Eating Disorders as a complication of bariatric surgery: A cross sectional study in Saudi Arabia.

Abstract

Background: Obesity is a growing global issue, and bariatric surgery has become a common long-term treatment for severe obesity. However, studies suggest that eating disorders are a frequent complication that can arise in patients following the surgery. **Objectives:** This study aimed to examine the rates of eating disorders and the factors influencing their occurrence in patients who have undergone bariatric surgery.**Design and settings:** The study was cross-sectional study conducted in Saudi Arabiain the period from October 2022 until January 2024. **Materials and methods:**An online questionnaire- (EDE-Q6.0) about eating disorders was distributed toall patients who had undergone bariatric surgery in Saudi Arabia. We got 1175responses. Data analysis was done using the SPSS version 22 software program. **Results:** The majority of participants were female (62.6%) and had a mean age of 31.49 years (SD = 8.51). Laparoscopic sleeve gastrectomy was the most commonly performed procedure (89.7%).The outcomes of bariatric surgery included an average weight loss of 36.7 kg (SD = 22.2), and a mean body mass index (BMI) post-surgery of 30.0 (SD = 6.7). Approximately a quarter of the participants reported experiencing side effects, including hair loss, vitamin deficiencies, and menstrual irregularities.However, most participants engaged in behaviours related to eating disorders and body image concerns, including a strong desire to lose weight (89.3%), fear of gaining weight (73.6%), and dissatisfaction with their body shape (42.6%).Significant findings included higher eating disorder scores among females (*p = 0.002*)

and higher body image concerns among patients who underwent endoscopic sleeve gastrectomy (*p = 0.012*). Participants from the eastern region of Saudi Arabia exhibited higher significant levels of body image concern (*p = 0.012*), and a strong negative correlation was found between age and body image concern (*p = 0.003*).**Conclusion**: These findings highlight the psychological challenges faced by bariatric surgery patients, particularly regarding body image and eating behaviors. Gender differences were notable, with females reporting higher levels of eating disorders and body image concerns. Future interventions should address these psychological factors, particularly among younger and female patients, to improve both their mental and physical health outcomes post-surgery.

Keywords: bariatric surgery, eating disorders, obesity, body image.

Introduction

Bariatric surgery has emerged as a vital option for individuals struggling with severe obesity, providing a means to lose weight and improve health conditions such as diabetes, high blood pressure, and sleep apnea (1). Obesity rates continue to rise globally impacting over 650 million adults this issue is particularly pronounced in Saudi Arabia, where nearly 35% of adults are affected by obesity(2), (3). As a result, bariatric procedures are increasingly being utilized to facilitate weight loss and enhance health outcomes. However, while these surgeries can lead to significant improvements, they also carry the risk of complications, notably the development of eating disorders, which can adversely affect both physical health and emotional well-being. Recognizing the significance of eating disorders following bariatric surgery is crucial. These disorders can hinder recovery and prevent patients from fully benefiting from their surgical interventions(4).

Eating disorders can lead to nutritional deficiencies, weight regain, and psychological distress, all of which may negate the advantages of surgery. Identifying these issues early allows for timely interventions, ultimately improving patient outcomes. Research indicates that eating disorders are relatively common among bariatric patients, with prevalence rates ranging from 30% to 50%. This high prevalence underscores the necessity for careful monitoring and support to help patients maintain a healthy relationship with food(5).

Several types of eating disorders may arise after bariatric surgery. One of the most prevalent is binge eating disorder (BED), where individuals consume large quantities of food in a

short time, often as a response to emotional stress. Patients may feel overwhelmed and seek comfort in food, despite having undergone a procedure intended to limit their intake. Bulimia nervosa can also develop, characterized by binge eating followed by purging behaviors, such as vomiting or excessive exercise. Additionally, some individuals may adopt restrictive eating patterns, which can lead to nutritional deficiencies and other health complications (6)

It is essential for healthcare providers to understand the prevalence and types of eating disorders as complications of bariatric surgery. Early identification and intervention can help mitigate these disorders and preserve the benefits of surgery. Comprehensive preoperative assessments and ongoing support—such as psychological counseling and nutritional education—are critical. By addressing both mental and physical health, healthcare professionals can assist patients not only in achieving weight loss but also in fostering a healthier relationship with food and enhancing their overall quality of life (7).

