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Factors associated with body image dissatisfaction in adults: a cross-sectional analysis of the ELSA-Brasil Study

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Abstract *The aim of this article is to assess the association between body image dissatisfaction and sociodemographic and health behaviors, according to sex. Data were analyzed for 6,289 women and 5,188 men (35-59 years), participants in the baseline of the Longitudinal Study of Adult Health (ELSA-Brasil), using multinomial regression. The odds of dissatisfaction due to feeling underweight were higher among in women with low schooling and those who only consumed fruit weekly. Moderate physical activity reduced this type of dissatisfaction by 50%. Higher odds of dissatisfaction due to overweight were seen in married women, those who practiced light physical activity, and former smokers. Men with secondary schooling and excessive alcohol consumption showed 50% higher odds of dissatisfaction due to underweight, while light or moderate physical activity increased the odds by 75% and 94%, respectively. Among men, light and moderate physical activity were also associated with increased odds of dissatisfaction due to overweight. These findings corroborate that unhealthy habits and behaviors can influence body image dissatisfaction with different patterns between women and men.*

Keywords *Body image, Risk factors, Distributions by sex*

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Introduction

Body image (BI) refers to individuals' perceptions, thoughts, and feelings towards their own body's appearance[1,2]. BI is influenced by many factors such as the media, mood, emotions, self-esteem, and influences from the sociocultural environmental in the person's life [3,4]. Body image is also imbued with historical conceptions concerning beauty standards, acquired experiences, lifetime physical characteristics, and personality[4,5]. Body image can vary throughout life, shaping and influencing individuals' actions according to what they consider "normal" and acceptable based on their social milieu[1].

Adulthood involves changes that affect the way individuals relate to their bodies. Such changes are both physiological and social. Physiological changes are associated with the natural maturation process. Social changes involve aspects in one's living standards and workplace characteristics, among others[6, 7].

Body image satisfaction can be assessed by a broad gradient ranging from positive perceptions and satisfaction and acceptance of one's body shape to negative feelings that generate distress towards one's physical appearance[8]. Most studies have focused on the effects related to dissatisfaction and negative experiences with body image[3-5,8]. Body image dissatisfaction occurs when one's perceived image of the body is inconsistent with the idealized body, potentially generating stress and suffering, influencing mood, health behaviors (especially diet and physical activity), and mental health, negatively affecting quality of life[4,8].

Body image dissatisfaction differs between men and woman, with striking biological differences related to appearance and bodily functions. However, the social environment has a strong impact on one's own body assessment, for example, in the ideal images propagated by the mass media, of the female body associated with slimness and the pumped-up muscular body for men[4]. Studies have shown that dissatisfaction due to the desire to be slimmer than one's real body is more prevalent among women and occurs in women of all ages [4,9]. Among men, research on the effects of dissatisfaction is more recent and has indicated that the most frequent dissatisfaction is wanting a more muscular shape than one's real body [10,11].

Research interest in body image has grown, focusing on its determinants and health consequences[4]. Articles have addressed eating disorders, depression, physical activity, and other issues related to the multidimensional and complex construct of body image dissatisfaction[8,12,13]. In Brazil, although studies in adolescents and university students are still the most prevalent[9,14], more recent publications have addressed the association between body image dissatisfaction and nutritional status, besides health behaviors, especially physical activity in adults[15-19]. As far as we could determine, there have been no nationwide studies in Brazil assessing the prevalence of types of dissatisfaction (due to weight below or above what the individual wants) in men and women and their association with sociodemographic and health behavior characteristics in a comprehensive sample and excluding specific eating disorders.

The current article aims to assess the prevalence of types of body image dissatisfaction (due to self-perceived underweight or excess weight) and their association with socioeconomic and behavioral factors in men and women 35 to 59 years of age who participated in the Longitudinal Study of Adult Health (ELSA-Brasil).

