weights, shapes, and sizes are all in various ways affected by body image. One may have also noticed that sometimes what one discerns might

not necessarily coincide with reality. Thus, a pattern between one's weight and one's understanding of one's appearance may not be as straightforward as previously believed.

## **2. Depression, Body Weight, and their Combined Impact**

In addition to body image being compared to a person's weight, many publications have also taken the time to compare body weight trends with depressive symptoms, even suicide. In a 2016 Swiss cross-sectional study, 15,975 individuals were asked about their body weight satisfaction using the Patient Health Questionnaire (PHQ-9) (8). Body weight dissatisfaction was associated with depression in the overall group as well as in men and women (independent of BMI) (8). The study also concluded that grouping by BMI categories results in statistically significant positive associations of body weight dissatisfaction and depression in underweight, normal weight, overweight, and obese individuals (8). Thus, in addition to weight alone, patients who experienced depressive symptoms were also observed to experience poorer body image satisfaction. Similar results were found in a 2018 cross-sectional study, where 882 remitted depressed patients, 242 currently depressed patients, and 325 healthy controls from the Netherlands Study of Depression and Anxiety were surveyed regarding their depressive symptoms in addition to their BMI (9). The study found that people who were more overweight viewed themselves as larger and disapproved more often with their body image (9). People who were severely depressed, whether they were currently or previously depressed, also saw themselves as larger and were less satisfied with their body image (9). Observers thus concluded that depression (current, remitted, and severe) and higher BMI contribute independently to a larger body size perception in addition to higher body image dissatisfaction (9). There also has been research done regarding depression and dietary behavioral changes. In a 2018 cross-sectional study, 1,060 remitted depressed patients, 309 currently depressed patients, and 381 healthy controls from the Netherlands Study of Depression and Anxiety were used to assess eating styles in depressed individuals (10). It was discovered that remitted and current cases of depressive disorders were significantly associated with higher emotional eating and higher external eating (10). Longer symptom duration was also associated with more emotional and external eating (10). In this study in particular it was also noticed that no depression associations were found with restrained eating (10). As previously established by analyzed literature, women who have higher body mass indexes tend to look upon themselves more poorly, which can be also said about depressive symptoms leading to similar effects. In a 2024 Polish study, 556 women from the West Pomeranian Voivodeship were diagnostically

surveyed using The Beck Depression Inventory, the ORTO-15 Questionnaire, the Three-Factor Eating Questionnaire, and a sociodemographic questionnaire (11). The study discovered that feeling more depressed was associated with higher levels of emotional and uncontrolled eating (11). Additionally, the study found that women who felt more depressed were also more likely to restrict their eating (11). Women who were in a relationship also showed more signs of controlling their food intake than women who were single (11). The study also touched upon orthorexia, and being preoccupied with a healthy diet, and noticed older women were at more risk for developing this condition (11). In addition to depressive behavior affecting eating patterns, some studies have also linked body mass index and suicidal behavior. In a 2023 cross-sectional study, aimed to explore the connection between BMI and suicide attempts amongst patients in China, 1,718 participants (588 males and 1,130 females) were surveyed (12). In males, BMI was significantly associated with suicide attempts, but not in females (12). Men who weighed less were more likely to attempt suicide (12). Specifically, for every unit decrease in BMI, the chance of attempting suicide increased by 16% (12). The study also discovered that this relationship changes at a certain weight point (12). For men, this change happened at a BMI of 27.3 kg/m<sup>2</sup>, and for women, at 21.4 kg/m<sup>2</sup> (12). Below these weights, the risk of attempting suicide was connected to lower BMI in both men and women (12). Above these weights, it appeared weight did not have an impact (12). One notices that weight alone sometimes does not explain trends in people's behavior or outlook, and in researching such a topic, it is wise to consider additional variables that can truly affect a person's body image, in this case, depression, and depressive symptoms.

### **3. Body Image in Lithuania**

We summarized many studies that were carried out around the world regarding body image and whether it is correlated with BMI. However, a summary of studies done on Lithuanians would also be useful, considering that a majority of the persons who contributed to the survey used for this thesis were Lithuanians. A 2015, European study conducted in several countries, including Lithuania, recorded 1,493 first-year university student responses (13). The study concluded that there exists a significant relationship between body dissatisfaction and body mass index for males, in addition to a significant relationship found between body dissatisfaction and body mass index for females (13). The group that corresponded to underweight females scored significantly lower in body dissatisfaction when compared to the normal-weight female group in addition to the overweight and obese female group (13). For men, significant differences in body dissatisfaction



were revealed among underweight, overweight, and obese men (13). Men labeled as normal weight reported a significantly lower median score in body dissatisfaction when compared to overweight and obese men (13). No significant differences in body dissatisfaction were observed between the underweight men and normal-weight men (13). Results in this survey mirror similar results noticed in other studies seen worldwide. However, the following speaks directly on Lithuanian men's preoccupation with muscle growth. In a 2020 study, 1,850 Lithuanian university students completed a series of questionnaires, regarding health-related lifestyle (14). The study reported that if students liked certain parts of his or her bodies, then generally quality of life scores tended to be better regardless of sex (14). Women who reported unhappy body image also reported having poorer psychological quality of life, the same which was not observed in men (14). Men reported if they had not achieved the desired amount of muscle mass, that their overall quality of life was lower (14). Overall, how much students liked their bodies played an important role in the connection between their body mass index and their psychological and physical quality of life (14). Additionally, when compared to results seen in other countries, Lithuania's overall approach to body image is unique. In a 2010 survey involving several European countries (including Lithuania), 5,900 university students were questioned regarding differences in perceived weight status (15). Although the majority of students reported a normal BMI, only 32% to 68% of students considered their weight to be adequate (15). Around 20% of females with a BMI of 20 kg/m<sup>2</sup> considered themselves heavier, and the percentage increased to 60% for a BMI of 22.5 kg/m<sup>2</sup> (15). Male students rarely identified as heavier if they were below a BMI of 22.5 kg/m<sup>2</sup>, but most felt too thin with a BMI of 20 kg/m<sup>2</sup> (15). When it came to specifically Lithuanian results observers noticed similar gender differences but an overall higher number of students considering their weight adequate over a wider range of BMI scores (15). It was also noticed that within Lithuania there were substantially smaller differences in terms of weight, height, and BMI between the sexes (15). Observers concluded that small differences observed might result from the lower importance of body shape specifically as a measure of attractiveness (15). In this case, we see similar results to other surveys regarding the fact that one's body mass index does not usually match one's body image. However, in Lithuania, this appeared to matter less, leading to appropriate conclusions. In the final study discussing trends in Lithuania, there appeared to be a trend not yet observed in the worldwide samples mentioned earlier. In a 2009 study 1,403 men and women residing in Kaunas city, aged 35–64 years and divided by age and sex, were examined to ascertain physical

measurements and risk factors related to lifestyle (16). Quality of life was assessed by the World Health Organization Quality of Life 100 questionnaire (16). It was discovered that less than three-fourths (73%) of men and women had excess body weight (16). Obesity in combination with other analyzed factors hurt men's quality of life while obesity for women increased the odds of having worse quality of life in the psychological and independence domains (16). Overall, excess body weight among women was associated with impaired quality of life while men with excess body weight reported better overall quality of life (16). Specifically, in Kaunas, it appears that a higher body mass index for men correlates with an overall better quality of life. With a greater understanding of potential trends seen in Lithuania, any noticeable patterns in the research of this thesis could be explained using said observed information.

#### **4. Body Image of Bariatric Patients**

Finally, when discussing body image, one must consider delving into the thought processes of individuals who decide to change their body elements which leads to body dissatisfaction. For example, bariatric surgery is an option for many obese individuals to achieve a more manageable weight, so that further weight loss can become achievable. Body image to these said individuals is also important and might unlock several elements important to consider when researching the subject. In a 2020 study, 125 pre-bariatric patients were compared with 125 general population controls using the Multidimensional Body-Self Relations Questionnaire-Appearance Scales (MBSRQ-AS) (17). It was noticed that pre-bariatric patients showed lower appearance satisfaction and were more prone to focus on appearance as a quality (17). Overall, it was concluded that such an understanding of one's body may be a major motivator in seeking surgery (17). Also, both experimental and control groups tended to rate their appearance lower than what would be perceived as normal (17). In the case of bariatric patients, this also appears to be true. Similar studies were conducted in 2019: 536 patients with extreme obesity evaluated for bariatric surgery were interviewed using the Body Shape Questionnaire (BSQ), together with performing assessments for depression, binge eating, and attachment styles (18). When it came to analyzing body image dissatisfaction, it was confirmed that binge eating habits, depression, and female gender were all significant predictors (18). Specifically, in this case, trauma and BMI were significant predictors (18). Psychiatric history, depressive symptoms, and binge eating severity all proved to be linked to dissatisfaction (18). When it comes to post-operation effects, the results vary depending on the study and sometimes with the period of time being observed. In a 2006

