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A preliminary study of body image and depression among adults during COVID-19: A moderation model

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ABSTRACT

Background: Since many aspects of functioning can affect body image, the aim of our study was to assess whether the relationship between body image-related negative emotions or depression and body dissatisfaction was moderated by body image-related quality of life and to compare these analyses among participants with various body mass index during COVID-19.

Subjects and methods: One hundred and thirty-one adults participated in the study. Measurement tools included the Body Image Quality of Life Inventory, the short form of the Situational Inventory of Body-Image Dysphoria, the Beck Depression Inventory-II and the Contour Drawing Scale.

Results: The effects of body image-related negative emotions or depression on body dissatisfaction is moderated by body image-related quality of life, but only among obese participants.

Conclusion: Treatment of obese patients should focus on improving quality of life related to body image, while managing negative emotions and body dissatisfaction.

Introduction

Obesity is a health problem of global dimensions that demands interdisciplinary solutions (Burlandy et al., 2020; Centers for Disease Control and Prevention, 2020; World Health Organization, 2020). Being obese may be associated with serious difficulties in mental functioning (Hemmingsson, 2014; Marks, 2015; Raman et al., 2020). Numerous studies (on the period before COVID-19) show that obese people are characterized by worse emotional functioning and have a more negative body image and lower quality of life, as well as a higher level of depression than people with normal body weight (e.g. Kass et al., 2019; Pimenta et al., 2015; Sarigiani et al., 2020; Weinberger et al., 2016). Moreover, obese people are at high risk of complications from developing COVID-19 (e.g. J. Wadman, 2020; World Obesity, 2021). With regard to mental health, many authors indicate that the epidemiological situation related to COVID-19 significantly disrupts mental functioning (including the quality of life, emotional functioning and body image) (e.g. Aksoy & Koçak, 2020; Bryson, 2020; Carbone, 2020; Fitzpatrick, 2020; Jakovljevic et al., 2020; Kamberi et al., 2020; Nurunnabi et al., 2021; Samlani et al., 2020; Shek, 2021; Swami et al., 2021). Therefore, in this study, we decided to analyze the relationship between various aspect of body image and depression separately among people with normal body weight and obesity during COVID-19.

In psychological research on corporeality, there are many different concepts that are related to the perception as well as the assessment of one’s own body (Cash & Smolak, 2012). In this article, we focused on the concept of body image (Schilder, 1950). However, we should mention such aspects of body image as the behavioral (e.g. excessive exercising or disordered eating as a means to change one's appearance), cognitive (e.g. beliefs about a perfect silhouette) and affective aspects (e.g. different feelings or emotions towards the body) (Cash & Pruzinsky, 2002; Levine & Piran, 2004; Markey & Gillen, 2016). When writing about body image, positive (PBI) and negative body image (NBI) should also be mentioned (e.g. Gillen & Markey, 2015; Markey & Gillen, 2016; Tylka & Wood-Barcalow, 2015). In this study, we focused on a negative body image and we interpret it itself, among other things, in negative emotions (e.g. shame) in relation to one’s own body (Tiggemann, 2004). NBI has a negative impact on various aspects of functioning (including interpersonal relations), which may be associated with a reduction in quality of life (Wilson et al., 2013).

In relation to the above division, the research described in this article is mainly related to negative body image, which, as mentioned above, is

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associated with body image dissatisfaction (BID). BID is most often defined as a negative, subjective assessment of body weight and its shape (Xu et al., 2010). The research states that negative body image may be associated with a high level of body image-related negative emotions (e.g. anxiety, sadness, distress, self-blame, shame) and depression, as well as low self-esteem (Blashill & Wilhelm, 2014; Gan et al., 2011; Shin & Shin, 2008; Steg et al., 2008). Interestingly, when people face the ideal imposed by society and their figure differs from the expected one, they probably feel shame, sadness and anxiety, which are classified as negative self-conscious emotions (e.g. Thompson et al., 2003). These emotions can evoke a desire to hide one’s bodily imperfections in the context of their exposure to others (e.g. Thompson et al., 2003). The above-mentioned emotions can contribute to the constant maintenance of and/or deterioration of negative body image. This may be related to the fact that experiencing negative emotions may be associated with the emergence and maintenance of cognitive distortions about oneself (and one’s own body image) and engaging in avoidance behavior (e.g. avoidance of social situations that focus on appearance or eating) (e.g. Hosseinl Padhy, 2020; Jakatdar et al., 2006; Lydecker, 2015; Scardera et al., 2020).