Methods

We analyzed the baseline data (2008-2010) from the Longitudinal Study of Adult Health (ELSA-Brasil), a cohort of workers consisting of 15,105 active or retired public employees 35 to 74 years of age from six states of Brazil (Bahia, Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo, and Rio Grande do Sul). The assessment included face-to-face interviews and clinical tests and anthropometric measurements. The questionnaire was applied in interview and the tests and measurements followed international guidelines. The quality control measures involved face-to-face meetings and cross-referenced visits. Throughout the study, the questionnaires were reviewed by the supervisors to guarantee the data quality and check for the presence of blank items or inconsistent data. Further details on the ELSA-Brasil Study have been published elsewhere[20]. The current study included the data from cohort participants 35 to 59 years of age (N=11,842), 97% of whom (11,477) presented all the target data (6,289 women and 5,188 men).

The dependent variable "body image" was obtained from the figure rating scale developed and validated by Kakeshita et al.[21] and consisting of 15 figures for each sex. The figures are presented from the slimmest to the most obese, and af-

ter showing all of the figures, the subject is asked to choose two: the one that best represents their current body and another that best represents the body they would like to have. Assessment of the scale's reliability was high, with most of the intraclass correlation coefficients exceeding 0.90[22].

Body image dissatisfaction was classified by a score, calculated by subtracting the number corresponding to the figure that best represents the "current body" selected by the participant from the number of the figure representing the body they "would like to have" varying from minus 14 to plus 14. The outcome was classified by adapting to the Kakeshita scale[21] the categorization used in the literature with the Stunkard scale [15,23,24], as "satisfied" (score of zero, that is, the participant chose the same figure for both their perceived body and their ideal body); "dissatisfied with body image due to underweight (UW)" (a negative score, where the individual chose an ideal figure larger than their current shape), and "dissatisfied with body image due to excess weight (EW)", or positive score, where the individual chose an ideal figure smaller than their current shape.

The covariables were age (continuous), schooling (primary, secondary, and university), per capita income (in tertiles), marital status (single, separated/widow/widower, and married or cohabiting), and physical activity (assessed by blocks of active commuting and leisure-time physical activity from the International Physical Activity Questionnaire - IPAQ, long version)[25]. The following categories were used to classify participants according to the amount of physical activity, which involves the intensity and duration of the physical activities performed[26]: light (individuals that do not exercise and that do not meet the criteria to be included in the other categories); moderate (three or more days a week of high-intensity activity for at least 20 minutes a day or five or more days of moderate-intensity activity and/or walking for 30 minutes a day, or five or more days of any combination of activities in walking, moderate or high-intensity, reaching a minimum of 600 MET-min/week); and heavy (high-intensity activity for three days a week, reaching a minimum of 1,500 MET-min/week, or seven days of any combination of walking, moderate or high-intensity activity, reaching a minimum total physical activity of 3000 MET-min/week). Consumption of fruits and vegetables was measured with two questions: "How often do you usually eat fruits?" and "How often do you usually eat raw, cooked, or sautéed vegetables, not including potato, manioc/cassava, and yams?" The eight possible answers were grouped as follows: high consumption (twice or more a day), daily consumption (once a day or five to six times a week), weekly consumption (two to four times a week), and rare consumption (once a week or less)[27]. Smoking was categorized as non-smoker, former smoker, and current smoker, and alcohol consumption was categorized as no current alcohol consumption, moderate consumption (<140 grams of alcohol per week for women and <210 grams for men), and excessive consumption (≥ 140 grams for women and ≥ 210 grams for men)[28].

Weight and height measurements were used to calculate body mass index (BMI) to describe the study population, considering the categories for classification of nutritional status of the World Health Organization (WHO)[29], which uses the following cutoff points: underweight, BMI <18.5 (kg/m²); normal, BMI from 18.5 (kg/m²) to 24.9 (kg/m²); overweight, BMI from 25 (kg/m²) to 29.9 (kg/m²); and obese, BMI ≥ 30 (kg/m²).

In the statistical analysis, we calculated the absolute and relative frequencies for the descriptive analysis (e.g., BMI). Modeling used the multinomial model that was estimated in the simple and multivariate analyses, adjusted to estimate the odds ratios (OR) with 95% confidence intervals. Separate analyses were performed by sex, based on the results of the literature pointing to different directions for men and women[4,11,24]. Models were built by introducing the variables that presented p <0.10 in the crude analysis. The first block considered the sociodemographic variables and the second block the behavioral variables. Variable that remained significant in the first and second blocks were grouped in the final model. We opted not to adjust the model for BMI, since the figure rating scale was developed with this measure[21], which could have resulted in over-adjustment.