American study, 109 individuals were surveyed using the Body Shape Questionnaire (BSQ), and the Shape and Weight Concern subscales of the Eating Disorder Examination Questionnaire (EDE-Q) (19). What the study discovered was not only significant weight loss in individuals after surgery, but also a decrease in body dissatisfaction at 6- and 12-month checkups (19). Additionally, the majority of women found body image comparable to standard norms (19). Similar conclusions were made in a 2021 German study, where 52 patients post-laparoscopic Sleeve Gastrectomy (LSG) underwent mediation analysis using the Body Image Questionnaire (BIQ-20) and the Patient Health Questionnaire (PHQ-9) for depressive symptoms (20). Depression symptoms (PHQ-9 scores) and negative body image significantly improved post-surgery, with additional positive body dynamics scores also improving after surgery (20). However, there was no direct impact of weight loss on depression levels (20). There was also an indirect small effect on depressive symptoms observed, through negative body image evaluation (20). It is thus conclusive that people feel happier when they start feeling better about their bodies. However, body image does not improve in all cases, and in certain examples, patients look for additional procedures that might attain a body figure that they consider more desirable. In a 2022 study, 216 individuals were surveyed one year before, one year after, and then five years after bariatric surgery (21). Various questionnaires were used to collect information regarding body satisfaction, mental health indicators, and demographic information (21). Results discovered that nearly one-third had body-contouring surgery (BCS) by the fifth-year checkpoint (21). This desire for the contouring surgery correlated with lower pre-surgery body satisfaction and resilience, in addition to higher depressive symptoms (21). For the surveyed patients body satisfaction improved overall, especially for those who had the additional body contouring surgery (21). Mental health improvements were also noticed in individuals who had the BCS procedure (21). Other articles commented on the fact that body image would improve suddenly and then in some way plateau later. In a 2022 survey, 61 individuals were given questionnaires five years after bariatric surgery (22). Assessments given included the Stunkard Figure Rating Scale, Multidimensional Body-Self Relations Questionnaire-Appearance Scales (MBSRQ-AS), and surveys assessing appearance, overweight preoccupation, body satisfaction, and self-classified weight (22). The survey showed that immediately after surgery, body image improved, but such results were not sustained over the entire five years (22). There was still quite a noticeable preoccupation with being overweight after follow-up (22). There was an observed overall positive correlation between weight loss and evaluated appearance, in

addition to body satisfaction (22). There was also a negative correlation between weight loss and earlier mentioned preoccupation (22). Similar sentiment was established in patients in a 2018 cross-sectional study conducted by the Federal University of Pernambuco (23). Thirty-six bariatric surgery candidates were given questionnaires (Silhouetted Figures Scale), to assess body image perception (23). As in other studies, patients reported feeling heavier than they were, in addition to a majority being dissatisfied with their post-surgery weight (23). There also was a disparity of satisfaction experienced by the sexes with only 11.8% of women liking the post-surgical result, while among men there was 50% satisfaction (23). In a 2020 study, 67 individuals undergoing bariatric surgery had sequential sampling in addition to surveys done regarding body image, and various weight loss indicators before and after surgery (24). There was a noticeable wide variability in body image improvement, and significant early weight loss did not show any link to comprehensive body image improvement (24). As seen in this case there was not even the associated improvement in body image immediately after the operation, which seemed to be normal in other cases. Although cases and studies may provide conflicting evidence, the results are still important, because the issue of body image can prove to be rather crucial in dealing with depressive, even suicidal ideations. In a 2017 study, 3,101 adults (majority female) considering bariatric surgery, underwent analysis regarding the mediating role of self-esteem in the relationship between BMI and psychological outcomes (with gender considered as a potential moderator) (25). The major takeaways regarding this study involve self-esteem being a mediator between BMI and depression/suicidality, in addition to men experiencing a greater mediation effect of self-esteem as opposed to women (25). Self-esteem played a big role in linking an individual's BMI to depression and suicidal thoughts, hence the authors mentioned that improving how people feel, and not just looking at weight alone, can make the weight loss process more seamless (25). Understanding this subset of individuals is critical in understanding body image and the effects it may have on individuals of various weights and sizes. As previously established, body image indeed motivates people. Whether one thinks well or not about his or her weight, the drive to get bariatric surgery is indeed one that is necessary, and should not be taken lightly.

## **5. Main Ideas from the Literature**

When developing potential research that concerns the subject of body image and its differences between obese, overweight, and normal-weight individuals, one must acknowledge learnings from previous research, in order to develop a proper hypothesis. First of all, body image

dissatisfaction is greater in obese individuals and has a negative correlation with self-esteem (1). However, a poor body image does not apply strictly to only obese individuals, in that those of normal weight also experience significant dissatisfaction (2,3,4). Many articles and surveys point to a tendency for women to be more affected by body image concerns than men, and many also tend to express a desire to be thinner (3,4,6). Regarding body appreciation, it has been observed that it has a more significant positive impact on health behaviors than body satisfaction or self-esteem (5). In several articles, it was noticed that depressive symptoms and body mass index each contribute independently to a poorer body image and a larger perception of one's body (8,9). Depressive disorders have been discovered to have relatively strong associations with altered eating patterns like emotional and external eating, with such eating behavior more noticeable in women (10,11). When observing bariatric patients, body image has been observed to be a major motivator to get the surgery done, with body image also being heavily associated with certain psychological factors, including depression and trauma (17,18). Although some patients report better body image with time, others may not experience positive changes sustained over time, and some patients may even experience dissatisfaction regarding appearance or weight (19,22). Also, image improvement after the procedure is variable with some experiencing improvement in body image post-surgery, while others do not (24).

## **6. Hypothesis**

Body image itself is seen in multiple societal facets, for example, personal health, societal norms, and one's mental health. The research conducted in this particular instance delves into the notion that body image can vary from individual to individual given their differing body mass indexes (e.g. obese, overweight, and normal-weight individuals). After addressing the existing literature analyzed earlier, and acknowledging current societal norms, one expects to see a possible pattern between a person's weight (BMI) and one's body image, with factors like sex, and depressive symptoms further encouraging a statistically significant correlation, where a higher BMI should result in a lower corresponding body image.

## **7. Summary of Content with Potential Relevance of Research**

Many have noticed the greater global awareness of mental health, a growing global desire to be healthy, and an endless litany of panaceas to help people achieve their dream physique. Understanding patterns of body image is crucial in this day and age, given the endless debates on what body is ideal, what body shapes should be encouraged, what diets to follow, and how one

should feel about oneself. The public discourse is constant, and unavoidable in a sense. Methods, results, and conclusions that will be discussed shortly, consider many different perspectives, from psychological, sociological, and holistic schools of thought. Data gathered during the research process involves perspectives of different cultures (particularly Lithuanian), providing a specific and unique snapshot into a culture's understanding of a complicated issue. Gender as seen in other studies plays an important role and will be considered in this research as well, to see how it differs in a particular culture, in the current year. A combination of different static gathering modalities is used, which addresses not only information pertaining to body image, but the role of depression symptoms, and any particular pattern that may be noticed between the two. Any potential findings could assist the public health sectors of Lithuania and other nations/communities, providing insight into the mental health component of body image, and how one may approach achieving overall better mental health. Clinical applications could possibly involve coaching and helping patients after weight-loss surgery since patients were also surveyed. Understanding body image, even in a general sense can improve health-related behavior, as seen in the mentioned literature. A greater understanding of possible suicidal behavior can also be addressed, in that links were made in previous studies, and a greater understanding of such patterns may lead to the prevention of suicide. The information that could potentially be provided by the performed research may not only be convenient for the sake of understanding body image patterns but also may have a large impact on persons, communities, and societies at large.

## **8. Objectives**

Throughout the following approaches, results, and potential conclusions, several objectives should be addressed. The first is to assess the possible correlation between one's weight (BMI) and body image among people of various shapes and sizes to ascertain quantitative measures in addition to qualitative self-assessments. A second objective would be to evaluate the sociocultural factors that may cause deviations in body image norms, through already published literature in addition to the newly acquired data. A third objective would be to explore any possible body image disparities between the sexes, to see if Lithuanians follow the same patterns as said people in the heretofore mentioned surveys. The final objective would be to observe a possible relationship between body image scores and mental health levels, to compare body image scores to depressive symptoms reported, and to see if any pattern exists, understanding full well that the literature has provided conflicting accounts in some cases.

## **Methods**

### **1. Participants**

167 individuals contributed to the survey. Participants included individuals representing the general population in addition to bariatric patients surveyed at The Republican Vilnius University Hospital. Individuals in the general population were either Lithuanian nationals or foreign nationals living in Lithuania for studies. The ages of those who participated were between the ages of 18 and 72. Participants were given body mass index categories of underweight, normal weight, overweight, and three different classes of obesity. Inclusion criteria included adults having to be over the age of 18, to properly consent to be surveyed. Exclusion criteria involved the survey itself being incomplete, lacking critical information (e.g. height and/or weight), and individuals who did not consent to be surveyed.

### **2. Study Design**

The survey was conducted in a cross-sectional design, observing a sample size of the population at one particular point in time. Data itself was collected from January 5<sup>th</sup>, 2024 till February 13<sup>th</sup>, 2024. Various factors were considered. These include the weight categories discussed earlier, the biological sex of the participants, and simultaneously mental health indicators.

### **3. Data Collection Methods**

Data itself was collected using standardized questionnaires (Body Shape Questionnaire, and The Center for Epidemiologic Studies Depression Scale Revised), to measure body image and depressive symptoms, respectively. Virtual and tangible modalities were used when handing out surveys to fill out.

The Body Shape Questionnaire (BSQ) was developed using semi-structured interviews with women to investigate relationships with body image, specifically observing individuals suffering from bulimia nervosa, anorexia nervosa, women who were dieters, exercisers, and women without specific weight concerns (26). The study itself used to develop the questionnaire focused on aspects of "feeling fat," the behavioral and emotional consequences associated, and potential triggers related to body shape concerns (26). A 6-point Likert scale assessing the frequency of body shape concerns over the prior four weeks would be used (26). When it came to testing validation predictions several observations were made: Bulimia patients scored significantly higher, showing the questionnaire's discriminative validity; the BSQ correlated with

other scales (Body Dissatisfaction Subscale and the Eating Disorder Inventory), in addition to self-reported dietary behaviors, providing evidence towards the BSQs concurrent validity; connections to eating disorders were established by noticing a significant relationship between the BSQ and Eating Attitudes Test scores; finally individuals from the community sample, who showed bulimic symptoms, scored similarly on the BSQ to those diagnosed, showing the BSQ is indeed valid when scoring individuals with potential eating disorders (27). The questionnaire scored a Cronbach's alpha of 0.97, indicating consistency and reliability (27).

Dr. Peter J Cooper was contacted in 2023, to ask for permission regarding the use of the Body Shape questionnaire, where he kindly permitted its use. Additionally, Dr. Audronė Miškinytė-Stepanavičienė was contacted, requesting permission for the use of her Lithuanian translations of the Body Shape Questionnaire. Again, permission was granted for use in this research. The format used in this case was the BSQ-34, with a total of thirty-four questions, with a Likert scale ranging from one to six, one meaning never applicable, and six meaning always applicable. The information pertained to the surveyed individual's body image over the previous four weeks. Cutoffs were as follows: less than 80-no concern with shape; 80 to 110- mild concern with shape; 111 to 140-moderate concern with shape; over 140-marked concern with shape (28). The information and questionnaires were found at [psyctc.org](http://psyctc.org) (28).