In these circumstances, attention should be paid to the usefulness of the concept of quality of life, which may turn out to be a key aspect for explaining the functioning of an individual in everyday life. The quality of life level often reflects a person’s sustained and global assessment of their own functioning (Kolman, 2002). We can talk about quality of life in a subjective and objective context. Objective components are primarily health assessment, as well as socio-economic position, while subjective are established by self-defined components, e.g. well-being, body image, self-esteem (Marks, 2015; Tobiasz-Adamczyk, 2000). Previous studies show that improving the quality of life in obese people is associated with improvement in many aspects of psychological functioning (e.g. Nickel et al., 2017). Overall, quality of life is also an important issue that can play a key role in the context of body image (e.g. Cash & Fleming, 2002; Nickel et al., 2017). In the literature, we can find the concept of body image-related quality of life which refers to the assessment of life satisfaction in the context of experiencing one’s own body in various social situations (Cash & Fleming, 2002). Since many aspects of functioning can affect body image (e.g., social functioning, emotional well-being, eating, sexuality, exercise etc.; Cash & Fleming, 2002), it is worth considering whether a good quality of life can protect against the effects of negative emotions or depression on the maintenance or further development of body dissatisfaction among obese people during COVID-19.

To sum up, as mentioned above, the coronavirus pandemic is related to serious mental and physical health consequences (Bryson, 2020; Carbone, 2020; Jakovljevic, 2020). This situation is especially unfavorable for obese people (Wadman, 2020; World Obesity, 2021). Therefore, it is worth checking whether by managing the quality of life we are able to improve the mental functioning of people with obesity during COVID-19. This will allow to identify those aspects that can be included in interventions to prevent the development of negative body image and depression, and as is known, these problems escalated during the COVID-19 period (Carbone, 2020; Jakovljevic et al., 2020; Kamberi et al., 2020). Well, the aim of our study was to assess whether the relationship between body image-related negative emotions or depression and body dissatisfaction was moderated by body image-related quality of life and to compare these analyses among participants with various body mass index during COVID-19. Body image-related quality of life was expected to moderate the relationship between body image-related negative emotions or depression and body dissatisfaction among obese participants; in other words, medium and high body image-related quality of life would mean a non-significant relationship between body image-related negative emotions or depression and body dissatisfaction among obese people during COVID-19.

Subjects and methods

Participants

This was a cross-sectional study. We used a volunteer sampling technique. Participants were recruited through advertisements in various workplaces and universities from June 2020 to November 2020 during COVID-19. After contacting the researchers, adults completed an online survey. Two hundred and three people contacted us and we sent the online survey. One hundred and eighty-three people completed the survey and confirmed that they agree to participate in the study (informed consent form). This sample turned out to be sufficient in relation to the earlier calculations (\( f^2 = 0.15; \) minimum required sample size = 76).

The eligibility criteria for the present analysis were: (a) age: 18–64 years old; (b) BMI: normal body weight (18.5–24.99 kg/m²) and obesity (≥ 30 kg/m²). Finally, 131 adults met the eligibility criteria and their data was included in the analysis. The reasons for exclusion from the analysis were: (a) missing data; 8; (b) BMI (underweight <18.5 kg/m² and overweight 25–29.9 kg/m²): 61; (c) age: 3. With regard to the final sample (N = 131), the mean age was 37.57 (SD = 10.88) and the mean BMI 28.12 (SD = 6.97). Most of the participants (50.38%) had high school education. Detailed participants’ characteristics are shown in Table 1.

Compensation was not offered for participants. All participants were

Table 1

Characteristics of normal body weight and obese participants.

| Demographic characteristics | Normal body weight | Obesity |
|-----------------------------|---------------------|---------|
| N (%)                       |                     |         |
| Level of education          |                     |         |
| Primary school              | 0 (0)               | 1 (1.53) |
| Trade school                | 1 (1.51)            | 17 (26.16) |
| High school                 | 36 (54.55)          | 30 (46.15) |
| University graduates        | 29 (43.94)          | 17 (26.16) |
| M (SD)                      |                     |         |
| Weight (kg)                 | 61.55 (7.94)        | 98.12 (15.46) |
| Height (m)                  | 1.67 (0.08)         | 1.69 (0.08) |
| BMI (kg/m²)                 | 22.13 (1.79)        | 34.19 (4.37) |
| Age (years)                 | 34.41 (10.25)       | 40.79 (10.63) |

| Additional characteristics* | Normal body weight | Obesity |
|-----------------------------|--------------------|---------|
| N (%)                       |                    |         |
| Would you like to change what you look like? |                     |         |
| Yes                          | 46 (69.70)         | 55 (84.62) |
| No                           | 14 (21.21)         | 7 (10.77) |
| I do not know                | 6 (9.09)           | 3 (4.61) |
| Are you currently taking any action to change your appearance? |                     |         |
| Yes                          | 27 (40.90)         | 30 (46.15) |
| No                           | 39 (59.10)         | 35 (53.85) |
| What kind of action are you taking?* |                     |         |
| Physical activity            | 16 (24.24)         | 21 (32.31) |
| Diet                         | 14 (21.21)         | 21 (32.31) |
| Weight loss supplements      | 1 (1.51)           | 0 (0) |
| Other                        | 3 (4.55)           | 1 (1.53) |

*a Multiple choice.