Ethical considerations

The Brazilian National Commission for Research Ethics and the Institutional Review Boards of all the participating institutions approved the study (University of São Paulo, Federal University of Minas Gerais, Oswaldo Cruz Foundation, Federal University of Espírito Santo, Federal University of Bahia, and Federal University of Rio Grande do Sul).

Results

Mean age was similar between men (48,6) and women (48,4). Compared to men, women were more likely to report dissatisfaction due to excess weight (EW) and less due to underweight (UW), although overweight was more frequent in men. Women had higher mean schooling and income, in addition to higher proportions of single or separated/widowed individuals, slightly lower rates of heavy and moderate physical activity, lower consumption of alcoholic beverages, and lower history of current or past smoking. Women also consumed more fruits and vegetables when compared to men (Table 1).

According to the crude analyses, for women, primary schooling, weekly fruit consumption, rare consumption of vegetables, and current smoking showed twofold higher odds of wanting a larger body figure. For women with body image dissatisfaction due to feeling overweight, those who were separated/widowed, reported light physical activity, and former smokers showed about 1,5 times higher odds of such dissatisfaction (Table 2).

For men, the odds of body image dissatisfaction due to feeling underweight were 1,5 higher for those with secondary schooling, low per capita income, and excessive alcohol consumption and 1,8 higher for light to moderate physical activity. Factors that increased the odds of dissatisfaction due to excess weight were light to moderate physical activity, weekly consumption of fruits and vegetable, excessive alcohol consumption, and former smoking. Meanwhile, low schooling and income and current smoking decreased the odds of men feeling overweight (Table3).

In the final model (Table 4), women with low schooling and with only weekly consumption of fruits showed approximately twofold higher odds of dissatisfaction due to feeling underweight, while moderate physical activity reduced the odds of this type of dissatisfaction by about 50%. For men, the factors that increased the odds of dissatisfaction due to feeling underweight by about 50% were secondary schooling and excessive alcohol consumption, while light or moderate physical activity increased these odds by 75% and 94%, respectively.

As shown in Table 5, married women, those reporting light physical activity, and former smokers showed about 50% higher odds of body image dissatisfaction due to feeling overweight. In men, both light and moderate physical activity were associated with increased odds of dissatis-

Table 1. Proportional distribution of sociodemographic variables, habits, and behaviors according to sex. ELSA-Brasil Study, 2008-2010.

Variables	Women		Men	
	n	%	n	%
Population	6,89	54,8	5,188	45,2
Body image*				
Satisfied	656	10,4	977	18,8
Dissatisfied, UW	275	4,4	589	11,4
Dissatisfied, EW	5,358	85,2	3622	69,8
BMI*				
Normal weight	2,496	39,7	1715	33,1
Underweight	61	1,0	55	1,1
Overweight	2,217	35,3	2,321	44,7
Obese	1,515	24,1	1,097	21,1
Schooling*				
University	3,485	55,4	2,500	48,2
Secondary	2,381	37,9	1,918	37,0
Primary	423	6,7	770	14,8
Per capita income *				
High	2,027	32,2	1,556	30,0
Middle	2,226	35,4	1,623	31,3
Low	2,036	32,4	2,009	38,7
Marital status*				
Single	890	14,2	284	5,5
Separated/Widowed	1,887	30,0	692	13,3
Married	3,512	55,8	4,212	81,2
Physical activity*				
Heavy	472	7,5	598	11,5
Moderate	732	11,6	709	13,7
Light	5085	80,9	3881	74,8
Consumption of fruits*				
High	1,589	25,3	731	14,1
Daily	2,841	45,2	1,998	38,5
Weekly	1,222	19,4	1447	27,9
Rare	637	10,1	1012	19,5
Consumption of vegetables*				
High	1,038	16,5	628	12,1
Daily	3,183	50,6	2,208	42,6
Weekly	1,344	21,4	1,392	26,8
Rare	724	11,5	960	18,5
Alcohol consumption *				
None	3,722	59,2	1,853	35,7
Moderate	2,340	37,2	2,699	52,0
Excessive	227	3,6	636	12,3
Smoking*				
Never smoked	3,893	61,9	2,769	53,4
Former smoker	1,567	24,9	1,638	31,6
Current smoker	829	13,2	781	15,1

*p-value <0.000000000; UW – underweight; EW - excess weight.