Despite the known risks, the prevalence of eating disorders among bariatric surgery patients in Saudi Arabia is not well-documented(8). This study aims to address this gap by providing empirical data on the rates and factors affecting eating disorders in patients who have undergone bariatric surgery in the country.

Methods

This study employed a cross-sectional design to investigate the impact of bariatric surgery on eating disorders. Ethical approval was granted (reference number 44-042) on October 5, 2022, and the study was conducted from October 2022 to January 2024 in Saudi Arabia. The research focused on adults who had previously undergone bariatric surgery within the Kingdom. A total of 1,175 participants consented to take part, with all individuals being fully informed about the study's purpose and assured that their data would remain confidential.

Participants completed a modified version of the Eating Disorders Examination Questionnaire (EDE-Q 6.0)(9), a tool designed specifically to assess eating disorders. The questionnaire included 12 items related to eating behaviors, body image perceptions, and psychological impacts. Responses to these questions were divided into seven scales, ranging from "no days per month" to "every day." Additionally, seven questions regarding body image concerns were assessed on four scales, ranging from "not at all" to "markedly." The average scores for eating disorders and body image concerns were calculated for each participant, allowing for comparisons across different groups.

Data analysis was conducted using SPSS software (version 22). Descriptive statistics, including means, standard deviations, and ranges, were calculated for continuous variables, while categorical data were presented as frequencies and percentages. To examine differences between groups, statistical tests such as the Mann-Whitney U test and Kruskal-Wallis test were applied. Spearman's correlation was used to assess the association between age and the average total scores for eating disorders and body image concerns. A significance level of 0.05 was set for all statistical tests.

Results

Table 1 demonstrates the mean (SD) age of participants was 31.49 (8.51) years, with a range from 18 to 61 years (non-tabulated data). Nearly two-thirds of the participants were female (62.6%). Participants were distributed across different regions, with the highest proportions in the Western (28.9%) and Middle (28.8%) regions. Regarding education, the majority of participants had university degrees (69.2%), followed by those with secondary education (20.9%), while a very small proportion were illiterate (0.4%).In Figure 1 Laparoscopic sleeve gastrectomy was the most common procedure (89.7%) adopted by participants for weight loss. Gastric bypass and the balloon procedure accounted for 4.9% and 5.4%, respectively.

Regarding the outcomes of bariatric surgery, including weight loss and complications, the following non-tabulated data were reported by participants: the mean (SD) body mass index (BMI) after the intervention was 30.0 (6.7). The average (SD) weight loss following the procedure was 36.7 (22.2) kg, with a range from 1 to 182 kg. Approximately 26.13% of participants experienced side effects, such as hair loss, heartburn, loss of appetite, and vitamin deficiencies. Additionally, 21.6% of the female participants reported menstrual irregularities.Table 2 presents the percentages of respondents who answered affirmatively to various questions related to eating behaviors, body image perceptions, and psychological impacts in the past 28 days before data collection, broken down by different frequency categories. More than half of the participants had practices related to eating disorders, body image and psychological impact in more than 15 days of the month. These practices included having a strong desire to lose weight in 89.3%, having a definite desire to have a totally flat stomach in 82.2%, having felt fat in 76.2%, having a definite fear to gain weight in 73.6%, restraint overeating in 60.2%, food avoidance in 56.5% and having a definite fear of losing control over

eating and Having tried to follow definite rules regarding eating in order to influence shape or weight in 56.4% and 55.4% respectively.