*b These questions were asked to gain additional insight into the cognitive and behavioral aspects of the body image.
treated in strict compliance with the Helsinki Declaration (2001). The Ethics Committee approved our study.

**Measurements**

**The Body Image Quality of Life inventory (BIQLI): body image-related quality of life**

The inventory consists of 19 items that yield one composite score - body image-related quality of life (Cash & Fleming, 2002). This tool evaluates the influence of body image to individuals' quality of life. Participants respond on a 7-point scale (from very negative [−3] to very positive [+3] effects). Example items are: “My basic feelings about myself — feelings of personal adequacy and self-regard”, “My relationships with family members”, “Enjoyment of my sex life”. The higher the score, the higher the level of body image-related quality of life. BIQLI has demonstrated adequate validity (Cash & Fleming, 2002). In our study, Cronbach's alpha coefficient (reliability) was 0.97.

**The short form of the Situational Inventory of Body-Image Dysphoria (SIBID-S): body image-related negative emotions**

The questionnaire includes 20 items that yields one composite score - body image-related negative emotions (Cash, 2002). This tool assesses negative body-image emotions in the everyday situations of life. This self-report assessment uses a 5-point response format (ranging from never [0] to (almost) always [4]). Example items are: “At social gatherings where I know few people”, “When anticipating or having sexual relations”, “When I see myself in a photograph or videotape”. Higher scores indicate a more intense feeling of negative emotion. SIBID-S had good validity (Cash, 2002). In our study, Cronbach's alpha coefficient (reliability) was 0.96.

**The Beck Depression Inventory-II (BDI-II): depression**

The inventory contains 21 items that form overall average score - depression (Beck et al., 1996). This tool uses to measure the intensity of depression symptoms. There is a 4-point scale (ranging from 0 to 3). Example items are: “Sadness: 0. I do not feel sad. 1. I feel sad most of the time. 2. I am sad all the time. 3. I am so sad or unhappy that I can’t stand it.”; “Crying: 0. I don’t cry more than I used to. 1. I cry more than I used to. 2. I cry over every little thing. 3. I feel like crying, but I can’t.”. This inventory has demonstrated adequate validity (Beck et al., 1996). In our study, Cronbach's alpha coefficient (reliability) was 0.90.

**The Contour Drawing Scale (CDRS): body dissatisfaction**

The scale consists of nine male and female silhouettes, ranked from the skinniest to the fattest (Thompson & Gray, 1995). We asked them to answer two questions: (a) real figure: “Which silhouette reflects what you look like now?”; (b) ideal figure: “Which silhouette reflects what you would like to look like?”. Body dissatisfaction was calculated by subtracting the number of the silhouette indicated as “real figure” from the number of the silhouette indicated as “ideal figure”. The higher the discrepancy between the real figure and the ideal figure, the greater body dissatisfaction.

**Data analyses**

Moderation analyses were carried out to examine whether the relationships between body image-related negative emotions (X) or depression (X) and body dissatisfaction (Y) were moderated by body image-related quality of life (W) (Fig. 1). We conducted separate analyses for participants with normal body weight and obesity. We used the macro PROCESS for IBM SPSS and followed the procedure described by Hayes (2018). By analysing confidence interval (not including zero) and tests of significance (p < .05), we were able to answer the question of whether body image-related quality of life moderated the effect of body image-related negative emotions or depression on body dissatisfaction. To examine the conditional effect of body image-related negative emotions or depression on body dissatisfaction at medium (50th percentile), low (16th percentile), and high (84th percentile) levels of moderator, we used the pick-a-point approach (Bauer & Curran, 2005; Rogosa, 1980).

**Results**

**Descriptive statistics and correlation analysis**

Table 2 shows the descriptive statistics and the results of correlation analysis for all variables separately in the group of people with normal body weight and obesity.

**Moderation analysis**

Moderation analysis with one moderator shows that the effects of body image-related negative emotions or depression on body dissatisfaction is moderated by body image-related quality of life, but only among obese participants (Table 3).