Source: The authors.

Table 2. Crude association between sociodemographic and behavioral variables and body image in women. ELSA-Brasil Study 2008-2010.

Women	Satisfied		BI dissatisfaction, UW			BI dissatisfaction, EW		
Variables	n	%	n	%	Crude OR (95%CI)	n	%	Crude OR (95%CI)
Schooling								
University	386	11,1	136	3,9	1	2.963	85,0	1
Secondary	230	9,7	108	4,5	1,33(0,99-1,8)	2.043	85,8	1,16(0,97-1,38)
Primary	40	9,5	31	7,3	2,2(1,32-3,66)**	352	83,2	1,15(0,81-1,62)
Per capita income								
High	225	11,1	84	4,1	1	1.718	84,8	1
Middle	241	10,8	90	4,0	1,0 (0,71-1,42)	1.895	85,1	1,03(0,85-1,25)
Low	190	9,3	101	5,0	1,42(1,0-2,02)	1.745	85,7	1,2(0,98-1,48)
Marital status								
Single	121	13,6	49	5,5	1	720	80,9	1
Separated/ Widowed	199	10,5	90	4,8	1,12(0,74-1,69)	1.598	84,7	1,35(1,06-1,72)*
Married	336	9,6	136	3,9	1,0 (0,68-1,47)	3.040	86,6	1,52(1,22-1,9)***
Physical activity								
Heavy	64	13,6	22	4,7	1	386	81,8	1
Moderate	01/10/21	15,0	19	2,6	0,5(0,25-1,0)	603	82,4	0,91(0,65-1,27)
Light	482	9,5	234	4,6	1,41(0,85-2,35)	4.369	85,9	1,5(1,14-1,99)**
Consumption of fruits								
High	156	9,8	47	3,0	1	1.386	87,2	1
Daily	311	10,9	120	4,2	1,28(0,87-1,89)	2.410	84,8	0,87(0,71-1,07)
Weekly	112	9,2	73	6,0	2,16(1,39-3,36)***	1.037	84,9	1,04(0,81-1,35)
Rare	77	12,1	35	5,5	1,51(0,9-2,53)	525	82,4	0,77(0,57-1,03)
Consumption of vegetables								
High	106	10,2	37	3,6	1	895	86,2	1
Daily	348	10,9	121	3,8	1,0 (0,65-1,53)	2.714	85,3	0,92(0,73-1,16)
Weekly	131	9,7	72	5,4	1,57(0,98-2,52)	1.141	84,9	1,03(0,79-1,35)
Rare	71	9,8	45	6,2	1,82(1,07-3,08)*	608	84,0	1,01(0,74-1,39)
Alcohol Consumption								
None	385	10,3	171	4,6	1	3.166	85,1	1
Moderate	251	10,7	98	4,2	0,88(0,65-1,18)	1.991	85,1	0,96(0,81-1,14)
Excessive	20	8,8	6	2,6	0,68(0,27-1,71)	201	88,5	1,22(0,76-1,96)
Smoking								
Never smoked	437	11,2	169	4,3	1	3.287	84,4	1
Former smoker	120	7,7	44	2,8	0,95(0,64-1,4)	1.403	89,5	1,55(1,26-1,92)***
Current smoker	99	11,9	62	7,5	1,62(1,13-2,33)**	668	80,6	0,9(0,71-1,13)

***p-value < 0.001; "**"p-value < 0.01; "*"p-value < 0.05. UW – underweight; EW - excess weight

Source: The authors.

faction. Smoking was also an important factor in men, who showed higher odds of dissatisfaction in former smokers and lower odds in current smokers. The odds of dissatisfaction were also approximately 90% higher in relation to excessive alcohol consumption.