The Center for Epidemiologic Studies Depression Scale-Revised (CESD-R), came about to closely align itself with DSM-IV criteria for major depressive episodes (29). The original scale was revised to ensure better recording of symptom frequency, updating the original content, and was also revised to incorporate new questions regarding anhedonia, psychomotor changes, and suicidal behaviors (29). 20 items reflecting the DSM-IV (The Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition) criteria for a major depressive episode, were used in refining the revised scale (29). Validation efforts included the following: the survey itself demonstrated internal consistency and strong psychometric properties, providing evidence for it being a comprehensive measurement of depressive symptoms; factor analysis provided evidence for the survey being an appropriate means of measuring depression's multidimensionality; convergent validity was observed when depressive symptoms correlated strongly with anxiety symptoms observed using other surveys along with schizotypy (just not as strongly); there was an observed negative correlation with positive affect which indicates the survey accurately measured depression severity; finally, the use of the DSM criteria proved useful in, suggesting improvements



in the previous approach (29). Within this study, 2 sample sizes were observed, sample 1 being that of the National Organization for the Reformation of Marijuana Laws listserv, and sample 2 being that of undergraduate psychology students at a state university in the United States (29). Cronbach's alpha for the two samples were .923 and .928 respectively, ensuring the CESD-R's (Center for Epidemiologic Studies Depression Scale-Revised) high consistency (29).

The CESD-R is a public domain scale that is free to use. This includes already existing Lithuanian versions available online. The CESD-R website states: "The 20 items in the CESD-R scale measure symptoms of depression in nine different groups as defined by the American Psychiatric Association Diagnostic and Statistical Manual, fifth edition" (30). The groups with associated questions were as follows: Sadness or Dysphoria (Questions 2,4, and 6); Loss of Interest or Anhedonia (Questions 8 and 10); Appetite (Questions 1 and 18); Sleep (Questions 5, 11, and 19); Thinking or Concentration (Questions 3 and 20); Guilt or Worthlessness (Questions 9 and 17); Tired or Fatigue (Questions 7 and 16); Movement or Agitation (Questions 12 and 13); Suicidal ideation (Questions 14 and 15) (30). The total CESD-R Score is ultimately calculated as a sum of all the twenty questions depending on the responses given. Possible responses include: Not at all or less than one day within the last week (score of 0); 1-2 days within the last week (score of 1); 3-4 days within the last week (score of 2); 5-7 days within the last week (score of 3); Nearly every day for 2 weeks (score of 3) (30). Depressive symptom categories are determined through several factors, including how much total people score, plus in what groups they in fact score. Major depressive episode criteria are met with the following, "Anhedonia or dysphoria nearly every day for the past two weeks, plus symptoms in an additional 4 DSM symptom groups noted as occurring nearly every day for the past two weeks" (30). Probable major episodes are similar except that symptoms only need to be found in an additional 3 DSM symptom groups and occurred either nearly every day for the past two weeks or 5-7 days in the past week (30). A possible major episode was marked if symptoms were found in an additional 2 DSM symptom groups (30). Subthreshold depression symptoms were marked if people had a score of at least 16 and no additional criteria, leaving the last classification, with no clinical significance, which is when scores on the survey were less than 16 (30).

#### **4. Variables and Measurements:**

The independent variables for this research included body mass index which was derived from the individuals' provided height and weight, biological sex, and weight category based on

one's BMI. The dependent variables were the BSQ-34 scores which corresponded with body image dissatisfaction, and the CESD-R score which corresponded to depressive symptoms.

When looking into data that uses body mass index (BMI; body weight [kg]/height- squared [m<sup>2</sup>]) as a measure, one must consider the potential drawbacks. Body mass index has often been criticized as a less accurate means of measurement by many, a common argument being that it does not consider muscle mass, making rather muscular individuals automatically overweight at times (32). This also goes for fat, bone, and fluid (32). Body mass index also does not consider fat distribution and does not differentiate between subcutaneous and visceral adipose (32). Body mass index does not consider many elements that are important to understanding and analyzing one's weight, including race, age, sex, hormones, etc. (32). However, it is a convenient means of measurement, and has been increasing in use prevalence throughout the twenty-first century (33). With drawbacks considered, its use is most necessary and is a valuable prognostic tool (33). Although health risk cannot be perfectly assumed using body mass index alone, referring to it as "just a number," downplays its value (33). Its use is objective, convenient, and provides a general understanding of weight distributions amongst people, which proves most necessary when comparing one's body shape to one's body image.

## **5. Statistical Analysis**

Considering data was not normally distributed, non-parametric tests were utilized to calculate appropriate data. Tests included Mann-Whitney U tests, Kruskal-Wallis tests, and Spearman's rank correlations, and were used for appropriate hypothesis testing. Statistical analysis was carried out using R studio.

## **6. Ethical Considerations**

The study adhered to ethical standards, ensuring that every participant was aware of his or her rights and that participants were fully capable of not submitting the surveys if it was deemed inappropriate. Confidentiality was ensured by not collecting any personal information, and information remains anonymous. Confidentiality of the survey was also informed and promised to the participants who consented. Due to the sensitive nature of the subject matter, contacts were provided for potential psychological help.

## **7. Validity and Reliability**

The studies listed above are reliable as seen in the literature provided. Both the BSQ and the CESD-R are validated means by which one may ascertain information regarding one's body

image and the potentiality of having depressive episodes. The study itself was organized to optimize response reliability.

## **8. Limitations**

There are clear flaws with self-reporting that need to be addressed. Due to the sensitive subject matter people perhaps were less willing to answer fully one of the questionnaires. Perhaps the information was misunderstood. Also, there is a possibility one may not remember how one feels. Considering the study is cross-sectional, it does not account for past or future results, just the cross-section of the population at that time. Potential non-response bias may skew results, considering who could have versus who did fill out the surveys. Considering the cultural ramifications, it is important to consider the fact that a vast majority of individuals surveyed were Lithuanian (with only several being foreign students who study in Lithuania). The cultural norms seen in Lithuanian society may also skew results.

## **9. Data Analysis**

A plan was made to fully analyze the provided data. Descriptive statistics would be collected by calculating means, medians, averages, etc. Demographic statistics were observed, followed by inferential statistics, to look for any possible associations between medians in groups and eventually possible linear regression models. Finally, subgroup analyses were performed for sex and weight categories.

## **10. Data Management**

Any response that was filled out online was stored on a Google sheet. Eventually, any tangible copy that was filled by a bariatric patient was transcribed to said Google sheet, where information was neatly organized. Answers to CESD-R were changed to the corresponding number score as described earlier. The sum of all the answers was then used to determine the category based on score and what category was marked. Similarly, the BSQ sum was calculated based on response scores, and then based on the sum, a category was selected accordingly. All recorded information was then organized for easier analysis so it could be inputted into R studio.

## **Results**

The general overview of the participants was as follows:

**Table 1: Summary Statistics (Appendix pg. 26)**

**Table 2: CESD-R & BSQ Classification (Appendix pg. 26)**

**Table 3: Distribution of the Sexes (Appendix pg. 26)**

Observing the distributions of BMI, and BSQ/CESD-R results across the entire sample, in addition to groups tested (e.g. bariatric patients, and the other participants), provided descriptive data regarding the data set as a whole. Descriptive statistics were as follows:

**Table 4: Descriptive Statistics (Appendix pg. 26)**

Distributions of BMI, BSQ scores, and CESD-R scores were calculated using the Shapiro-Wilk test for normality. All variables indicate deviations from normality, as evidenced by the statistics being less than one and the p-values being significantly lower than the standard threshold of 0.05.

**Figure 1: Histograms of Variables (Appendix pg. 26)**

**Table 5: Shapiro-Wilk Data (Appendix pg. 26)**

In every variable data is skewed to the left. With low P-values considered, one can verify that the distributions of these variables are not normally distributed, supporting the use of non-parametric tests for subsequent analyses.

**Figure 2: Box and Whisker Plot Distribution (Appendix pg. 27)**

**Table 6: Boxplot Distribution of Variables (Appendix pg. 27)**

BMI values indicate a majority of participants have a BMI within the normal to overweight categories. The ten discovered outliers correlate with individuals with very high values (severe obesity). Regarding BSQ scores, the median score positions the central tendency towards moderate concern with one's shape, with two outliers indicating highly marked concern with one's shape. CESD-R scores range from no symptoms to severe depression symptoms. The median indicates mild to moderate symptoms in survey participants. Ten outliers are associated with high survey scores, signifying noteworthy mental health challenges.

**Table 7: Spearman's Rank Correlation Analysis (Appendix pg. 27)**

Spearman's rank analyzed relationships between the established variables across the different tested groups. This test highlights a significant, moderate positive relationship between BMI and body shape concerns overall, with an especially strong correlation among surveyed bariatric patients. No significant relationship was observed between BMI and CESD-R scores.

**Table 8: Results According to Sex (Mann-Whitney U Test) (Appendix pg. 28)**

The Mann-Whitney U test indicates no statistically significant difference in BMI between men and women. The same can be said regarding CESD-R scores, there is no observed significant difference. There is a statistically significant difference in BSQ scores between men and women,

with an observed U value of 1545.0. This indicates that women may have higher BSQ scores on average than men.

**Table 9: Results According to Weight Category (Kruskal-Wallis H Test) (Appendix pg. 27)**

The Kruskal-Wallis test statistic for BSQ scores of 22.14 with a P-Value of 0.000493 indicates statistically significant differences in body shape concerns across the defined different weight categories (e.g. underweight, normal weight, etc.) For CESD-R scores, the test statistic is 1.76 with a P-Value of 0.881448, indicating that there are no statistically significant differences in depression symptoms as measured by the CESD-R across the different defined weight categories.

Linear regression models were drawn to see possible predictive values if there is any sort of pattern noticeable. This is evident while observing BMI and BSQ linear regression. Data is as follows:

**Figure 3: Total Data Scatterplot for BSQ scores (Appendix pg. 28)**

**Figure 4: Bariatric Patient Scatterplot for BSQ scores (Appendix pg. 28)**

**Figure 5: Other Participant Scatterplot for BSQ scores (Appendix pg. 29)**

**Table 10: BSQ Scores Linear Regression Results (Appendix pg. 27)**

Relationships observed between BMI and body shape concerns are stronger among bariatric patients, with a significant positive coefficient indicating that higher BMI is associated with greater body shape concerns. Statistical significance is observed for bariatric patients but not for the other surveyed participants, where BMI explains very little of the variance in BSQ scores.