Only among obese adults do body image-related negative emotions have a positive impact on body dissatisfaction when participants have medium and low levels of body image-related quality of life (Table 4; Fig. 2). In relation to the same group, depression has a positive impact on body dissatisfaction when participants have a low level of body image-related quality of life (Table 4; Fig. 3). Among people with normal body weight, no similar results were observed (Fig. 4 and Fig. 5).

**Discussion**

The aim of our study was to assess whether the relationship between body image-related negative emotions or depression and body dissatisfaction were moderated by body image-related quality of life and to compare these analyses among participants with various body mass indices during COVID-19. Only among obese adults does a body image-related quality of life significantly moderate the relationship between body image-related negative emotions or depression and body
related quality of life. Negative emotions and depression are associated with higher body dissatisfaction, only higher body image-related negative emotions are associated with greater body dissatisfaction. These results therefore confirm that high level of quality of life can be protective factors for the effects of negative emotions or depression on the maintenance or further development of body dissatisfaction among obese people during COVID-19.

Previous research interests in body image have focused primarily on adverse effects, such as low self-esteem, eating disorders and depressive mood (Neumark-Sztainer et al., 2006). But it is important to pay attention to the relationship between body image and quality of life because many studies confirm these associations (e.g. Medeiros de Morais et al., 2017; Tylka & Wood-Barcalow 2015). Researchers from Northeast Brazil show that there is a significant relationship between quality of life and body image among women who declare dissatisfaction with their body image due to excessive body weight (Medeiros de Morais et al., 2017). Interestingly, in other studies we also read that high socioeconomic factors (which can be considered as components of quality of life) have a protective effect on body dissatisfaction in women (Dinsa et al., 2012; Tobiasz-Adamczyk, 2000; Wardle et al., 2006). Another study also indicates that the positive body image is more strongly associated with quality of life than negative body image (preoccupation with being overweight) (Tylka & Wood-Barcalow 2015). In the same study, we read that the greater body satisfaction, the greater the investment in appearance and the higher the assessment of appearance, which correlates with the psychological and physical assessment of quality of life (Tylka & Wood-Barcalow 2015). Our research results also overlap with other reports. Researchers from Australia show that the occurrence of a higher level of body dissatisfaction is associated with a worse quality of life (Mond et al., 2013). Moreover, Rodgers et al. (2011) highlight that body satisfaction is related to a higher quality of life in the context of social functioning. In turn, Duarte et al. (2015) establish that body dissatisfaction and the feeling of inferiority that is based on body image dissatisfaction. According to our results for obese participants in low body image-related quality of life, both higher body image-related negative emotions and depression are associated with higher body dissatisfaction. For obese people in medium body image-related quality of life, only higher body image-related negative emotions are associated with greater body dissatisfaction. These results therefore confirm that high level of quality of life can be protective factors for the effects of negative emotions or depression on the maintenance or further development of body dissatisfaction among obese people during COVID-19.

### Table 2
| Normal body weight | Obesity |
|--------------------|---------|
| 1. Body image-related negative emotions | 0.535 *** | 0.607 *** |
| 2. Depression | 0.404 ** | 0.566 *** |
| 3. Body dissatisfaction | -0.331 ** | -0.615 *** |
| 4. Body image-related quality of life | 19.64 | 29.71 |

Note. The statistically significant interactions were highlighted in bold.

### Table 3
| Model | Normal body weight | Obesity |
|-------|-------------------|---------|
| X = body image-related negative emotions | Y = body dissatisfaction | W = body image-related quality of life |
| I: R = 0.53, F(3, 62) = 7.76, p < .001, MSE = | | |
| Y = body dissatisfaction | | |
| W = body image-related quality of life | II: R(1,62) = 0.001, p < .05 |
| X = depression | Y = body dissatisfaction | W = body image-related quality of life |
| I: R = 0.43, F(3, 62) = 4.67, p < .01, MSE = | | |
| W = body image-related quality of life | II: R(1,62) = 0.005, p < .05 |
| X = depression | Y = body dissatisfaction | W = body image-related quality of life |
| I: R = 0.58, F(3, 61) = 10.10, p < .001, MSE = | | |
| W = body image-related quality of life | II: R(1,61) = 9.94, p < .01 |

Note. The statistically significant interactions were highlighted in bold.