Discussion

Prevalence of body image dissatisfaction was high and differed according to sex and type of dissatisfaction. Dissatisfaction due to perceived excess weight was higher in women and dissat-

Table 3. Crude association between sociodemographic and behavioral variables and body image in men. ELSA-Brasil Study, 2008-2010.

Men	Satisfeitos		Dissatisfied with BI, UW			Dissatisfied with BI, EW		
Variables	n	%	n	%	Crude OR (95%CI)	n	%	Crude OR (95%CI)
Schooling								
University	439	17,6	222	8,9	1	1.839	73,6	1
Secondary	342	17,8	263	13,7	1,52(1,21-1,91)***	1.313	68,5	0,92(0,78-1,07)
Primary	196	25,5	104	13,5	1,05(0,79-1,4)	470	61,0	0,57(0,47-0,7)***
Per capita income								
High	280	18,0	137	8,8	1	1.139	73,2	1
Middle	291	17,9	170	10,5	1,19(0,9-1,58)	1.162	71,6	0,98(0,82-1,18)
Low	406	20,2	282	14,0	1,42(1,1-1,83)**	1.321	65,8	0,8(0,67-0,95)*
Marital status								
Single	52	18,3	43	15,1	1	189	66,5	1
Separated/Widowed	134	19,4	98	14,2	0,88(0,55-1,43)	460	66,5	0,94(0,66-1,36)
Married	791	18,8	448	10,6	0,68(0,45-1,04)	2.973	70,6	1,03(0,75-1,42)
Physical activity								
Heavy	164	27,4	60	10,0	1	374	62,5	1
Moderate	142	20,0	95	13,4	1,83(1,23-2,71)**	472	66,6	1,46(1,12-1,89)**
Light	671	17,3	434	11,2	1,77(1,28-2,43)***	2.776	71,5	1,81(1,48-2,22)***
Consumption of fruits								
High	159	21,8	75	10,3	1	497	68,0	1
Daily	370	18,5	220	11,0	1,26(0,91-1,74)	1.408	70,5	1,22(0,98-1,51)
Weekly	251	17,3	165	11,4	1,39(0,99-1,95)	1.031	71,3	1,31(1,05-1,65)*
Rare	197	19,5	129	12,7	1,39(0,98-1,98)	686	67,8	1,11(0,88-1,41)
Consumption of vegetables								
High	136	21,7	71	11,3	1	421	67,0	1
Daily	415	18,8	221	10,0	1,02(0,73-1,42)	1.572	71,2	1,22(0,98-1,53)
Weekly	242	17,4	169	12,1	1,34(0,94-1,89)	981	70,5	1,31(1,03-1,66)*
Rare	184	19,2	128	13,3	1,33(0,92-1,92)	648	67,5	1,14(0,88-1,47)
Alcohol consumption								
None	382	20,6	227	12,3	1	1.244	67,1	1
Moderate	511	18,9	283	10,5	0,93(0,75-1,16)	1.905	70,6	1,14(0,98-1,33)
Excessive	84	13,2	79	12,4	1,58(1,12-2,24)**	473	74,4	1,73(1,33-2,24)***
Smoking								
Never smoked	527	19,0	322	11,6	1	1.920	69,3	1
Former smoker	268	16,4	128	7,8	0,78(0,61-1,01)	1.242	75,8	1,27(1,08-1,5)**
Current smoker	182	23,3	139	17,8	1,25(0,96-1,62)	460	58,9	0,69(0,57-0,84)***

***p-value < 0.001; "**"p-value < 0.01; "*"p-value < 0.05. UW – underweight; EW - excess weight.

Source: The authors.

isfaction due to perceived underweight was more common in men. In three previous studies in Brazil[15,24,30], prevalence rates of dissatisfaction due to feeling overweight were lower than this in women, around 65%. The findings were more divergent in men, with prevalence rates ranging from 26% to 46%. The difference in prevalence rates may have been due to the use of different instruments to assess body image and the age difference, since the target age bracket was larger (35 and 59 years) and the mean age was 48 years. Increasing age is known to be associated with increasing BMI[31], which may explain the higher prevalence rates. Meanwhile, according to some studies[32,33], as individuals grow older, their ideal youthful body shape decreases and they adjust their expectations of achieving this model figure. However, since our study population had

Table 4. Factors associated with body image dissatisfaction due to underweight, according to sex. ELSA-Brasil, 2008-2010.

