

Original Article

Body Dissatisfaction in Individuals with Obesity Compared to Normal-Weight Individuals: A Systematic Review and Meta-Analysis

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Key Words

Obesity · Body image · Body dissatisfaction · BMI groups · Adults

Abstract

Background: Body dissatisfaction has been identified as a psychological correlate of obesity that is related to disordered eating, poor self-esteem, and depression. However, not all individuals with obesity are equally vulnerable to these correlates, and 'normative discontent' is present in individuals with normal weight, too. In this light, the complex relationship of body image and individual weight status seems like a worthwhile direction of research inquiry. As such, this review aims to systematically explore the degree of body dissatisfaction in individuals with obesity compared to normal-weight individuals. **Methods:** A systematic literature search was conducted. All quantitative studies of adult samples reporting results regarding differences in body dissatisfaction between individuals with normal weight and obesity were included. **Results:** 17 articles were found. Across studies, individuals with obesity reported higher body dissatisfaction than normal-weight individuals (questionnaires: $d = 0.89$, 95% CI = 0.63–1.16, $p < 0.001$; silhouette scales: $d = 1.41$, 95% CI = 0.57–2.25, $p < 0.001$). Meta-regression revealed a significant association of female gender and higher body dissatisfaction ($b = 0.60$, $p = 0.007$). **Conclusion:** The findings underline the severity of body dissatisfaction among individuals with obesity and especially among women. Future research recommendations are discussed.

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Introduction

Obesity is widely considered to be one of the most serious public health problems of recent times, not only increasing health care costs and risk of illness but also burdening individuals with obesity with severe psychological consequences [1]. Next to self-esteem and emotional well-being, body image is a key concept believed to be negatively affected in obesity [2].

Body image is a multidimensional construct and refers to a person's perceptions and attitudes, including feelings, thoughts and behaviors, regarding their own body and appearance [3]. According to this cognitive-behavioral model of body image, personality and physical attributes as well as interpersonal attributes and cultural socialization all play a role in how invested individuals are in their body image and how they evaluate it [4].

One facet of attitudinal body image is referred to as body satisfaction or body dissatisfaction [5]. It describes the subjective evaluation of the degree to which an individual has a positive or negative regard for their body [6].

Similarly to the concept itself, measurement of body image is multidimensional as well, a circumstance that explains why, e.g., weight dissatisfaction does not necessarily imply body dissatisfaction [7]. Assessment tools generally include perceptual accuracy of or attitudes regarding body image like subjective satisfaction, investment in appearance and beliefs about the body, and avoidance behavior [8]. While the former tend to make use of figural drawing scales and computer morphing techniques, the latter is often assessed using self-report questionnaires [9, 10].

The link between weight status and body image is complex. Schwartz and Brownell [11] argue that body image might be affected by obesity through psychological distress, which has an impact on quality of life. As outlined above, while body image is a subjective psychological phenomenon, it is also largely determined by social experiences [12]. Current Western societies tend to idealize slenderness, and it is assumed that media portrayal of the ideal female or male body has great influence on the way individuals evaluate and experience their physical appearance [13]. These ideals are generally associated with being strong-willed and in control of one's body, and individuals not able to conform to this ideal face substantial stigma [12]. While the focus in women is on being thin, men are supposed to be moderately muscular as well [14]. Past research has indeed found women to be more likely to strive for thinness [15]. Interestingly, men seem to be split between those wanting to be thinner and those who wish to be larger and more muscular [14], a distinction that lead to recommendations of investigating male and female body dissatisfaction separately from each other [16].

In light of the negative preconceptions that come with not meeting society's bodily ideals, it seems unsurprising that body dissatisfaction is particularly prevalent in individuals with overweight or obesity [17] and sometimes even related to eating disorders [18]. However, it seems that not all persons with obesity are equally vulnerable to this problem: Previous evidence indicates lower prevalence of body image concerns in individuals with obesity who are not seeking treatment in comparison to those who are [19, 20]. Moreover, individuals with normal weight are far from satisfied with their body shape or size, a circumstance so widespread among women that it has aptly been labeled as a 'normative discontent' [21] which reaches well into older age categories [15, 22].

A number of individual studies have reported findings on body dissatisfaction in samples of various weight statuses. Further, research has consistently found women to be more dissatisfied with their body than men [23, 24]. No comprehensive review, however, has quantified differences in body dissatisfaction between individuals with normal weight and obesity up to date. While this difference is commonly assumed, the magnitude of the problem still needs to be determined. To gain a more comprehensive picture of this issue, this systematic review

aims to systematically explore the degree of body dissatisfaction of individuals with obesity compared to individuals with normal weight. Moreover, gender differences in body dissatisfaction across studies are analyzed.

Material and Methods

This review was prepared according to the systematic literature review guidelines of the Centre for Reviews and Dissemination [25] and follows PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) suggestions [26].

Eligibility Criteria

Eligible for inclusion in the systematic review were published articles in which an assessment of body image was conducted and in which a quantitative outcome regarding differences in body image between adults with normal weight and obesity was reported. The weight groups were defined according to the BMI cut-off criteria of the WHO [27]. Journal articles published in English before December 2015 were eligible for inclusion.

Information Sources

We searched the electronic databases Medline 1970 to present, Web of Science 1970–2015, PsycINFO 1970–2015, and Cochrane Library 1970–2015. Relevant secondary references from the bibliographies of the selected articles were searched as well.