Results regarding CESD-R linear regression models did not yield statistical significance generally speaking. The findings were as follows:

**Figure 6: Total Data Scatterplot for CESD-R scores (Appendix pg. 29)**

**Figure 7: Bariatric Patient Scatterplot for CESD-R scores (Appendix pg. 30)**

**Figure 8: Other Participant Scatterplot for CESD-R scores (Appendix pg. 30)**

**Table 11: CESD-R Scores Linear Regression Results (Appendix pg. 28)**

Analysis reports very weak relationships with BMI across all groups. There is a marginal increase in CESD-R scores amongst bariatric patients with increasing BMI, but this relationship does not reach statistical significance (p-value: 0.05). Hence BMI's impact on CESD-R scores appears to be negligible in addition to not statistically significant.

## **Discussion**

### **1. Critical Evaluation**

Results not only demonstrated findings that coincided with conclusions in other studies, but also diverged in certain areas. Ultimately the relationship between obesity and body dissatisfaction is a complicated one, as seen in a plethora of literature. Different trends apply to different people, and no two individuals are the same. Yet, some similarities are noticeable nonetheless. In certain cases, direct negative correlations were observed between body image dissatisfaction and levels of obesity, corroborating a straightforward relationship (1). In the survey performed for the above results, a Spearman's correlation coefficient of 0.27 between BMI and BSQ for overall participants was found, in addition to 0.59 among bariatric patients alone. Although results suggest that obesity might have some ties to body dissatisfaction, a lot depends on personal experience, and finding an absolute reason for said dissatisfaction might not be that cut and dry. Other sources refer to various individuals reporting various body dissatisfaction levels (2,3). This coincides with the fact that results did not strictly show higher body mass indexes having poorer BSQ scores. Simply put the associations that are often made cannot be oversimplified. Regarding sex, and how it may affect results, it was discovered that women had a much stronger chance of scoring higher when it came to body dissatisfaction, as similarly reported by Gruszka et al. and Edlund et al (4,6). This observation makes known that women may be disproportionately affected by societal pressures to look a certain way, even in places like Lithuania. When looking at the cultural context, the Kruskal-Wallis test shows significant differences in body shape concerns, with a linear model that is only moderately visible. This is evidence of the complexity of this issue amongst Lithuanians considering a moderate relationship corresponds to a complex issue. Comparing said results to insights from Hricová et al. and Mikolajczyk et al., there is a common understanding that there is a certain cultural sensitivity to these issues, that must be taken seriously (13,15). Novel aspects of this research include a nuanced approach to understanding patterns between body mass index and body dissatisfaction. This can be said especially regarding the stronger correlation among bariatric patients. More individualized care is necessary to ensure patients the best possible outcomes regarding weight loss, weight loss surgery, and post-weight loss care.

## **2. Interpretation of Results**

Generally speaking the range of BSQ scores across different weight categories, with greater noticed variability among the bariatric patients surveyed suggests that body image dissatisfaction is mostly experienced in obese individuals. A moderate positive relationship was observed

between body mass index and the body shape questionnaire scores, hinting at the fact although body weight is an important factor, it is not by any means the only one. There was a stronger relationship seen between BMI and BSQ scores in the bariatric patient group which underscores the sensitive matter of this subject for this specific group of people. As previously mentioned women were found to experience greater body dissatisfaction, with a significant difference in BSQ scores in the sexes. Across the board, there was a lack of evidence for a significant relationship between depression and BMI. This suggests that perhaps societal factors and other psychological factors (other than depression) can explain observed patterns. As previously mentioned the significant body shape difference amongst weight categories provides evidence that the patterns observed are quite complex and are in part due to several factors including societal factors. The variability seen in the Lithuanian population, when compared to the European/global literature from earlier emphasizes that there is a lot of cultural sensitivity when addressing these issues. Cultural norms may prove to be rather important in people's relationships with themselves.

### **3. Limitations**

Multiple elements of this research could be considered limiting. For example, a cross-section design naturally limits finding a link for causality. Also, self-reporting has its problems. Individuals might experience social desirability bias. Also, the answer given might only represent an individual's psychological state at that time only. The gender distribution was not ideal, although conclusions were similar to that of earlier literature. Not to mention more women were willing to answer the survey (103 women to 61 men) so that skew is not ideal either. Considering moderate relationships were found, it indicates that other factors were at play in peoples' decisions, and said factors were not necessarily tested in this study. Also, both surveys used had rather larger variabilities which may complicate interpretation of results. Regarding the analysis done, the results had a non-parametric distribution which also is not ideal, considering it lacks depth of analysis compared to parametric testing.

### **4. Significance of Findings**

Only a moderate relationship was observed between body mass index and body dissatisfaction. This hints that the assumed linear relationship is not necessarily accurate, challenging conventional understanding of the subject. The research highlights the importance of multifactorial causes in the creation of theoretical models, which should most definitely include sex and an understanding of the cultural context. Seeing a moderate relationship between body

image and weight in bariatric patients gives credibility to the fact that there is a complex interplay of many factors in body image, and obesity along with other factors (societal, and psychological) in part forms the perception of body image.

## **5. Clinical Relevance**

Clinically speaking there are several applications to this research. One would be the greater focus on personal interventions regarding weight-related healthcare. This is especially true for bariatric patients, considering that motivation and personal acceptance have a certain connection to weight. Perhaps more personalized care can address the societal and psychological issues that touch on this subject. The observed difference in the sex's response to body image, in the literature and the previous research, provides evidence that sex-sensitive approaches to healthcare may prove most useful. Sex-sensitive approaches may address problems that face people individually. Said issues could be addressed more efficiently with a greater understanding of cultural and/or societal standards, etc. Also, an understanding of culture can prove useful when it comes to clinical practice. Cultural understanding of norms may address the pressures and challenges one may face that in turn may affect the way one sees himself or herself.

## **6. For Future Research**

In future research, if this investigation were to be repeated, there definitely would be several elements that would be done differently. For example, to greater understand the cultural significance behind these issues, there should be a separate questionnaire that would ask about specific pressures one might experience. The longitudinal aspects of a study done for a longer time can provide more information regarding how attitudes and understanding may change over time, perhaps understanding how age affects body image, especially in the Lithuanian context. Perhaps a different scale for psychological effects, looking at something other than depression may prove useful, considering a significant pattern was not noticeable. Also knowing how active one is might provide information considering the body mass index itself is not perfect.

## **7. Novelty and Contribution**

The variability observed in body image dissatisfaction highlights the way obese individuals feel about themselves, which especially can be applied to the Lithuanian community. It provides evidence regarding the complex nature of this issue. It also provides evidence that the relationship is not strictly a linear one (as demonstrated by the moderate relationship observed). While observing a majority Lithuanian audience, a gap can be bridged in the present literature, which can



on occasion overlook the impact cultural and societal standards may have. Also, similar trends in regards to sex can be noticed, but it provides a snapshot into a specific cultural context, overall providing a more nuanced approach to observing patterns in body image. Regarding the novelty of this study, another final element would be the use of both the BSQ and the CESD-R scales together, providing evidence for the general public surveyed, in addition to the bariatric patients interviewed. This approach accounts for the multifactorial nature of body image, exploring the issue in depth, and providing a model for future studies, perhaps regarding complex psychological phenomena.

### **8. Compliance and Ethical Considerations**

All of the people who participated in the study consented to the survey itself. They were given a prompt asking if they consent to being surveyed and could not continue if consent was not given. None of the participants' identities are known. Names and personal information were not collected, as it was not necessary for this particular study. Anonymity was ensured for all who were willing to participate. Individuals were warned of the sensitive nature of the surveys and were provided with mental health resources if needed. The participant's welfare was a foremost priority.

### **Conclusion**

Research was conducted, to explore connections between body image and body mass index, by surveying people of different sizes and weights, using both quantitative and qualitative self-assessments. Results showed a moderate positive relationship, particularly noticeable in the surveyed bariatric patients. Such trends thus indicate while body weight in itself is a significant factor, it is not by any means the only factor. The culturally sensitive landscape concerning body image in Lithuania provided unique trends that could prove useful in the future when addressing similar situations. Overall Lithuania offered unique trends in comparison to the available global data. Women were discovered to experience greater body dissatisfaction, providing specific evidence regarding populations in Lithuania, in addition to confirming trends seen globally. Although in this particular piece of research, no apparent link was seen regarding body mass index and depression, it does not in any case prove that mental health does not have a profound effect on one's body image. Further research is required to observe such a link and to understand better mental health's role in shaping one's image of self. Clinical relevance is significant considering the study provides evidence that a personalized approach to weight loss can provide a plethora of benefits. In the future, other scales and questionnaires should be added to similar projects, to assess

lifestyle, fitness, quality of life, and mental health, to understand what factors contribute to the way one sees himself or herself. The issue is complex, the nature of the problem is multifactorial, and no one factor alone holds the secrets to understanding apparent patterns, yet one is one step closer to understanding this issue, in the Lithuanian context. All participants were treated fairly, with one's privacy, consent, and personal well-being being of the utmost importance. There are no two people that are the same. Every person has a different size, weight, and appearance, and all may feel differently about themselves, some better and some worse. However, it is one's duty on this earth to make the most of one's experience, live one's life to the fullest, and do so in the best health possible. In a culture that is steeped in outward appearance, a growing appreciation for the way one looks is a gateway to better health and better self-appreciation. In a world where the individual controls so little, the least one can control, is the way one perceives oneself. Perhaps in understanding this, one may broaden his or her horizons to other things.