Variables	Body image dissatisfaction due to underweight					
	Women			Men		
	Block 1 OR (95%CI)	Block 2 OR (95%CI)	Final model OR (95%CI)	Block 1 OR (95%CI)	Block 2 OR (95%CI)	Final model OR (95%CI)
Age	0,99(0,96-1,01)	1(0,98-1,02)	0,99(0,97-1,02)	0,97(0,91-1,03)	0,97(0,96-0,99)**	0,97(0,96-0,99)**
Schooling						
University	1	-	1	1	-	1
Secondary	1,3(0,92-1,83)	-	1,22(0,9-1,66)	1,37(1,04-1,81)*	-	**1,45(1,15-1,83)****
Primary	2,18(1,23-3,87)**	-	**2,04(1,2-3,46)****	1,0(0,7-1,42)	-	1,06(0,78-1,44)
Per capita income						
High	1	-	-	1	-	-
Middle	0,89(0,62-1,29)	-	-	1,1(0,82-1,48)	-	-
Low	1,09(0,72-1,65)	-	-	1,25(0,9-1,73)	-	-
Marital status						
Single	1	-	1		-	-
Separated/Widowed	1,06(0,69-1,61)	-	1,04(0,68-1,58)		-	-
Married	0,95(0,64-1,41)	-	0,95(0,64-1,41)		-	-
Physical activity						
Heavy	-	1	1		1	1
Moderate	-	0,51(0,26-1,01)	0,49(0,24-0,97)*		1,97(1,32-2,92)***	**1,94(1,31-2,89)****
Light	-	1,27(0,76-2,13)	1,2(0,72-2,03)		1,77(1,28-2,45)***	**1,75(1,26-2,42)*****
Consumption of fruits						
High	-	1	1		1	
Daily	-	1,18(0,79-1,77)	1,18(0,8-1,74)		1,17(0,84-1,64)	-
Weekly	-	1,67(1,04-2,7)*	**1,86(1,19-2,92)****		1,11(0,77-1,59)	-
Rare	-	1,04(0,59-1,83)	1,17(0,69-1,99)		1,02(0,69-1,51)	-
Consumption of vegetables						
High	-	1	-		1	
Daily	-	0,89(0,57-1,38)	-		0,97(0,69-1,37)	-
Weekly	-	1,22(0,74-2,02)	-		1,28(0,89-1,85)	-
Rare	-	1,45(0,82-2,56)	-		1,26(0,85-1,86)	-

it continues

Table 4. Factors associated with body image dissatisfaction due to underweight, according to sex. ELSA-Brasil, 2008-2010.

Variables	Body image dissatisfaction due to underweight					
	Women			Men		
	Block 1 OR (95%CI)	Block 2 OR (95%CI)	Final model OR (95%CI)	Block 1 OR (95%CI)	Block 2 OR (95%CI)	Final model OR (95%CI)
Alcohol consumption						
None	-	-	-		1	1
Moderate	-	-	-		0,93(0,75-1,16)	0,95(0,76-1,18)
Excessive	-	-	-		1,55(1,08-2,23)*	1,53(1,07-2,2)*
Smoking						
Never smoked	-	1	1		1	1
Former smoker	-	1,0(0,67-1,49)	0,96(0,65-1,43)		0,81(0,63-1,06)	0,79(0,6-1,02)
Current smoker	-	1,52(1,04-2,21)	1,4(0,96-2,05)		1,18(0,9-1,56)	1,14(0,86-1,51)

***p-value < 0.001; "**" p-value < 0.01; "*" p-value < 0.05. UW – underweight; EW - excess weight.
Source: The authors.

high average schooling and were still active in the work market, this desire to achieve less bulky bodies may still have been present.