Search

A systematic literature search was carried out using the following strategy: ['obesity' OR 'overweight'] AND ['body image' OR 'body dissatisfaction' OR 'body satisfaction' OR 'body image*'].

Study Selection

The first stage of screening was conducted by one author. Here, papers which were clearly not studies about body image or quantitative studies, or about adult samples were excluded on the basis of title and abstracts alone. In the second stage, full texts were obtained for the remaining records and screened by two authors.

Papers were rejected which were not published in the English language, not conducted using a normal-weight comparison group, did not include participants with obesity, and did not report separate outcomes for participants with overweight and obesity. Taking previous findings into consideration that hint at potential differences in body dissatisfaction among subgroups [19, 20], articles which focused on participants of weight loss, weight maintenance or weight management interventions, focused on bariatric surgery patients or patients undergoing treatment/therapy of obesity/binge eating/eating disorders, or included/focused on pregnant women were excluded. Also, papers were rejected which did not report separate, quantifiable outcomes for the group with obesity and the comparison group. Further, to account for the multidimensional nature of the body image construct, papers were excluded which did not focus on body dissatisfaction in particular. Finally, duplicates, conference papers, editorials as well as review articles and book chapters were rejected.

Eligible papers were tabulated and used in the qualitative synthesis. Criteria for inclusion in the meta-analysis were more restrictive. Studies with a sample size ≤ 10 in any of the weight groups and studies using single items to assess body dissatisfaction were excluded. Further, papers not reporting separate data for women and men or not reporting data necessary to calculate effect size (standardized differences in means) were not included in the meta-analyses.

Data Collection Process

Data relevant for the review and meta-analyses were collected in a datasheet. Two corresponding authors were contacted via email for further information. The first author was asked to provide the numerical data of two figures illustrating the percentage of participants dissatisfied with their weight. This paper was excluded after the detailed final analysis due to its focus on weight dissatisfaction. The second author was asked for the exact number of participants in each of the weight groups for the female and male sample. Since we did not receive a response, the paper was not included in the meta-analysis.

Data Items

The following characteristics were extracted from the original articles and included in the review: lead author, year of publication, country of origin of the sample, sample size, age, sex, BMI assessment method, and body image measure as well as outcomes of body dissatisfaction (e.g., mean, SD, percentages) and effect size. For an overview see tables 1 and 2.

Risk of Bias in Individual Studies

A tool similar to the risk-of-bias assessment tool outlined in the Cochrane Handbook for Systematic Reviews of Interventions [28] was created to account for the most common factors influencing body image assessment [11]. The author reviewed the following aspects of all included studies: i) control for gender, ii) control for ethnicity of sample, iii) control for weight-control behavior, iv) control for comorbidities (e.g., eating disorders, depression, or personality disorders), and v) assessment of other body image facets (e.g., appearance investment).

Data Analysis

Statistical analyses were performed using the statistical software Comprehensive Meta-Analysis, version 3.0 (Biostat, Englewood, NJ, USA) and STATA 13.1 using the metan and metareg commands. The standardized differences in means with standard errors were calculated for relevant body dissatisfaction outcomes for the group with obesity and the group with normal weight. A random-effects model of analysis was used, and heterogeneity among the included studies was assessed by determining the Cochran Q and the I^2 statistic. For Cochran Q, a p value < 0.10 indicated statistically significant heterogeneity. For I^2 , the percentage of observed between-study variability due to heterogeneity rather than chance was used as an indicator. No heterogeneity was indicated by 0–30%, moderate heterogeneity was indicated by 30–50%, substantial heterogeneity was indicated by 50–75%, and considerable heterogeneity was indicated by 75–100%. Pooled standardized differences in means for all outcomes were calculated. A two-sided p value < 0.05 was taken to indicate statistical significance.

Results

A total of 17 studies were identified for inclusion in the review, and 14 studies met the stricter inclusion criteria for the meta-analyses. The studies excluded from the meta-analyses either used single items to assess body dissatisfaction or had a sample size of 10 or less in any of the weight groups or did not report data necessary to calculate standardized differences in means [29–31]. The study selection process is illustrated in figure 1.

Characteristics of Included Studies

The characteristics of the studies meeting the eligibility criteria are summarized in table 1.

Overall, the included studies involved 13,508 participants and varied in their samples' country of origin and analyzed ethnic groups. Gender-specific data were present in 16 of the 17 papers. The majority of studies focused on body image and related topics such as prevalence of overweight and obesity, or BMI and body composition. Five studies assessed and reported body image but also focused on a different topic, e.g. narcissism or sexuality [29, 32–35].

The reviewed papers relied on different methods to assess body dissatisfaction. Nine studies made use of generally established and validated self-report questionnaires like the Multidimensional Body-Self Relations Questionnaire (MBSRQ) [36]; for an overview of body satisfaction instruments [8]. Morotti and colleagues [29] measured body dissatisfaction with two single items, Baceviciene and colleagues [37] used the body image subscale of the WHO Quality of Life Scale. Moreover, two studies had subjects complete body image scales developed by the respective authors [34, 38]. Further, four studies used figure rating scales and had

Table 1. Summary of basic characteristics of studies included in the systematic review