Figure 2 highlights respondents' attitudes toward their body image, specifically their perceptions of shape and weight, and the varying degrees of influence, dissatisfaction, and discomfort they experienced. Approximately 42.9% of participants reported that their weight significantly influenced how they judged themselves, while 43.9% felt the same about their body shape. Regarding dissatisfaction, 41.1% expressed significant dissatisfaction with their weight, and 42.6% with their body shape. In terms of discomfort, 43.1% reported feeling considerable discomfort with seeing their own body shape, and 43.7% felt similarly uneasy about others seeing their body shape. However, when asked about being weighed once a week for a month, the majority (30.4%) indicated they would feel moderately upset.The only demographic factor significantly associated with eating disorders in participants was gender. Specifically, females exhibited significantly higher scores for eating disorders compared to males ($p = 0.002$) as observed in table 3.

Table 4 shows that patients who underwent endoscopic sleeve gastrectomy reported significantly higher levels of concern about their body image ($p = 0.012$). Additionally, participants from the eastern region of Saudi Arabia also exhibited the highest levels of body image concern, with a significant result ($p = 0.012$).Figure 3 shows the correlation between age and the average total scores on the eating disorder scale and the body image concern scale for participants. The correlation coefficient between age and the average total eating disorder score was -0.2, with a p-value of 0.467, indicating no significant relationship. In contrast, the correlation coeffecient between age and body image concern was -0.9, with a p-value of 0.003, suggesting a strong and statistically significant negative relationship.

Discussion

This study aimed to examine the relationship between bariatric surgery and body image concerns, eating behaviors, and psychological impacts among Saudi participants. It provides a comprehensive overview of the experiences of individuals undergoing bariatric surgery, with a particular focus on factors influencing the development of eating disorders following the procedure.

The mean age of participants in this study (31.49 years) shows that individuals seeking bariatric surgery tend to be relatively young, typically in their 30s or early 40s.This age group is often motivated by health-related concerns such as obesity-related comorbidities, which can drive the decision to undergo weight-loss surgery (10). The gender distribution in this study also aligns with findings from other bariatric surgery studies, where females overwhelmingly represent the majority of patients. In our study, 62.6% of participants were female, a figure that is comparable to reports indicating that women make up approximately 70% of bariatric surgery patients in many regions (11), (12)

This gender disparity is thought to be driven by higher rates of obesity and greater concern about body image among women(13). Additionally, the educational background of participants, with 69.2% holding university degrees, suggests that those seeking bariatric surgery may be more educated or health-conscious(14).

The high rate of laparoscopic sleeve gastrectomy (89.7%) aligns with global trends, as this procedure has become the most commonly performed bariatric surgery due to its relatively low complication rates and effectiveness(11) (Baker et al., 2020).

The outcomes of bariatric surgery, including BMI and weight loss, are consistent with those reported in the literature. The mean post-surgery BMI of 30.0 kg/m² in our study is indicative of significant weight loss, as patients typically reach a BMI range of 30-35 after surgery. The average weight loss of 36.7 kg in this study aligns with the typical weight loss of 30-40 kg seen in bariatric surgery patients, which represents about 50% to 60% of excess body weight (15).

Complications such as hair loss, heartburn, and vitamin deficiencies were reported by 26.13% of participants, Additionally, menstrual irregularities were reported by 21.6% of female participants. These findings mirror other studies that highlighed common post-surgical issues(16). Vitamin deficiencies are a particularly well-known concern after bariatric surgery, and require ongoing supplementation and monitoring(17). (18).