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## Appendix

**Table 1: Summary Statistics**

Description	Age	Weight (kg)	BMI
Min	18.00	42.00	15.62
1st Qu.	23.00	63.00	21.37
Median	27.00	76.00	23.84
Mean	32.11	79.02	25.74
3rd Qu.	39.00	90.00	28.23
Max	72.00	154.00	60.16

**Table 2: CESD-R & BSQ Classification**

CESD-R Classification	Count	BSQ Classification	Count
Meets criteria for Major depressive episode	8	Marked concern with shape	10
No clinical significance	115	Mild concern with shape	30
Possible major depressive episode	1	Moderate concern with shape	17
Probable major depressive episode	3	No concern with shape	118
Subthreshold depression symptoms	37		

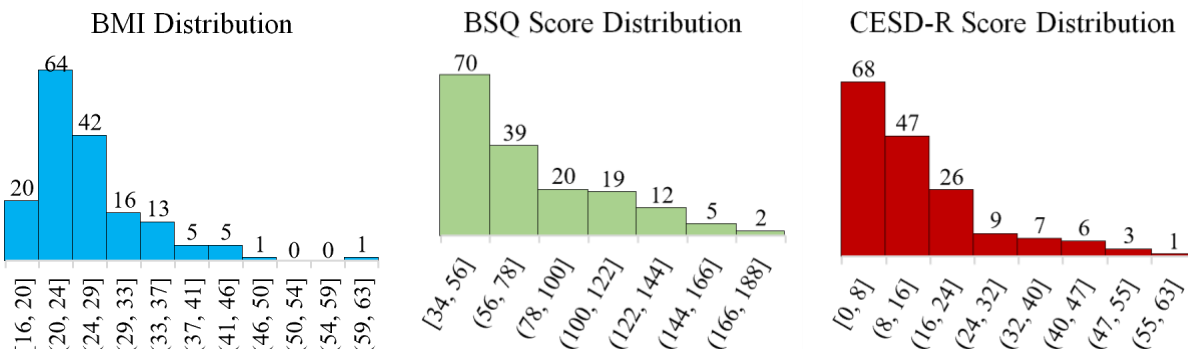
**Table 3: Distribution of the Sexes**

Gender	Count
Female	103
Male	61
Preferred not to say	3
<b>Total</b>	<b>167</b>

**Table 4: Descriptive Statistics**

Variable	Overall (n=167)	Bariatric Patients (n=58)	Other Participants (n=109)
<b>BMI</b>	Mean = 25.74, SD = 6.77	Mean = 29.72, SD = 8.99	Mean = 23.63, SD = 3.84
<b>BSQ Score</b>	Mean = 72.87, SD = 35.06	Mean = 74.95, SD = 39.97	Mean = 71.77, SD = 32.28
<b>CESD-R Score</b>	Mean = 13.22, SD = 12.36	Mean = 11.29, SD = 12.10	Mean = 14.24, SD = 12.44

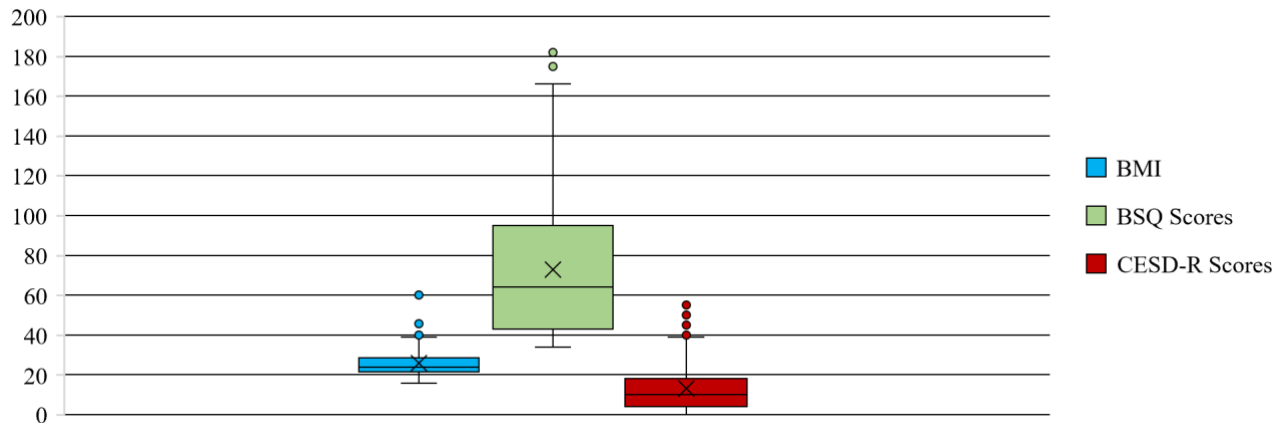
**Figure 1: Histograms of Variables**



**Table 5: Shapiro-Wilk Data**

Variable	Shapiro-Wilk Statistic	P-Value	Interpretation
<b>BMI</b>	0.866	$4.81 \times 10^{-11}$ – $114.81 \times 10^{-11}$	Not normally distributed
<b>BSQ Score</b>	0.895	$1.64 \times 10^{-9}$ – $91.64 \times 10^{-9}$	Not normally distributed
<b>CESD-R Score</b>	0.862	$3.16 \times 10^{-11}$ – $113.16 \times 10^{-11}$	Not normally distributed

**Figure 2: Box and Whisker Plot Distribution**



**Table 6: Boxplot Distribution of Variables**

Variable	Minimum	Q1	Median	Q3	Maximum	Potential Outliers
<b>BMI</b>	15.62	21.37	23.84	28.23	60.16	10
<b>BSQ Score</b>	34.00	43.50	64.00	95.00	182.00	2
<b>CESD-R Score</b>	0.00	4.00	10.00	18.00	58.00	10

**Table 7: Spearman's Rank Correlation Analysis**

Group	Relationship	Correlation Coefficient	P-Value
<b>Overall</b>	BMI & BSQ	0.27	0.0004
	BMI & CESD-R	-0.014	0.8563
<b>Bariatric Patients</b>	BMI & BSQ	0.59	<0.00001
	BMI & CESD-R	0.165	0.2166
<b>Other Participants</b>	BMI & BSQ	0.101	0.2961
	BMI & CESD-R	-0.0063	0.9481

**Table 8: Results According to Sex (Mann-Whitney U Test)**

Test	U-Statistic	P-Value	Interpretation
<b>BMI</b>	3162.0	0.946	No significant difference in BMI between sexes.
<b>BSQ Score</b>	1545.0	<0.00001	Significant difference in BSQ scores between sexes.
<b>CESD-R Score</b>	2893.0	0.398	No significant difference in CESD-R scores between sexes.

**Table 9: Results According to Weight Category (Kruskal-Wallis H Test)**

Measure	H-Statistic	P-Value
<b>BSQ Scores</b>	22.14	0.0005
<b>CESD-R Scores</b>	1.76	0.8814

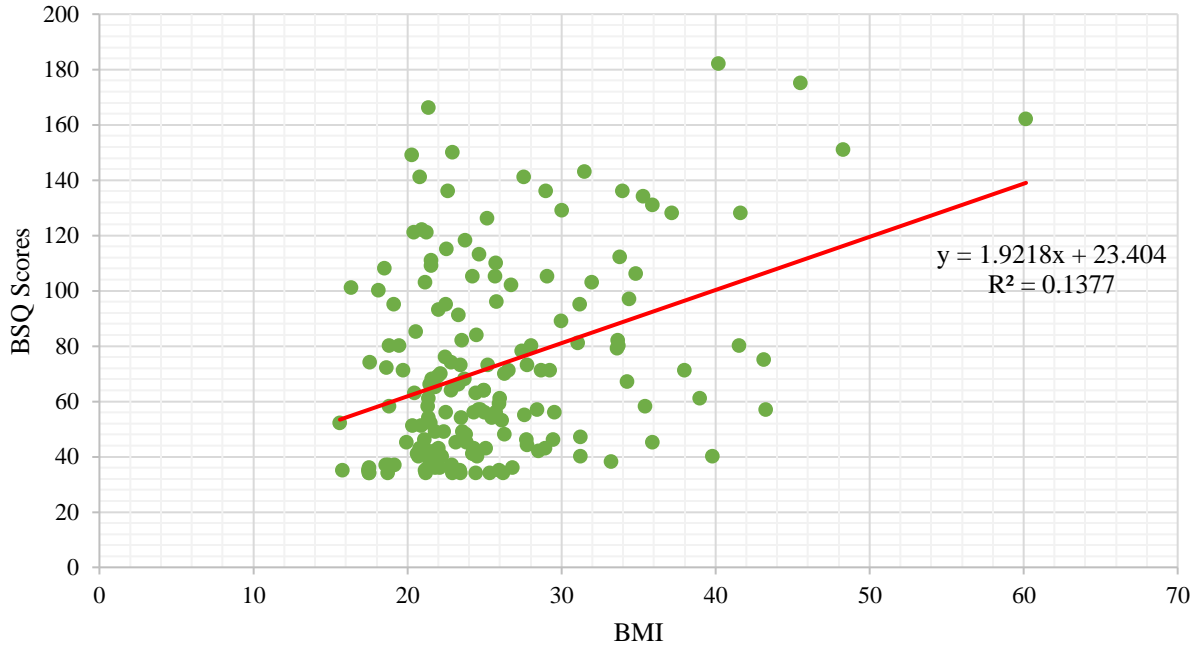
**Table 10: BSQ Scores Linear Regression Results**

Group	R-squared	Coefficient (BMI)	P-Value	95% Confidence Interval
Total Dataset	0.138	1.9218	<0.00001	[1.182, 2.661]
Bariatric Patients	0.411	2.8506	<0.00001	[1.937, 3.764]
Other Participants	0.003	0.4736	0.560	[-1.133, 2.081]

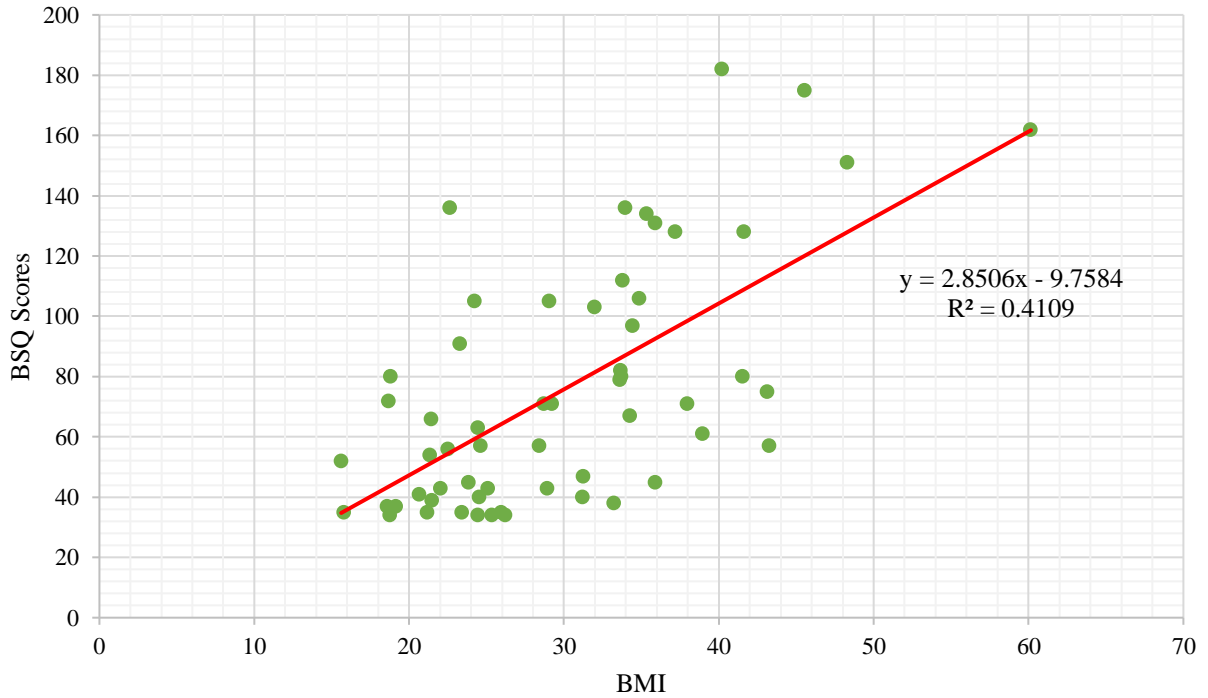
**Table 11: CESD-R Scores Linear Regression Results**