Study	N	Country	% female	Age	BMI*	Body image instrument	Scoring dissatisfaction	Inclusion meta-analysis?
<i>Questionnaire</i>								
Baceviciene et al. [37]	1,260	Lithuania	56	35–64	measured	WHO QOL-100 (body image and appearance facet; [40])	higher scores = lower dissatisfaction	yes
Fallon et al. [41]	1,893	USA	66	18–90	self-report	The Multidimensional Body-Self Relations Questionnaire (MBSRQ);[36]	higher scores = lower dissatisfaction	yes
Herbozo et al. [32]	924	USA	100	18–25	self-report	The Eating Disorder Inventory-3-Body Dissatisfaction (EDI-3-BD); [42]	higher scores = higher dissatisfaction	yes
Hrabosky, Grilo [35]	120	USA	100	18–58	self-report	The Body Shape Questionnaire (BSQ); [43]	higher scores = higher dissatisfaction	yes
Jun and Choi [44]	700	South Korea	100	20.22 ± 1.90	self-report ^a	The Body Esteem Scale for Adolescents and Adults (BESAA); [45]	higher scores = lower dissatisfaction	yes
Lipowska and Lipowski [33]	325	Poland	100	18–35	measured ^b	Multidimensional Body-Self Relations Questionnaire (MBSRQ; [36]); The Body Esteem Scale (BES; [46])	higher scores = lower dissatisfaction	yes
McCabe and McGreevy [34]	526	USA, Europe, Australia/Oceania	0	18–60	self-report	The Body Image Satisfaction Scale [47]	higher scores = lower dissatisfaction	yes
Morotti et al. [29]	90	Italy	100	18–35	measured	how satisfied they are of their own body and how good they felt because of their silhouette	higher scores = lower dissatisfaction	no
Streeter et al. [48]	170	Canada	54	18–25	measured	The Body Esteem Scale for Adolescents and Adults (BESAA);[45]	higher scores = lower dissatisfaction	yes (female sample)
Watkins et al. [38]	188	USA	0	18–57	self-report	body image scale [38]	higher scores = higher dissatisfaction	yes
<i>Silhouette scales</i>								
Benkeser et al. [49]	2,684	Ghana	100	18–99	measured	The Figure Rating Scale [39]	higher scores = higher dissatisfaction	yes
Cachelin et al. [50]	276	US	100	18–52	self-report	The Figure Rating Scale [39]	higher scores = higher dissatisfaction (lose weight) 0=satisfied lower scores = higher dissatisfaction (gain weight)	yes
Gilbert-Diamond et al. [51]	671	Colombia	100	21–55	measured	The Figure Rating Scale [39]	higher scores = higher dissatisfaction (lose weight) 0=satisfied lower scores = higher dissatisfaction (gain weight)	yes
Santos Silva et al. [52]	1,720	Brazil	56	20–59	measured	The Figure Rating Scale [39]	higher scores = higher dissatisfaction	yes (female sample)

Table 1 continued on next page

Table 1. Continued

Study	N	Country	% female	Age	BMI*	Body image instrument	Scoring dissatisfaction	Inclusion meta-analysis?
<i>Both measures</i>								
Johnstone et al. [31]	60	UK	50	20–55	measured ^c	Silhouette: The Figure Rating Scale [39]; digital body image technique [53] Questionnaire: Body image Ideals Questionnaire (BIQ); [54] Silhouette: The contour drawing scale (three scoring methods; [30])	silhouette: higher scores = lower dissatisfaction questionnaire: higher scores = higher dissatisfaction silhouette: FRS & computer method: higher scores = higher dissatisfaction (lose weight) 0=satisfied lower scores = higher dissatisfaction (gain weight)	no
Kakeshita and Sousa Almeida [30]	106	Brazil	54	18–55	measured	Questionnaire: The Body Shape Questionnaire (BSQ); [43] Silhouette: Body Image Assessment Questionnaire (silhouettes; [55]) Questionnaire: The Body Shape Questionnaire (BSQ); [43]	questionnaire: higher scores = higher dissatisfaction silhouette: higher scores = higher dissatisfaction questionnaire: higher scores = higher dissatisfaction	no
Vieira et al. [20]	1,795	Portugal	100	18–99	measured	Questionnaire: The Body Shape Questionnaire (BSQ); [43] Silhouette: Body Image Assessment Questionnaire (silhouettes; [55]) Questionnaire: The Body Shape Questionnaire (BSQ); [43]	questionnaire: higher scores = higher dissatisfaction silhouette: higher scores = higher dissatisfaction questionnaire: higher scores = higher dissatisfaction	yes

*Division of BMI groups according to WHO criteria if not stated otherwise.

^aAsian criteria of WHO: normal (18.0 kg/m² ≤ BMI < 25.0 kg/m²); obese (BMI ≥ 25.0 kg/m²).

^bIdeal group: BMI = 21.7–22.7 kg/m²; obese group: BMI > 30.0 kg/m².

^cObese group = BMI > 30.0 kg/m²; normal-weight group = BMI < 23.0 kg/m².

WHO = World Health Organization; QOL = quality of life; FRS = figure rating scale.