While surgery results in significant physical changes, many patients continue to perceive themselves negatively, and some even develop maladaptive eating behaviors post-surgery. Our study's findings align with this trend; over half of the participants reported engaging in behaviors typically associated with eating disorders, body image dissatisfaction, and psychological distress for more than 15 days in the month prior to the study. The high prevalence of a desire to lose weight (89.3%), fear of gaining weight (73.6%), and dissatisfaction with body shape (42.6%) is consistent with previous studies suggesting that bariatric surgery patients often continue to struggle with body image issues even after significant weight loss(19). The strong desire for a flat stomach (82.2%), fear of losing control over eating (56.4%) and the degree of discomfort participants felt regarding their body image, with 43.1% feeling uncomfortable seeing their own

body shape and 43.7% uneasy about others seeing it observed in this study further underscore the importance of addressing psychological aspects of bariatric surgery, as patients frequently experience post-surgical body dissatisfaction and distorted body image(20).These findings suggest that interventions targeting body image and psychological well-being should be integral parts of post-surgical care to ensure more holistic recovery.

In this study, patients who underwent endoscopic sleeve gastrectomy reported significantly higher levels of concern about their body image ($p = 0.012$) which is consistent with research (21). Moreover, females reported significant higher eating disorder scores than males ($p = 0.002$). This is consistent with research indicating that women are more likely to suffer from eating disorders and body dissatisfaction, particularly in the context of bariatric surgery (22). The fact that female patients may be more sensitive to body image concerns post-surgery suggests the need for gender-specific psychological support.

Regional differences were also observed, with participants from the eastern region reporting higher levels of body image concern ($p = 0.012$). This finding is consistent with other studies highlighting regional disparities in body image perceptions and cultural influences on beauty standards(23). In Saudi Arabia, cultural expectations regarding body image are strongly influenced by societal standards of beauty, which may contribute to heightened concerns in certain regions.

Finally, the negative correlation between age and body image concern ($r = -0.9$, $p = 0.003$) suggests that younger participants in this study may experience greater psychological distress related to body image. This is in line with existing literature, which shows that younger patients often struggle more with body image issues compared to older patients(24).

Conclusion

The findings of this study contribute valuable insights into the psychological outcomes of bariatric surgery, particularly regarding gender differences, body image concerns, and eating behaviors. These results underscore the importance of considering psychological factors, including body dissatisfaction and eating disorders, when treating bariatric patients. Future studies should explore targeted interventions to address these concerns, especially among younger and female patients, to improve both physical and mental health outcomes post-surgery.

Table 1: Demographic Profile and Characteristics of Study Participants (n=1175)

Variables:	No (%)
Gender:	
Male	439 (37.4)
Female	736 (62.6)
Region:	
Southern	120 (10.2)
Eastern	251 (21.4)
Northern	126 (10.7)
Western	340 (28.9)
Middle	338 (28.8)
Education:	
Primary	8 (0.7)
Secondary	246 (20.9)
University	813 (69.2)
Postgraduate	82 (7)
Illiterate	5 (0.4)
Preparatory	21 (12)

Table 2: Eating behaviors, body image perceptions, and psychological impacts among participants

Eating Behaviors, Body Image, and Psychological Impact in the past 28 DAYS	**NO days**	**1-5 days**	**6-12 days**	**13-15 days**	**16-22 days**	**23-27 days**	**Every day**
	No (%)	No (%)	No (%)	No (%)	No (%)	No (%)	No (%)
Q1: Restraint overeating	211 (18)	95 (8.1)	71 (6)	90 (7.7)	92 (7.8)	142 (12.1)	474 (40.3)
Q2: Avoidance of eating	437 (17.2)	180 (15.3)	108 (9.2)	91 (7.7)	68 (5.8)	109 (9.3)	185 (15.7)
Q3: Food avoidance	202 (17.2)	114 (9.7)	91 (7.7)	105 (8.9)	82 (7)	171 (14.6)	410 (34.9)
Q4: Dietary Rules	288 (24.5)	70 (6)	75 (6.4)	90 (7.7)	87 (7.4)	164 (14)	401 (34.1)
Q5: Empty stomach	476 (40.5)	125 (10.6)	70 (6)	79 (6.7)	65 (5.5)	78 (6.6)	282 (24)
Q6: Flat stomach	86 (7.3)	33 (2.8)	44 (3.7)	47 (4)	45 (3.8)	54 (4.6)	866 (73.7)
Q7: Preoccupation with food, eating or calories	451 (38.4)	91 (7.7)	81 (6.9)	82 (7)	69 (5.9)	67 (5.7)	334 (28.4)
Q8: Preoccupation with shape or weight	368 (31.3)	66 (5.6)	68 (5.8)	91 (7.7)	67 (5.7)	61 (5.2)	454 (38.6)
Q9: fear of losing control over eating	283 (24.1)	83 (7.1)	70 (6)	77 (6.6)	63 (5.4)	67 (5.7)	532 (45.3)