Group	R-squared	Coefficient (BMI)	P-Value	95% Confidence Interval
Total Dataset	0.002	0.0870	0.541	[-0.194, 0.368]
Bariatric Patients	0.057	0.3228	0.070	[-0.027, 0.673]
Other Participants	0.001	-0.0913	0.771	[-0.711, 0.528]

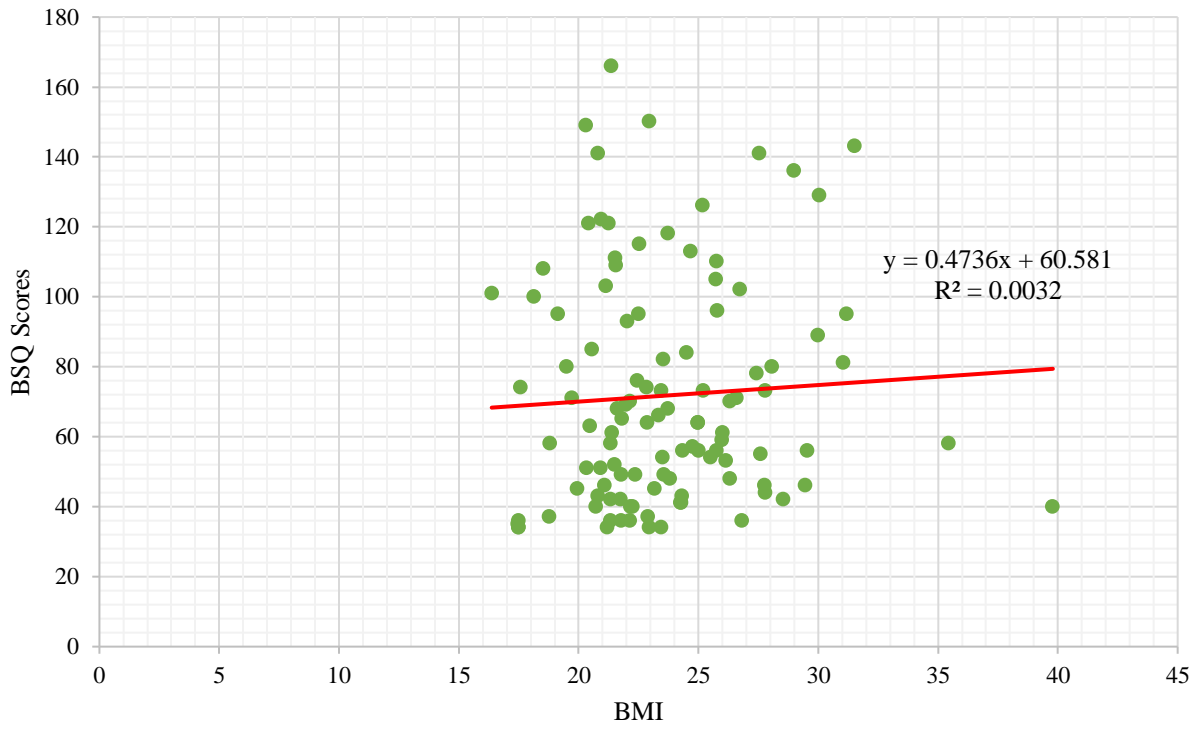
**Figure 3: Total Data Scatterplot for BSQ scores**



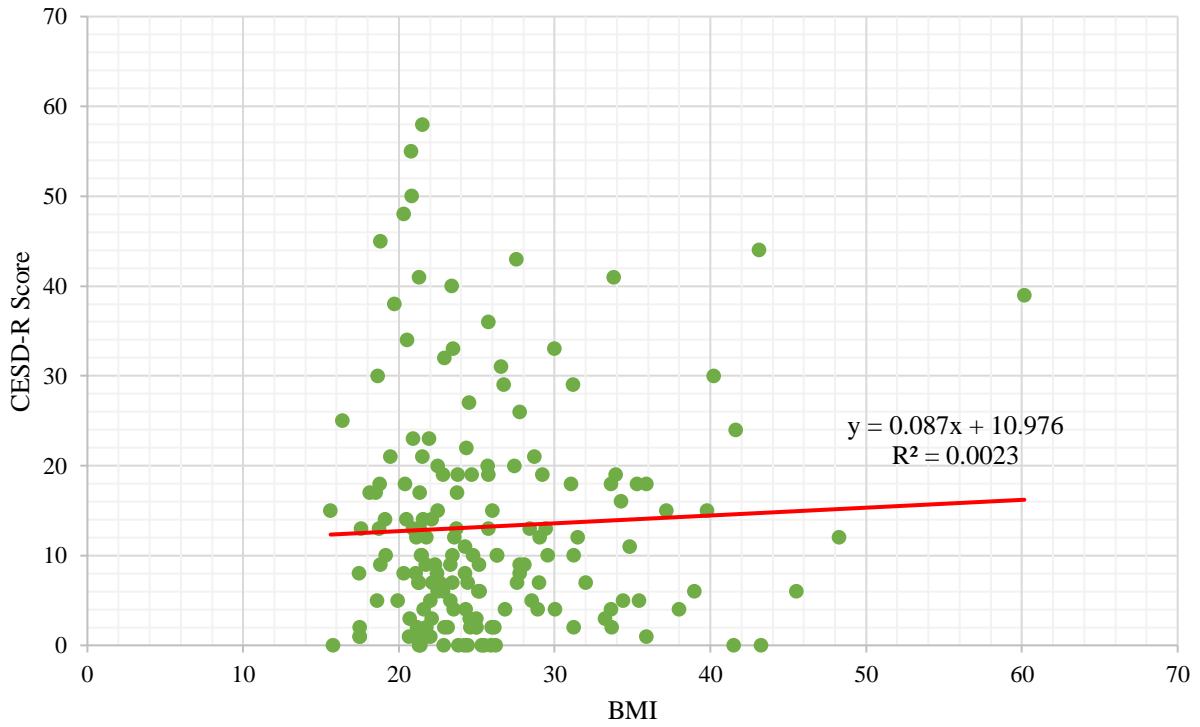
**Figure 4: Bariatric Patient Scatterplot for BSQ scores**