Table 2. Outcomes and summary of results of included studies

Study	N	Outcome	Results dissatisfaction	Comment	d	r, SE
<i>Questionnaire</i>						
Baceviciene et al. [37]	female: ob = 277, nw = 192 male: ob = 145, nw = 148	M (SD)	ob > nw (both genders)	results adjusted for age; both genders dissatisfied, but women especially; in men no difference between body image scores of nw & ow subjects	female: -1.31 male: -0.63	female: -0.55, 0.10 male: -0.3, 0.12
Fallon et al. [41]	female: ob = 240, nw = 673 male: ob = 147, nw = 262	M (SD)	ob > nw (both genders; BS & AE subscale)	post hoc: no significant BMI group differences for any of the body image dependent variables; compared to men women had sig. lower body area satisfaction; no difference was found in appearance evaluation; BS & AE: in the ow & obese category men consistently report more positive body image than women	female: BS: -1.36 AE: -1.70 male: BS: -0.91 AE: -1.26	female: BS: -0.56, 0.08 AE: -0.65, 0.09 BS: -0.42, 0.11 AE: -0.53, 0.11
Herbozo et al. [32]	female: ob = 105, nw = 580	M (SD)	ob > nw	no test of differences reported	1.32	0.55, 0.11
Hrabosky and Grilo [35]	Black females: ob = 28, nw = 15 Hispanic females: ob = 20, nw = 13	M (SD)	ob > nw (both ethnic groups)	/	Black: 1.27 Hispanic: 0.96	Black: 0.54, 0.35 Hispanic: 0.43, 0.38
Jun and Choi [44]	female: ob = 25, nw = 530	M (SD)	ob > nw	/	-0.49	-0.24, 0.21
Lipowska and Lipowski [33]	female: ob = 72, nw = 168	M (SD)	ob > nw (AE subscale)	no sig. difference in AO – all participants scored moderate in the MBSRQ and no sig. difference between ob & nw in sexual attractiveness subscale	AE: -0.80	AE: -0.37, 0.15
McCabe and McGreevy [34]	male: ob = 102, nw = 205	M (SD)	ob > nw	/	UB: -0.35 LB: -0.22	UB: -0.17, 0.12 LB: -0.11, 0.12
Morotti et al. [29]	female: ob = 21, nw = 47	M (SD)	ob > nw	both groups are satisfied, ob just less so	body: -0.86 silhouette: -1.30	body: -0.40, 0.27 silhouette: -0.54, 0.29
Streeter et al. [48]	female: ob = 12, nw = 46 male: ob = 9, nw = 44	M (SD)	ob > nw (both genders)	weight esteem was more heavily influenced by higher BMI than appearance esteem in both sexes, but more so in women.	female: -1.06	female: -0.47, 0.34
Watkins et al. [38]	male: ob = 26, nw = 79	M (SD)	ob > nw	/	BD: 0.88 total: 0.42	BD: 0.40, 0.23 total: 0.20, 0.23

Table 2 continued on next page

Table 2. Continued

Study	N	Outcome	Results dissatisfaction	Comment	d	r, SE
<i>Silhouette</i>						
Benkeser et al. [49]	female: ob = 973, nw = 828	prevalence	ob > nw	almost 3/4 of women dissatisfied; the majority of the satisfied 1/4 were overweight or obese; obese more likely to desire weight loss; results independent of age, wealth & education	0.30	0.15, 0.06
Cachelin et al. [50]	female: ob = 70, nw = 123	M (SD)	ob > nw	results independent of age, SES & dependent on acculturation	1.35	0.56, 0.16
Gilbert-Diamond et al. [51]	female: ob = 78, nw = 390	M (SD)	ob > nw	results independent of SES & education	1.63	0.63, 0.13
Santos Silva et al. [52]	female: ob = 155, nw = 493 male: ob = 115, nw = 346	odds ratio	ob > nw	results independent of skin color, education & income; dependent of age; more women than men dissatisfied by being heavier than ideal; more men than women dissatisfied by being lighter than ideal	female: 1.75 male: 1.61	female: 0.66, 0.26 male: 0.63, 0.21
<i>Both measures</i>						
Johnstone et al. [31]	female: ob = 10, nw = 10 male: ob = 10, nw = 10	M (SEd)	ob > nw (all measures)	results indicate that females had a greater body dissatisfaction score than males	/	/
Kakeshita and Sousa Almeida [30]	NA	M (SD)	ob > nw (all measures, both genders)	results independent of age; questionnaire: women had higher dissatisfaction scores compared to men; difference scores: women had higher dissatisfaction scores compared to men, but only in the nw group	/	/
Vieira et al. [20]	female: ob = 74, nw = 798	M (SD)	ob > nw (both measures)	participants seeking treatment (not included in this review) reported significantly higher body image dissatisfaction compared to women in the non-clinical group [normal-weight women excluded].	BIAQ: 2.05 0.78	BIAQ: 0.72, 0.13 0.36, 0.12

d = Cohen's d effect size, r = correlation; SE = standard error; M = mean, SD = standard deviation; ob = obese, nw = normal-weight, ow = overweight, NA = no data available; BS = body satisfaction; AE = appearance evaluation; AO = appearance orientation; UB = upper body; LB = lower body; SES = socioeconomic status; SED = standard error of the difference; BIAQ = Body Image Assessment Questionnaire.