Q10: Fear of weight gain	127 (10.8)	71 (6)	42 (3.6)	70 (6)	44 (3.7)	69 (5.9)	752 (64)
Q11: Feelings of fatness	120 (10.2)	36 (3.1)	56 (4.8)	68 (5.8)	46 (3.9)	68 (5.8)	781 (66.5)
Q12: strong desire to lose weight	41 (3.5)	17 (1.4)	21 (1.8)	46 (3.9)	31 (2.6)	40 (3.4)	979 (83.3)

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233 **Table 3: Associations Between Eating Behaviors and participants variables:**

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Variables	Total score for eating disorders; mean (SD)	P value
Gender Male Female	 3.6 (1.4) 3.8 (1.2)	0.002
Procedure: Endoscopic sleeve gastrectomy Balloon Bypass	 3.7 (1.3) 3.8 (1.5) 3.6 (1.3)	0.537
Region: Southern Eastern Northern Western Middle	 3.6 (1.3) 3.8 (1.4) 3.6 (1.4) 3.8 (1.2) 3.7 (1.3)	0.405
Education: Illiterate Primary Preparatory Secondary University Postgraduate	 3.8 (0.9) 3.9 (1.1) 3.7 91.4) 3.7 (1.4) 3.7 (1.3) 3.8 (1.3) 3.8 (1.3)	0.969

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236 **Table 4: Associations Between body image concerns and participants variables**

Variables	Total score for binge disorders; mean (SD)	P value
Gender Male Female	 1.9 (0.8) 2 (0.7)	0.140
Procedure: Endoscopic sleeve gastrectomy Balloon Bypass	 2.0 (0.73) 1.7 (0.86) 1.7 (0.79)	0.012
Region: Southern	 1.9 (0.73)	0.012

Eastern Northern Western Middle	2.1 (0.74) 1.9 (0.83) 1.9 (0.76) 1.9 (0.71)	
Education: Illiterate Primary Preparatory Secondary University Postgraduate	 2.4 (0.34) 1.8 (0.76) 2 (0.78) 1.9 (0.76) 1.9 (0.74) 1.9 (0.80) 1.9 (0.75)	0.938

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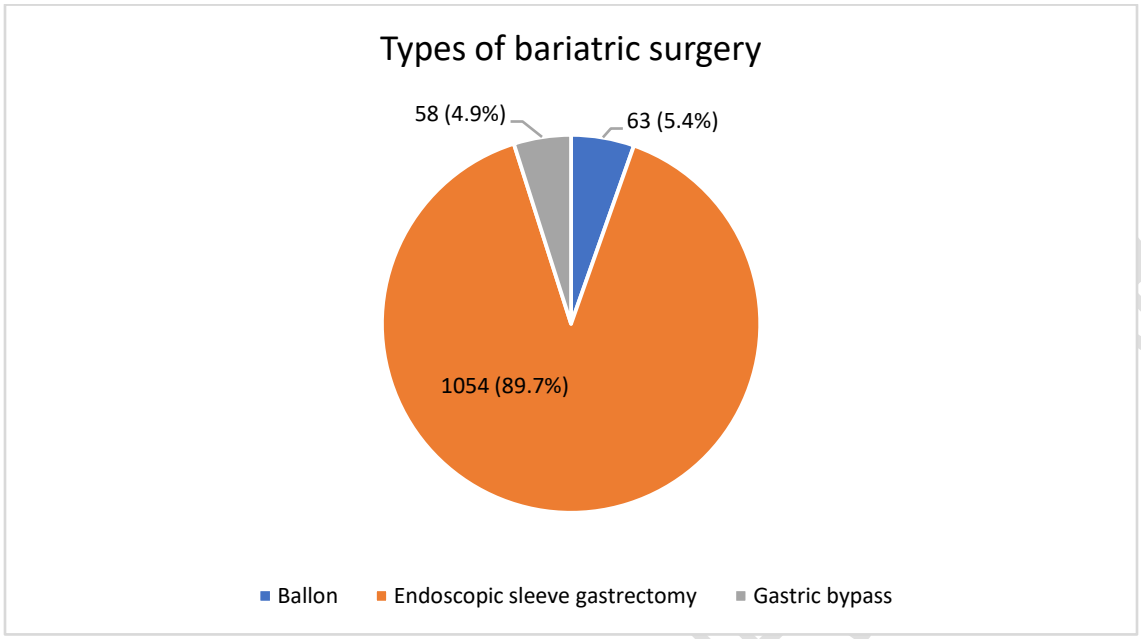