**Figure 5: Other Participant Scatterplot for BSQ scores**

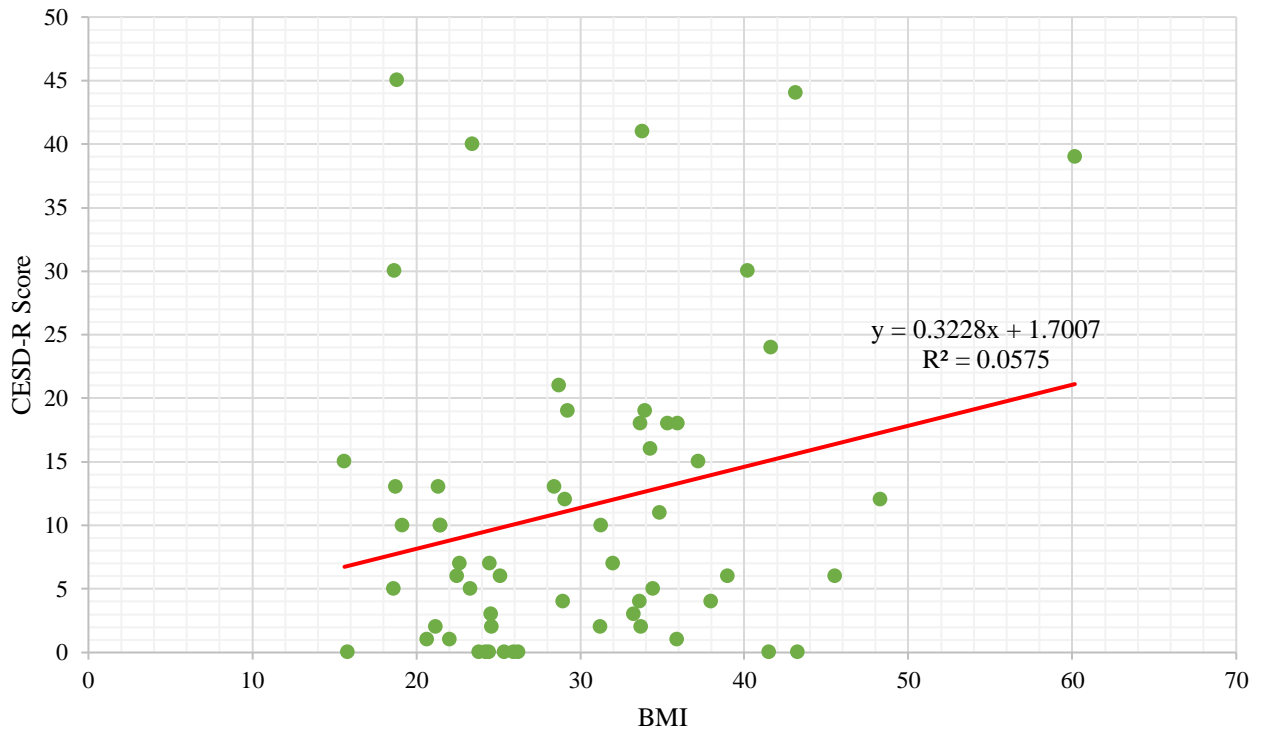


**Figure 6: Total Data Scatterplot for CESD-R scores**

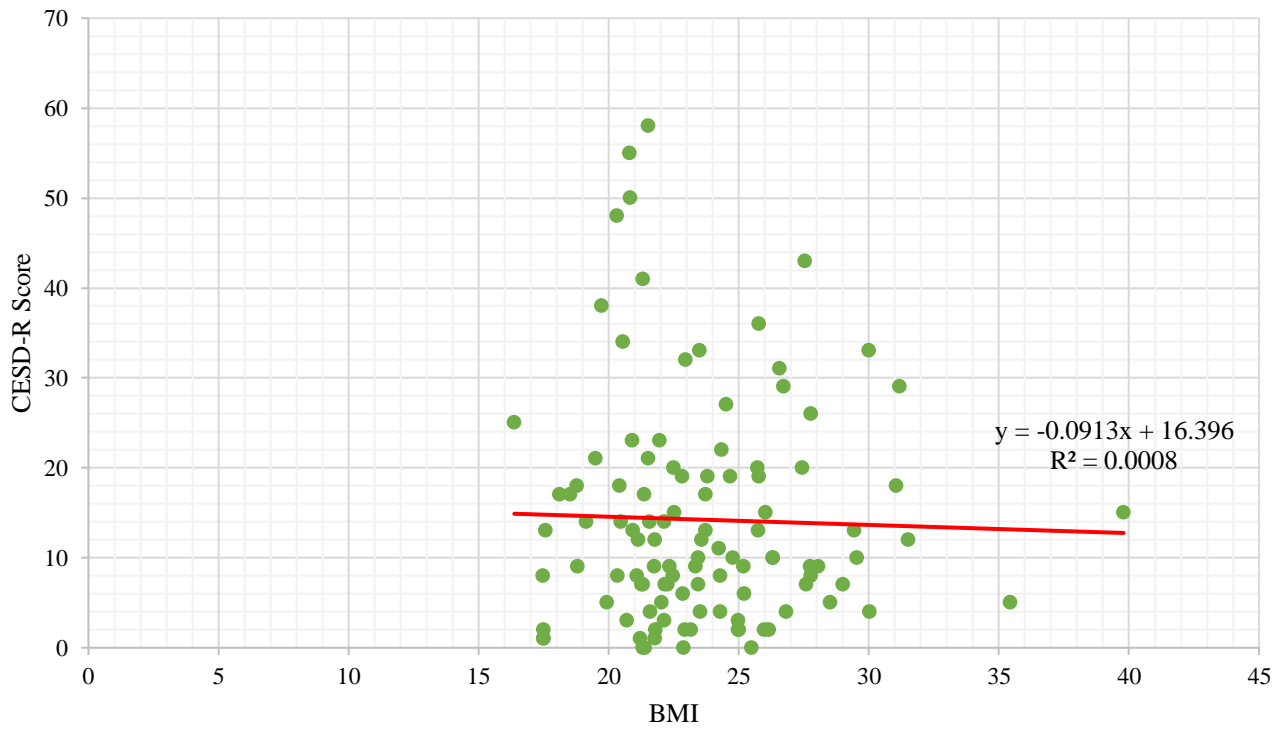




**Figure 7: Bariatric Patient Scatterplot for CESD-R scores**



**Figure 8: Other Participant Scatterplot for CESD-R scores**



**Body Shape Questionnaire – 34-item version (BSQ-34)®  
Female Version**

We should like to know how you have been feeling about your appearance over the **PAST FOUR WEEKS**. Please read each question and circle the appropriate number to the right. Please answer all the questions.

**OVER THE PAST FOUR WEEKS:**

	Never		Rarely		Sometimes		Often		Very often		Always
	1	2	3	4	5	6					
1. Has feeling bored made you brood about your shape?.....	1	2	3	4	5	6					
2. Have you been so worried about your shape that you have been feeling you ought to diet?.....	1	2	3	4	5	6					
3. Have you thought that your thighs, hips or bottom are too large for the rest of you?.....	1	2	3	4	5	6					
4. Have you been afraid that you might become fat (or fatter)?.....	1	2	3	4	5	6					
5. Have you worried about your flesh being not firm enough?.....	1	2	3	4	5	6					
6. Has feeling full (e.g. after eating a large meal) made you feel fat?.....	1	2	3	4	5	6					
7. Have you felt so bad about your shape that you have cried?.....	1	2	3	4	5	6					
8. Have you avoided running because your flesh might wobble?.....	1	2	3	4	5	6					
9. Has being with thin women made you feel self-conscious about your shape?.....	1	2	3	4	5	6					
10. Have you worried about your thighs spreading out when sitting down?	1	2	3	4	5	6					
11. Has eating even a small amount of food made you feel fat?.....	1	2	3	4	5	6					
12. Have you noticed the shape of other women and felt that your own shape compared unfavourably?.....	1	2	3	4	5	6					
13. Has thinking about your shape interfered with your ability to concentrate (e.g. while watching television, reading, listening to conversations)?.....	1	2	3	4	5	6					
14. Has being naked, such as when taking a bath, made you feel fat?.....	1	2	3	4	5	6					
15. Have you avoided wearing clothes which make you particularly aware of the shape of your body?.....	1	2	3	4	5	6					
16. Have you imagined cutting off fleshy areas of your body?.....	1	2	3	4	5	6					

	Never		Rarely		Sometimes		Often		Very often		Always
	1	2	3	4	5	6					
17. Has eating sweets, cakes, or other high calorie food made you feel fat?	1	2	3	4	5	6					
18. Have you not gone out to social occasions (e.g. parties) because you have felt bad about your shape?.....	1	2	3	4	5	6					
19. Have you felt excessively large and rounded?.....	1	2	3	4	5	6					
20. Have you felt ashamed of your body?.....	1	2	3	4	5	6					
21. Has worry about your shape made you diet?.....	1	2	3	4	5	6					
22. Have you felt happiest about your shape when your stomach has been empty (e.g. in the morning)?.....	1	2	3	4	5	6					
23. Have you thought that you are in the shape you are because you lack self-control?.....	1	2	3	4	5	6					
24. Have you worried about other people seeing rolls of fat around your waist or stomach?.....	1	2	3	4	5	6					
25. Have you felt that it is not fair that other women are thinner than you?	1	2	3	4	5	6					
26. Have you vomited in order to feel thinner?.....	1	2	3	4	5	6					
27. When in company have you worried about taking up too much room (e.g. sitting on a sofa, or a bus seat)?.....	1	2	3	4	5	6					
28. Have you worried about your flesh being dimply?.....	1	2	3	4	5	6					
29. Has seeing your reflection (e.g. in a mirror or shop window) made you feel bad about your shape?.....	1	2	3	4	5	6					
30. Have you pinched areas of your body to see how much fat there is?.....	1	2	3	4	5	6					
31. Have you avoided situations where people could see your body (e.g. communal changing rooms or swimming baths)?.....	1	2	3	4	5	6					
32. Have you taken laxatives in order to feel thinner?.....	1	2	3	4	5	6					
33. Have you been particularly self-conscious about your shape when in the company of other people?.....	1	2	3	4	5	6					
34. Has worry about your shape made you feel you ought to exercise?.....	1	2	3	4	5	6					

**Body Shape Questionnaire – 34-item version (BSQ-34)<sup>©</sup>**  
**Male Version**

We should like to know how you have been feeling about your appearance over the **PAST FOUR WEEKS**. Please read each question and circle the appropriate number to the right. Please answer all the questions.

**OVER THE PAST FOUR WEEKS:**

	Never	Rarely	Sometimes	Often	Very often	Always
	1	2	3	4	5	6
1. Has feeling bored made you brood about your shape?.....	1	2	3	4	5	6
2. Have you been so worried about your shape that you have been feeling you ought to diet?.....	1	2	3	4	5	6
3. Have you thought that your thighs, hips or bottom are too large for the rest of you?.....	1	2	3	4	5	6
4. Have you been afraid that you might become fat (or fatter)?.....	1	2	3	4	5	6
5. Have you worried about your flesh being not firm enough?.....	1	2	3	4	5	6
6. Has feeling full (e.g. after eating a large meal) made you feel fat?.....	1	2	3	4	5	6
7. Have you felt so bad about your shape that you have cried?.....	1	2	3	4	5	6
8. Have you avoided running because your flesh might wobble?.....	1	2	3	4	5	6
9. Has being with thin men made you feel self-conscious about your shape?.....	1	2	3	4	5	6
10. Have you worried about your thighs spreading out when sitting down?	1	2	3	4	5	6
11. Has eating even a small amount of food made you feel fat?.....	1	2	3	4	5	6
12. Have you noticed the shape of other men and felt that your own shape compared unfavourably?.....	1	2	3	4	5	6
13. Has thinking about your shape interfered with your ability to concentrate (e.g. while watching television, reading, listening to conversations)?.....	1	2	3	4	5	6
14. Has being naked, such as when taking a bath, made you feel fat?.....	1	2	3	4	5	6
15. Have you avoided wearing clothes which make you particularly aware of the shape of your body?.....	1	2	3	4	5	6
16. Have you imagined cutting off fleshy areas of your body?.....	1	2	3	4	5	6

	Never	Rarely	Sometimes	Often	Very often	Always
	1	2	3	4	5	6
17. Has eating sweets, cakes, or other high calorie food made you feel fat?	1	2	3	4	5	6
18. Have you not gone out to social occasions (e.g. parties) because you have felt bad about your shape?.....	1	2	3	4	5	6
19. Have you felt excessively large and rounded?.....	1	2	3	4	5	6
20. Have you felt ashamed of your body?.....	1	2	3	4	5	6
21. Has worry about your shape made you diet?.....	1	2	3	4	5	6
22. Have you felt happiest about your shape when your stomach has been empty (e.g. in the morning)?.....	1	2	3	4	5	6
23. Have you thought that you are in the shape you are because you lack self-control?.....	1	2	3	4	5	6
24. Have you worried about other people seeing rolls of fat around your waist or stomach?.....	1	2	3	4	5	6
25. Have you felt that it is not fair that other men are thinner than you?	1	2	3	4	5	6
26. Have you vomited in order to feel thinner?.....	1	2	3	4	5	6
27. When in company have you worried about taking up too much room (e.g. sitting on a sofa, or a bus seat)?.....	1	2	3	4	5	6
28. Have you worried about your flesh being dimply?.....	1	2	3	4	5	6
29. Has seeing your reflection (e.g. in a mirror or shop window) made you feel bad about your shape?.....	1	2	3	4	5	6
30. Have you pinched areas of your body to see how much fat there is?.....	1	2	3	4	5	6
31. Have you avoided situations where people could see your body (e.g. communal changing rooms or swimming baths)?.....	1	2	3	4	5	6
32. Have you taken laxatives in order to feel thinner?.....	1	2	3	4	5	6
33. Have you been particularly self-conscious about your shape when in the company of other people?.....	1	2	3	4	5	6
34. Has worry about your shape made you feel you ought to exercise?.....	1	2	3	4	5	6

BSQ-34

Kaip Tu jauteisi dėl savo išvaizdos **pastarąsias 4 savaites**? Perskaityk klausimą ir apibrauk Tau tinkantį atsakymą.