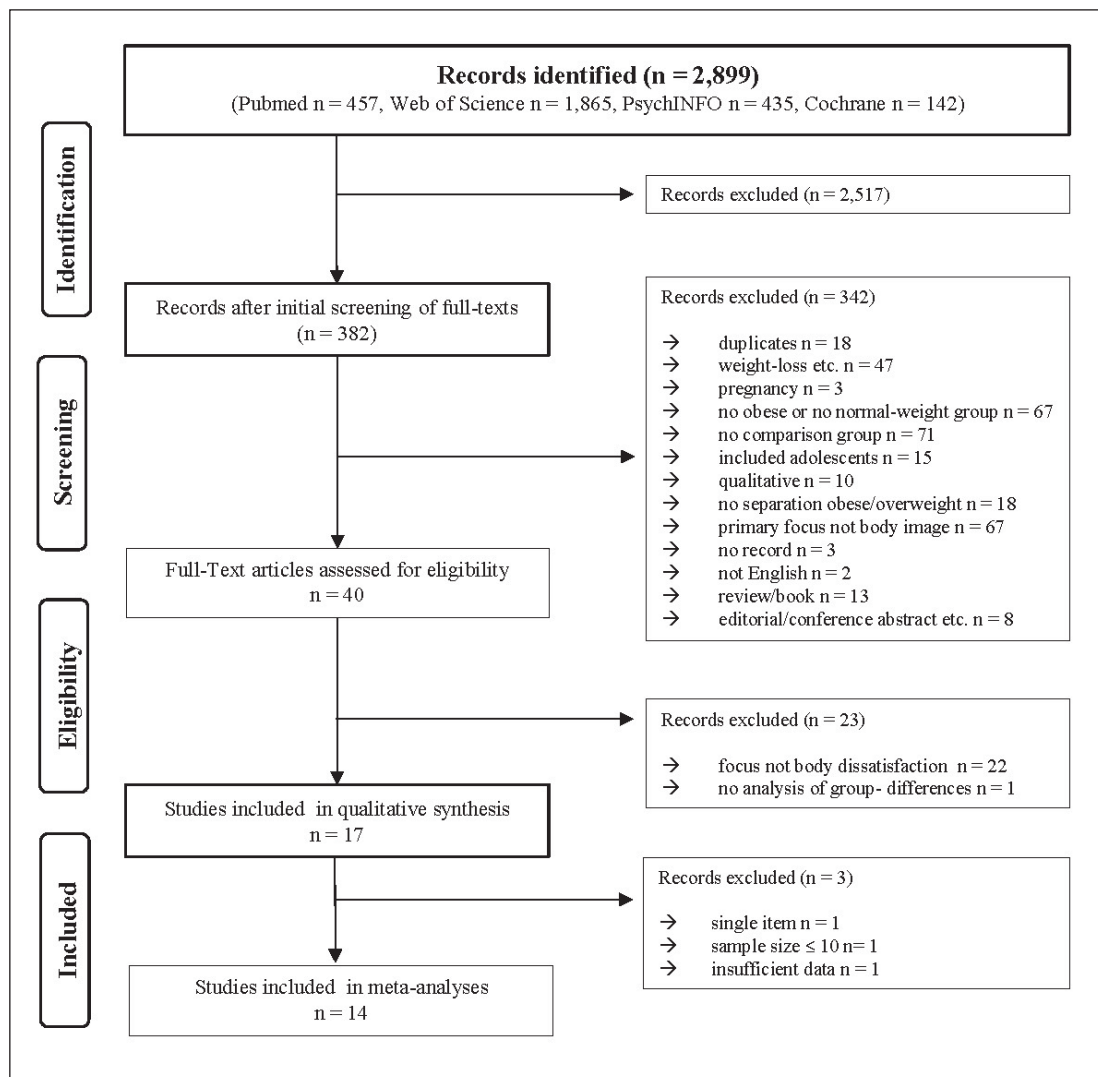


Fig. 1. Flow diagram of study selection. Adapted from [26].

participants chose the silhouette that represented how they would like to look (ideal) and how they currently look (current). Body dissatisfaction was then measured by calculating the difference between ideal and current silhouette, with greater discrepancies indicating greater dissatisfaction [39]. In addition to a body image questionnaire, two studies used figure drawing scales [20, 30]. One study made use of a digital body image technique comparing both a figure drawing scale and a questionnaire [31].

Finally, while the majority of studies using figure drawing scales measured participants' weight and height, studies using self-report questionnaires often relied on the subjects' self-reported anthropomorphic data (table 1).

Results of Individual Studies and Quality Assessment

Across the studies, individuals with obesity reported higher body dissatisfaction than individuals with normal weight. Notably however, Lipowska and Lipowski [33] found no significant difference between women with obesity and women with normal weight in their

Table 3. Risk of bias assessment of included studies

Study	Separate gender	Separate ethnic group	Weight-control behavior	BI comorbidities	Other BI relevant factors	Other BI facets
<i>Questionnaire</i>						
Baceviciene et al. [37]	yes	Lithuanian	no	no	none	no
Fallon et al. [41]	yes	yes	no	no	failure to complete items of demographics or MBSRQ*	overweight preoccupation, fitness & health evaluation (via MBSRQ; [36])
Herbozo et al. [32]	female only	yes (but not in results)	no	no	verbal commentary on physical appearance	shape concern, weight concern (via EDE-Q; [56])
Hrabosky and Grilo [35]	female only	yes (Black, Hispanic)	eating- & weight patterns	depression (via BDI; [57])	none	shape concern, weight concern (via EDE-Q; [56]); distress with specific body areas (via PASTAS; [58])
Jun and Choi [44]	female only	South-Korean	weight-control behavior	self-rated depression [59]	incomplete or missing answers*	weight esteem, external attribution (via BESAA; [45])
Lipowska and Lipowski [33]	female only	Polish	practicing sports on a professional basis*	anorexia* (via DSM-IV; [60])		appearance orientation (via MBSRQ; [36]); sexual attractiveness, weight concern, physical condition (via BES; [46])
McCabe and McGreevy [34]	male only	yes (but not in results)	binge eating behavior; body change strategies to lose weight/to increase muscle size	no	not heterosexual*	body image importance, ideal body internalization, sociocultural influences on body image & body change strategies perception
Morotti, et al. [29]	female only	Italian	exercise intensely on a regular basis	neurological*, psychiatric*, depression (via BDI; [57])	not married or in a stable relationship*; childbirth*, pregnancy*; use of psychoactive or recreational substances*; (...)	
Streeter et al. [48]	yes	Canadian (Caucasian only)		no	none	weight esteem, external attribution (via BESAA; [45])
Watkins et al. [38]	male only	yes (but not in results)	no	no	none	weight/shape concern