Figure 1: Types of bariatric surgery undergone by participants

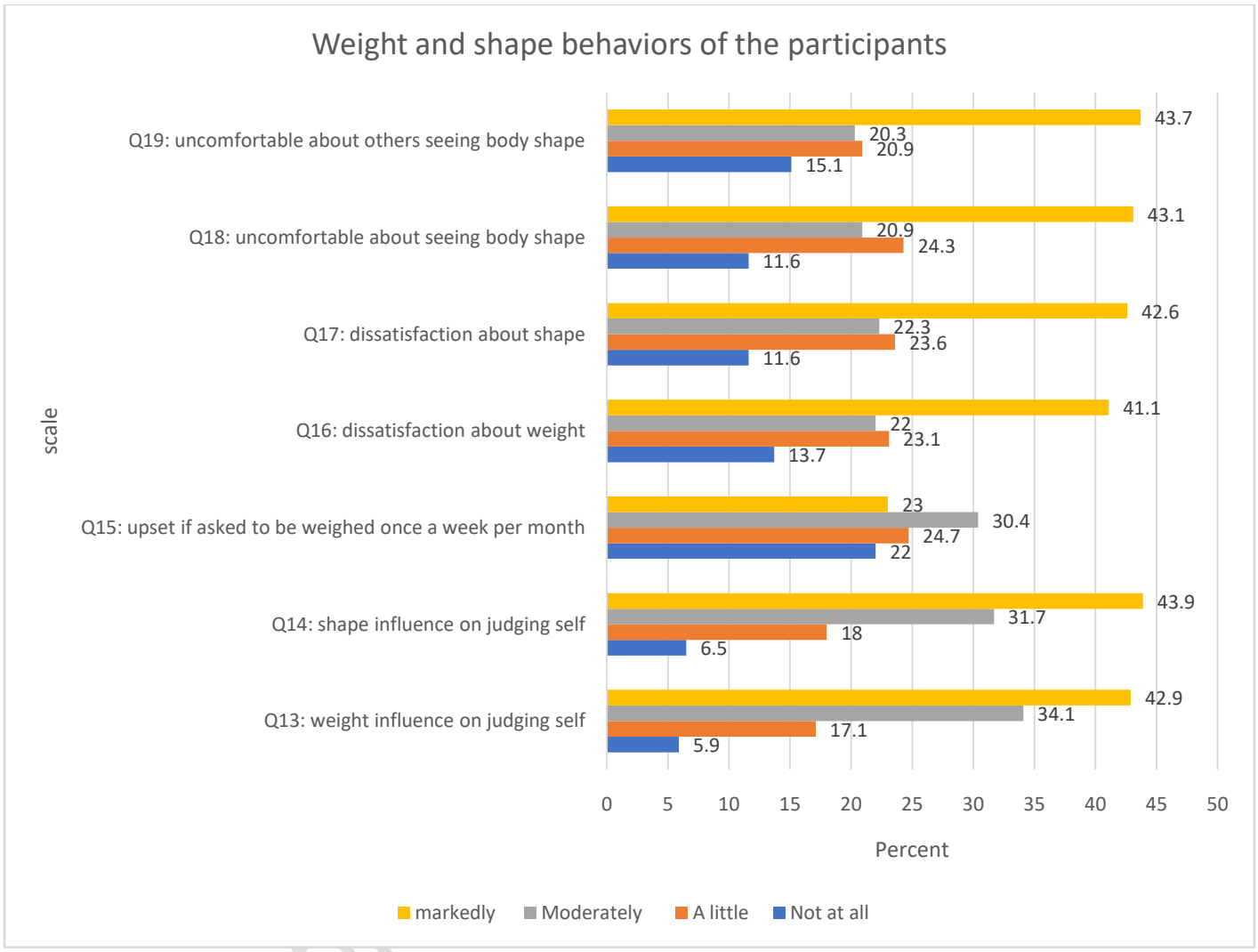

Figure 2: Body image; weight and shape concerns among participants:

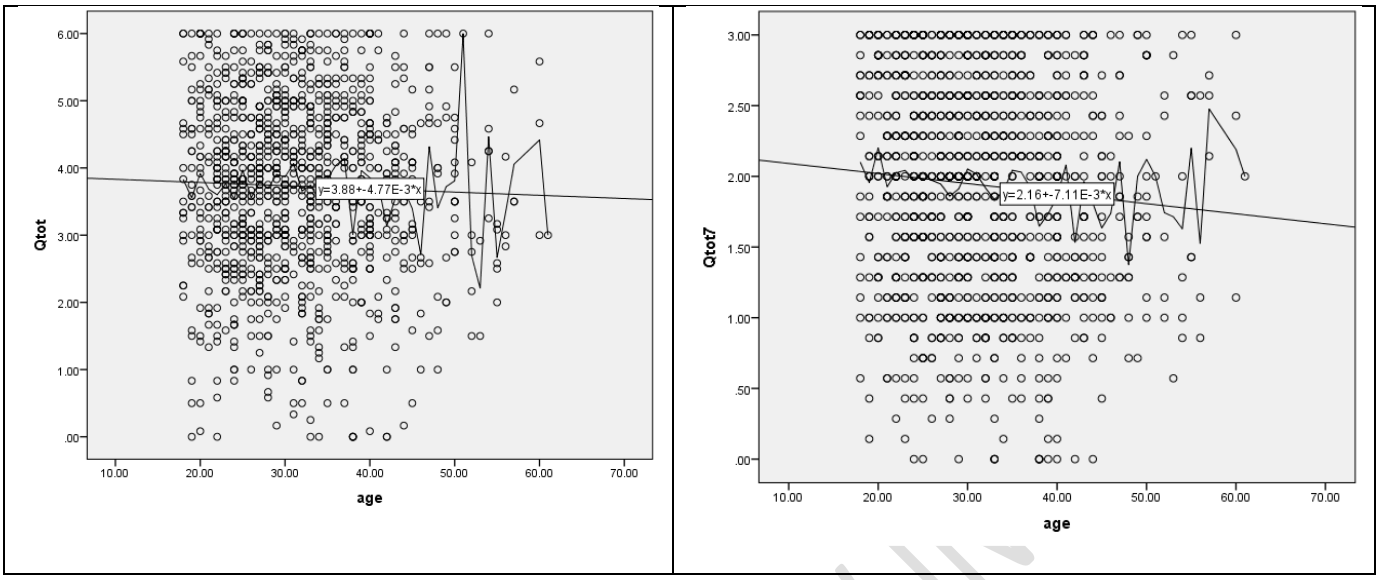

Figure 3: Correlation between Age of participants and their average total scores on the eating disorder scale and the body image concern scale

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