	Niekada					
		Retai		Kartais		
				Dažnai		
					Labai	
					dažnai	
<b>PER PASTARĄSIAS 4 SAVAITES:</b>						Visada
1. Mąstei apie savo kūno išvaizdą, kai Tau būdavo nuobodu.	1	2	3	4	5	6
2. Buvai susirūpinusi savo kūno išvaizda tiek, kad galvojai apie dietos laikymąsi?	1	2	3	4	5	6
3. Manei, kad Tavo šlaunys, klubai ar sėdmenys yra per dideli Tavo kūno sudėjimui.	1	2	3	4	5	6
4. Bijojai sustorėti.	1	2	3	4	5	6
5. Manei, kad Tavo kūnas nėra pakankamai tvirtas.	1	2	3	4	5	6
6. Prisivalgiusi (pvz., sočių pietų) jauteisi stora.	1	2	3	4	5	6
7. Buvai tiek susirūpinusi savo kūno išvaizda, kad net verkei.	1	2	3	4	5	6
8. Vengei bėgioti, kad Tavo kūnas netabaluotų.	1	2	3	4	5	6
9. Būdama šalia lieknų merginų/moterų, drovėjaisi savo kūno.	1	2	3	4	5	6
10. Bijojai atsisėsti, kad Tavo šlaunų apimtis per daug nepadidėtų.	1	2	3	4	5	6
11. Suvalgiusi net ir mažą maisto kiekį jauteisi stora.	1	2	3	4	5	6
12. Pastebėdavai kitų merginų/moterų kūno išvaizdą ir buvai nepatenkinta savo kūnu.	1	2	3	4	5	6
13. Susirūpinimas savo kūno išvaizda trukdė Tau susikaupti.	1	2	3	4	5	6
14. Prausiantis duše Tavo nuogumas vertė jaustis stora.	1	2	3	4	5	6
15. Vengei dėvėti drabužius, išryškinančius tavo figūrą.	1	2	3	4	5	6
16. Įsivaizdavai, kad riebalai nuo kai kurių Tavo kūno dalių išnyksta.	1	2	3	4	5	6



BSQ-34

Kaip Tu jauteisi dėl savo išvaizdos **pastarąsias 4 savaites**? Perskaityk klausimą ir apibrauk Tau tinkantį atsakymą.

	Niekada					
		Retai		Kartais		
				Dažnai		
					Labai	
					dažnai	
<b>PER PASTARĄSIAS 4 SAVAITES:</b>						Visada
1. Mąstei apie savo kūno išvaizdą, kai Tau būdavo nuobodu.	1	2	3	4	5	6
2. Buvai susirūpinęs savo kūno išvaizda tiek, kad galvojai apie dietos laikymąsi?	1	2	3	4	5	6
3. Manei, kad Tavo šlaunys, klubai ar sėdmenys yra per dideli Tavo kūno sudėjimui.	1	2	3	4	5	6
4. Bijojai sustorėti.	1	2	3	4	5	6
5. Manei, kad Tavo kūnas nėra pakankamai tvirtas.	1	2	3	4	5	6
6. Prisivalgęs (pvz., sočių pietų) jauteisi storas.	1	2	3	4	5	6
7. Buvai tiek susirūpinęs savo kūno išvaizda, kad net verkei.	1	2	3	4	5	6
8. Vengei bėgioti, kad Tavo kūnas netabaluotų.	1	2	3	4	5	6
9. Būdamas šalia lieknų vaikinių/vyrų, drovėjaisi savo kūno.	1	2	3	4	5	6
10. Bijojai atsisėsti, kad Tavo šlaunų apimtis per daug nepadidėtų.	1	2	3	4	5	6
11. Suvalgęs net ir mažą maisto kiekį jauteisi storas.	1	2	3	4	5	6
12. Pastebėdavai kitų vaikinių/vyrų kūno išvaizdą ir buvai nepatenkintas savo kūnu.	1	2	3	4	5	6
13. Susirūpinimas savo kūno išvaizda trukdė Tau susikaupti.	1	2	3	4	5	6
14. Prausiantis duše Tavo nuogumas vertė jaustis storu.	1	2	3	4	5	6
15. Vengei dėvėti drabužius, išryškinančius tavo figūrą.	1	2	3	4	5	6
16. Įsivaizdavai, kad riebalai nuo kai kurių Tavo kūno dalių išnyksta.	1	2	3	4	5	6



	Niekada					
	Retai		Kartais		Dažnai	
PER PASTARĄSIAS 4 SAVAITES:					Labai dažnai	
					Visada	
	1	2	3	4	5	6
17. Valgydamas saldinius, pyragus ar kitokį kaloringą maistą jauteisi storas.	1	2	3	4	5	6
18. Nėjai į renginius (pvz., vakarėlius), kadangi jauteisi per storas.	1	2	3	4	5	6
19. Jauteisi stambus ir apvalių formų.	1	2	3	4	5	6
20. Gėdijaisi savo kūno.	1	2	3	4	5	6
21. Susirūpinimas savo kūno išvaizda paskatino tave laikytis dietos.	1	2	3	4	5	6
22. Geriausiai jauteisi dėl savo kūno išvaizdos būdamas tuščiu pilvu (pvz., ryte).	1	2	3	4	5	6
23. Manei, kad Tavo kūno išvaizda yra tokia, kokia yra tik dėl Tavo savikontrolės trūkumo.	1	2	3	4	5	6
24. Bijojai, kad kiti žmonės pamatys riebalų raukšles ant Tavo liemens ar pilvo.	1	2	3	4	5	6
25. Manei, kad taip nesąžininga, jog kiti vaikinai/vyrai yra lieknesni už Tave.	1	2	3	4	5	6
26. Verčiau save vemti, kad pasijaustum lieknesnis.	1	2	3	4	5	6
27. Būdamas tarp žmonių bijojai, kad užimsi per daug vietos (pvz., ant sofos ar autobuso sėdynės).	1	2	3	4	5	6
28. Buvai susirūpinęs, kad Tavo kūno paviršius (ir oda) yra nelygus.	1	2	3	4	5	6
29. Matydamas savo atvaizdą (pvz., veidrodyje ar parduotuvės vitrinoje) blogai jauteisi dėl savo kūno išvaizdos.	1	2	3	4	5	6
30. Spaudei, gnaibei savo kūno dalis, norėdamas pažiūrėti, kiek ten riebalų.	1	2	3	4	5	6
31. Vengei situacijų, kuriose kiti žmonės gali pamatyti Tavo kūną (pvz., bendrų persirengimo kambarių).	1	2	3	4	5	6
32. Naudojai vidurius laisvinančius vaistus, kad pasijustum lieknesniu.	1	2	3	4	5	6
33. Buvai labai susirūpinęs savo kūno išvaizda būdamas su kitais žmonėmis.	1	2	3	4	5	6
34. Susirūpinimas savo kūno išvaizda paskatino pamąstyti apie sportavimą.	1	2	3	4	5	6

Below is a list of the ways you might have felt or behaved. Please check the boxes to tell me how often you have felt this way in the past week or so.	LAST WEEK				Nearly every day for 2 weeks
	Not at all <i>or</i> Less than 1 day	1-2 days	3-4 days	5-7 days	
My appetite was poor.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I could not shake off the blues.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I had trouble keeping my mind on what I was doing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt depressed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My sleep was restless.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt sad.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I could not get going.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nothing made me happy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt like a bad person.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I lost interest in my usual activities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I slept much more than usual.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt like I was moving too slowly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt fidgety.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wished I were dead.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to hurt myself.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was tired all the time.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I did not like myself.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I lost a lot of weight without trying to.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I had a lot of trouble getting to sleep.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I could not focus on the important things.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Epidemiologinių tyrimų centro depresijos simptomų skalė- pataisyta (angl. Center for Epidemiology Studies Depression Scale Revised (CESD-R)) (Eaton et al., 2004)**

Pateiktame sąrašė įvardinta, kaip galbūt jaučiatės ar elgiatės pastaruoju metu. Kas tinka, pažymėkite langeliuose, kad žinočiau, kiek kartų taip jautėtės praėjusią savaitę ar ilgiau.	PRAĖJUSIĄ SAVAITĘ				Beveik kasdien dvi savaites
	Visai netinka <i>arba</i> Mažiau nei 1 dieną	1-2 dienas	3-4 dienas	5-7 dienas	
Mano apetitas buvo prastas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aš negalėjau atsikratyti slogios nuotaikos.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Man buvo sunku susitelkti ties tuo, ką dariau.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aš jaučiausi prislėgtas (prislėgta).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aš neramiai miegojau.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Man buvo liūdna.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aš nieko negalėjau imtis.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Manęs niekas nedžiugino.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aš jaučiausi esantis blogas žmogus.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aš praradau susidomėjimą įprastomis veiklomis.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aš miegojau daug daugiau nei įprastai.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aš jatau, lyg judėčiau per lėtai.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aš jatau, kad nenustygsiu vietoje.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aš norėjau būti miręs (mirusi).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Man norėjosi save žaloti.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aš visą laiką jaučiausi pavargęs (pavargusi).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aš nepatikau sau.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nesistengdamas (nesistengdama) numečiau svorio.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Man buvo sunku užmigti.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aš negalėjau susikaupti ties tuo, kas svarbu.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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Version is freely usable.