Table 3 continued on next page

Table 3. Continued

Study	Separate gender	Separate ethnic group	Weight-control behavior	BI comorbidities	Other BI relevant factors	Other BI facets
<i>Silhouette</i>						
Benkeser et al. [49]	female only	Ghanaian	no	no	pregnancy*, time post-partum < 3 months*	perception
Cachelin et al. [50]	female only	Mexican American only	no	no	acculturation; pregnancy*, time post-partum < 4 months*	perception
Gilbert-Diamond et al. [51]	female only	Colombian	no	no	high income*	perception
Santos Silva et al. [52]	yes	Brazilians of different skin colors	no	no	none	perception (data not shown)
<i>Both measures</i>						
Johnstone et al. [31]	no (but test for group effect)	NA	diet; weight loss*; unstable weight (+ 2kg in the previous 3 months)*; exercise regime to change body shape*	no	chronic health complains*	perception
Kakeshita and Sousa Almeida [30]	yes	Brazilian	BMI < 18,5 or > 40,0	no	none	perception
Vieira et al. [20]	female only	Portuguese	non-clinical sample: Enrollment in a formal weight loss treatment program*; present attempt to lose weight clinical sample: treatment level*	no	pregnancy*, being (post) menopausal*	investment in BI, preoccupation (both via BSQ; [43])

*Listed as exclusion criteria in original article.

BI = body image, EDE-Q = Eating Disorder Examination Questionnaire, BDI = Beck Depression Inventory, PASTAS = Physical Appearance State and Trait Anxiety Scale.

estimation of their sexual attractiveness. They also note that all participants scored moderate in the MBSRQ and subjects of both groups did not differ in the extent of investment their appearance. Moreover, Morotti and colleagues [29] reported both groups to be satisfied, with obese women being more dissatisfied. Further, Benkeser and colleagues [49] found three-quarters of their sample to be dissatisfied with their body. Interestingly, the majority of the subjects reporting satisfaction with their body were overweight or obese.

Regarding gender differences, women generally reported being more dissatisfied with their body image than men [30, 31]. In addition, Fallon and colleagues [41] found men with overweight and obesity to consistently report more positive body image than women in both body area satisfaction and the appearance evaluation. Similarly, Baceviciene and colleagues [37] report both genders to be dissatisfied, particularly the women. They also found no difference between body image scores of male subjects with normal weight and overweight. Further, Streeter and colleagues [48] found weight esteem to be more heavily influenced by higher BMI than appearance esteem in both sexes, but again more so in women. Santos Silva and colleagues [52] report more women than men to be dissatisfied by being heavier than ideal, but more men than women being dissatisfied by being lighter than ideal.

Per assessment method, an overview of body dissatisfaction results is provided in table 2.

All of the studies controlled for gender, and a majority either analyzed only one or reported separate results for different ethnic groups. Moreover, in the majority of questionnaire studies, body image dissatisfaction was assessed using validated instruments that accounted for the multidimensionality of the construct. Although all studies reported inclusion or exclusion criteria as well as control variables, body image-related influence factors such as eating disorders could not be fully ascertained for all of them. Particularly, weight control behavior and comorbidities such as eating disorders and depression were not collected in a large proportion of studies. The details of the risk-of-bias assessment are illustrated in table 3.

Synthesis of Results

Questionnaires Body Dissatisfaction

A random-effects model of analysis was used and significant heterogeneity was found ($Q = 117.12$, $df = 10$, $p < 0.001$; $I^2 = 91.5\%$). The overall analysis showed body dissatisfaction to significantly afflict the group with obesity over the normal-weight group (pooled standardized difference in means = 0.89, 95% CI = 0.63–1.16, $p < 0.001$). Based on the literature, we decided to conduct gender-specific analyses as shown in figure 2.

The pooled effect size of body dissatisfaction for men was 0.58 (95% CI = 0.31–0.85) compared to 1.18 (95% CI = 0.97–1.40) in women. Subsequent meta-regression revealed a significant association of female gender and higher body dissatisfaction ($b = 0.60$, $p = 0.007$).

Questionnaires Appearance Evaluation

Four studies assessed Appearance Evaluation in women. Again, significant heterogeneity ($Q = 49.4$, $df = 4$, $p < 0.001$, $I^2 = 93.3\%$) existed, and a random-effects model was run. The overall effect size was 1.02 (95% CI = 0.37–1.67).

Figure Drawing Scales

Four studies assessed body dissatisfaction in women with a figure drawing scale. A random-effects model of analysis was used, and significant heterogeneity was found ($Q = 231.5$, $df = 4$, $p < 0.001$; $I^2 = 98.3\%$). The overall analysis showed body dissatisfaction to significantly more afflict the group with obesity than the normal-weight group (pooled standardized difference in means = 1.41, 95% CI = 0.57–2.25, $p < 0.001$).