### Table 4
| Model | B | SE | t | p | Lower Limit | Upper Limit |
|-------|---|----|---|---|-------------|-------------|
| X = body image-related negative emotions | Constant | 0.79 | 0.45 | 1.74 | -0.12 | 1.70 |
| Y = body dissatisfaction | Body image-related negative emotions | 0.04 | 0.10 | 3.45 | 0.001 | 0.02 |
| W = body image-related quality of life | Body image-related quality of life | -0.01 | 0.01 | -0.68 | 0.50 | -0.03 |
| X x W | 0.00 | 0.0003 | 0.03 | 0.98 | -0.001 | 0.001 |
| X = depression | Constant | 1.37 | 0.40 | 3.43 | 0.001 | 0.57 |
| Y = body dissatisfaction | Depression | 0.06 | 0.03 | 2.31 | 0.02 | 0.01 |
| W = body image-related quality of life | Body image-related quality of life | -0.01 | 0.01 | -0.94 | 0.35 | -0.03 |
| X x W | 0.0001 | 0.0007 | 0.07 | 0.94 | -0.001 | 0.002 |
| X = body image-related negative emotions | Constant | 0.84 | 0.34 | 2.47 | 0.02 | 0.16 |
| Y = body dissatisfaction | Body image-related negative emotions | 0.04 | 0.01 | 5.08 | 0.0000 | 0.03 |
| W = body image-related quality of life | Body image-related quality of life | 0.03 | 0.01 | 2.49 | 0.02 | 0.01 |
| X x W | -0.001 | 0.003 | -2.40 | 0.02 | -0.001 | -0.0001 |
| X = depression | Constant | 1.27 | 0.31 | 4.17 | 0.0001 | 0.66 |
| Y = body dissatisfaction | Depression | -0.08 | 0.02 | 4.21 | 0.0001 | 0.04 |
| W = body image-related quality of life | Body image-related quality of life | 0.03 | 0.02 | 2.42 | 0.02 | 0.01 |
| X x W | -0.003 | 0.001 | -3.15 | 0.003 | -0.004 | -0.001 |

Note. The statistically significant interactions were highlighted in bold.
is associated with a poorer quality of life in all its dimensions.

Many studies have shown that there is a strong link between depression, BMI and body image (e.g. Goldschmidt et al., 2016; Paans et al., 2018; Richard et al., 2016). Moreover, it is confirmed that we can observe a strong relationship between depression and weight gain (e.g. Simon et al., 2006), which in turns can very often cause a negative body image (Brechan & Kvalem, 2015). Body dissatisfaction may coexist with stress and other negative emotional states (Dhurup & Nolan, 2014). The most common negative emotions related to negative body image are disgust (Spreckelsen et al., 2018) and shame (Thompson et al., 2003). The dominance of such emotions is often observed in patients with increased levels of depression symptoms. This state of affairs can be explained according to the classic Beck’s Theory of Depression, which says that distortions of body image are classified as cognitive symptoms of depression (Beck, 1976; Noles et al., 1985). Thus, a higher intensity of depression symptoms in obese people may predispose them to be more dissatisfied with the body compared to people with normal body weight (McIntyre et al., 2006; Sarigiani et al., 2020).

Regarding the clinical implications, treatment of obese patients during COVID-19 should focus also on improving quality of life related to body image, while managing negative emotions and body dissatisfaction. Improving quality of life can help reduce body dissatisfaction and improve emotional functioning in the context of experiencing one’s own body. Therefore, prevention programs and clinical life programs dealing with obesity should take into account the development of a positive body image in populations. Educational programs should also deal with such topics. Behavioral intervention is important here, which requires that patients introduce new behaviors into their life (Lau et al.,

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**Fig. 2.** Moderation analysis: the effect of body image-related negative emotions on body dissatisfaction by body image-related quality of life among obese participants.

**Fig. 3.** Moderation analysis: the effect of depression on body dissatisfaction by body image-related quality of life among obese participants.

**Fig. 4.** Moderation analysis: the effect of body image-related negative emotions on body dissatisfaction by body image-related quality of life among normal weight participants.

**Fig. 5.** Moderation analysis: the effect of depression on body dissatisfaction by body image-related quality of life among normal weight participants.
Based on the results obtained to help counteract the negative effects of threat to our mental health. Recent research suggests that negative well-being and facilitate lifestyle changes consisting of, e.g., implementing healthy eating, appropriate physical human functioning, including body image (e.g. Swami et al., 2021). This in requires that we analyze these relationships and create interventions based on the results obtained to help counteract the negative effects of the pandemic.

This study also has some limitations: (1) the sample size can be larger; (2) this is a cross-sectional study (causality cannot be inferred); (3) BMI was calculated based on self-reported data; (4) we used only self-reported questionnaires. These limitations should be taken into account in interpreting our results and planning further studies.

Declaration of competing interest
No conflict of interest.

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