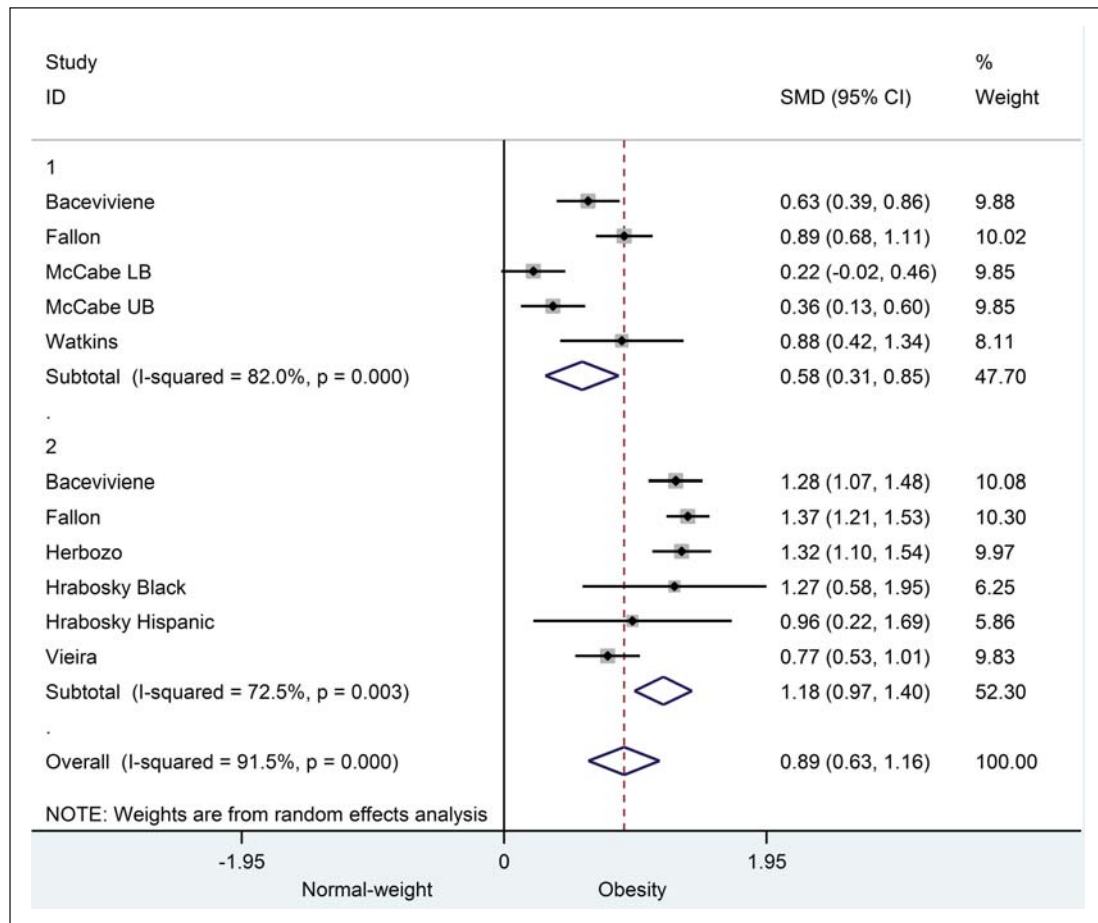


Fig. 2. Meta-analysis of differences in body dissatisfaction questionnaire scores between individuals with obesity and normal-weight among male and female samples. Abbreviations: 1 = male; 2 = female; SMD = standardized mean difference; CI = confidence interval; LB = lower body; UB = upper body.

Risk of Bias across Studies

Considering that each meta-analysis performed included less than 10 studies, no sensitivity analysis or assessment of publication bias was performed.

Discussion

This review aimed at systematically exploring the degree of body dissatisfaction in individuals with obesity compared to individuals with normal weight as well as analyzing gender differences in body dissatisfaction across studies. In total, 17 studies met the eligibility criteria for inclusion, and 14 of them provided suitable data for meta-analysis. Meta-analyses showed body dissatisfaction to significantly more afflict the group with obesity than the normal-weight group in both studies using questionnaires as well as in those using figure drawing scales. Further, participants with obesity rated their bodily appearance significantly more negative in comparison to normal-weight participants. Effect sizes ranged from small to large in the male samples (d = 0.22–0.89) and from medium to large in the female samples (d =

0.77–1.37). The meta-regression revealed the difference in body dissatisfaction between women with obesity and normal weight to be significantly higher than in men.

The two major results of the current systematic review and meta-analyses seem to be in line with past findings on the topic: body dissatisfaction is greater in persons with obesity than in normal-weight persons, and compared to their respective normal-weight peers, women with obesity are more dissatisfied with their bodies than men with obesity. These differences appear hardly surprising considering that societies' emphasis on thinness and beauty particularly affect girls and women [12]. Accordingly, past research shows that physical appearance seems to be of more importance to females than males [61]. Moreover, women report significantly higher body dissatisfaction, even if their BMIs are lower than those of men [62]. This finding was affirmed by a recent cross-national study that reports that 25% of girls were undertaking some measure to lose weight, like dieting, and that they were more likely to think of themselves as 'fat' even though overweight and obesity was higher in boys [63]. Furthermore, a number of studies have concluded that body dissatisfaction in women seems to be stable across the life span [15].

Due to past research having focused on women, the picture of body dissatisfaction in men is less clear and as such the subject of a rising number of studies. McCreary and Sasse [64] for example report that men and boys also seem to increasingly report body dissatisfaction and that body image is a concern for males over the lifespan [14]. Similarly to women, body dissatisfaction in men is linked to low self-esteem, depression, and eating disorders [65], but also to the use of bodybuilding drugs like anabolic steroids or human growth hormone [66]. Moreover, it is hypothesized that males with overweight or obesity might protect themselves from body dissatisfaction by considering themselves as 'big and strong' rather than 'fat' [11].

As a consequence, nuanced approaches to further investigate the relationship between male gender, weight status and body image are required.

Regarding body dissatisfaction in populations with obesity, our findings are in accordance with previous assumptions, especially concerning women with obesity [11, 19]. Interestingly, not all studies of women with obesity find a relationship between BMI and body dissatisfaction [8]. Certain factors like weight-related teasing or stigmatizing experiences appear to play a role in increased body image concerns in this population as well [67].

An important practical implication of these negative obesity-related consequences pertains to treatment options. Schwartz and Brownell [11] theorize that many individuals with obesity might consider weight loss to be the optimal way to improve their body image. Generally, studies examining body image before and after weight loss treatment find improved body image as a person loses weight and deterioration if the individual regains weight [68]. One particular exception constitutes massive weight loss following bariatric surgery: Body dissatisfaction due to hanging skin is common and often entails body contouring surgery to alleviate this 'new' dissatisfaction [69]. However, individuals with extreme obesity seeking bariatric surgery underscore the importance of body dissatisfaction as a motivating factor as these individuals are impelled by improvements in appearance rather than improvements in health [8]. Moreover, previous research suggests that, unlike the experience of stigma and discrimination, a certain level of body dissatisfaction might motivate healthy behavior changes like increased physical activity [70]. In turn, improved body image is theorized to facilitate use of psychosocial resources and lead to better adherence to weight management [71].

Thus, intervention and prevention measures that also take into account the heterogeneity of the population with obesity seem to be a promising approach to not only mitigate negative psychological consequences but also – due to body dissatisfaction's association with vital health behaviors – contribute in the treatment against obesity itself.

Naturally, the current review has limitations. The number of studies that we were able to include is limited. It seems likely that studies reporting null findings or results contradicting the general consensus might have been susceptible to publication bias. Moreover, the current research does not include papers not written in English. Considering the rising prevalence of obesity in developing nations and cultural differences in body image that may be a promising approach for prevention and intervention measures [50], insufficient inclusion of potential findings regarding body image among samples of different ethnicities is particularly unfortunate.

As with any overview, the samples and assessment tools are not identical across studies. Especially, the use of different measures to determine body dissatisfaction makes comparisons rather difficult. While some studies used validated scales, others relied on single items or figure rating scales to assess body dissatisfaction. Even though past research has shown high correlations between figure rating scores and body dissatisfaction questionnaires [72], not all lines of action of psychological research assume self and ideal ratings to be distinct causes of body dissatisfaction [73]. Next to conceptual differences, there is also debate regarding the use of difference scores as a measure of body image due to potential methodological problems like ambiguity or dimensional reduction (see [74] for details).

Further, we agree with past studies that encourage researchers to make use of measures developed for and validated in samples with obesity [10].

Another critical point pertains to the assessment of anthropometric data (particularly subjects' height and weight). The majority of included studies used self-reported height and weight data to calculate BMI and determine consequent group assignment. However, while self-report data may be more time- and cost-effective in comparison to measurement of weight and height, research shows trends of participants underestimating their weight and BMI and overestimating their height [75]. This is particularly problematic if the self-reported BMI is a primary variable of interest and used for example in classification of BMI groups or evaluations of prevalence of obesity or overweight [76]. Thus, the use of measured anthropometric data is recommended especially in studies analyzing participants with overweight and obesity [77].

Moreover, possible influences of comorbid conditions in the included studies could not be controlled for completely. As illustrated in table 3, not all studies explicitly excluded participants engaging in weight control behavior or seeking or already undergoing treatment for weight management. In addition, comorbidities like eating disorders or depression were not controlled for in all included papers, making conclusions about potential differences in body dissatisfaction between subsamples with and without comorbid conditions extremely difficult. Taken together with the fact that the majority of studies analyzed a sample that was not representative of the respective population, the current findings should be interpreted with care.

The current review is the first to attempt to quantify differences in body dissatisfaction between individuals with normal weight and obesity. As such, it gives a first estimation as to the magnitude of the problem. Our results underline the severity of body dissatisfaction among individuals with obesity and especially among women.

This is particularly concerning since the prevalence of obesity is increasing worldwide [78] and consequently puts more individuals at risk of suffering its negative physical and psychological consequences. As outlined above, interventions to improve body image are not just beneficial to obesity management but also to psychological well-being in general. Considering that body dissatisfaction and body perception are associated with partly unfavorable obesity-related behaviors, like excessive weight loss attempts and binge eating [79], not just the development of prevention and intervention measures but also their implication in practice is essential. Furthermore, to account for the complexity of the issue in this group,

more research regarding body image in men and particularly in men with obesity is required. Also, in light of its multidimensionality, a closer look at other body image facets like body image perception and their relationship with individual's weight status seems worthwhile. Finally, future research on the topic should also include and analyze individuals of different classes of obesity.

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