The association with schooling was observed for both types of body image dissatisfaction, although with opposite trends. Higher odds of body image dissatisfaction due to feeling underweight were associated with low schooling, while higher odds of body image dissatisfaction due to excess weight were seen with higher schooling. Studies of women in Brazil and elsewhere also showed higher prevalence of dissatisfaction due to perceived excess weight among those with higher income[34, 35]. A possible explanation for this result may relate to the definition of the "beautiful body" in different social groups. Qualitative studies in the city of Rio de Janeiro showed that women living in wealthy neighborhoods and favelas had different views of what they considered a "beautiful body"[36].

Among married women, the association with dissatisfaction due to perceived excess weight may be related to interference from the relationship with the spouse in the construction of the woman's own body image, generating expectations from the husband about her body or merely the woman's own feelings about the husband's opinion of her body[2,37]. Other studies[24, 31] have also shown an association between marital status and body image dissatisfaction due to excess weight. However, Tom et al.[38] found that body image dissatisfaction is less important in married couples, and according to Meltzer et al.[39], couples in a stable and lasting relationship tend to reduce their attempts to maintain their weight, since they do not assign as much priority to attracting the spouse. On the other hand, Lundborg et al[40] report that married couples are more concerned about their body shape, since it may affect their spousal relations. The studies indicate that the affective relationship is important, but they do not agree as to its effect on body image dissatisfaction.

The association between physical activity and body image dissatisfaction could be explained by the energy expenditure imbalance that contributes to weight gain and increases the discrepancy between current and ideal body image[41]. An individual's type of physical activity may be associated with the intended ideal body, under the influence of the bodies displayed by the media, namely extremely slim bodies for women and muscular bodies for men[4,10]. Another possible explanation is that greater care and concern for the body could increase the level of physical ac-

Table 5. Factors associated with body image dissatisfaction due to excess weight according to sex. ELSA-Brasil Study, 2008-2010.

Variables	Body image dissatisfaction due to excess weight					
	Women			Men		
	Block 1 OR (95% CI)	Block 2 OR (95% CI)	Final model OR (95% CI)	Block 1 OR (95% CI)	Block 2 OR (95% CI)	Final model OR (95% CI)
Age	1,02 (1,01-1,03)**	1,02(1,0-1,03)	1,02(1,0-1,03)	1,01(1-1,02)	1,0(0,99-1,01)	1,0 (0,99-1,02)
Schooling						
University	1	-	1	1	-	1
Secondary	1,07 (0,88-1,3)	-	1,09(0,92-1,31)	0,93(0,77-1,12)	-	0,87(0,74-1,03)
Primary	0,94 (0,65-1,37)	-	1,0(0,7-1,43)	0,57(0,45-0,72)***	-	0,53(0,43-0,65)***
Per capita income						
High	1	-	-	1	-	-
Middle	1,0 (0,82-1,23)	-	-	1,05(0,87-1,28)	-	-
Low	1,16 (0,91-1,48)	-	-	0,98(0,78-1,22)	-	-
Marital status						
Single	1	-	1		-	-
Separated/Widowed	1,28(1,0-1,64)	-	1,28(1,0-1,64)		-	-
Married	1,51(1,21-1,89)***	-	1,49(1,19-1,87)***		-	-
Physical activity						
Heavy		1	1		1	1
Moderate		0,9(0,64-1,25)	0,87(0,62-1,23)		1,44(1,1-1,87)**	1,45(1,11-1,9)**
Light		1,56(1,18-2,08)**	1,52(1,14-2,03)**		1,86(1,51-2,3)***	1,99(1,62-2,45)***
Consumption of fruits						
High		1	1		1	
Daily		0,85(0,69-1,06)	0,84(0,69-1,04)		1,12(0,89-1,4)	-
Weekly		0,99(0,75-1,31)	1,01(0,78-1,32)		1,16(0,91-1,48)	-
Rare		0,72(0,52-0,98)*	0,74(0,55-1,0)		1,01(0,78-1,32)	-
Consumption of vegetables						
High		1	-		1	-
Daily		0,94(0,74-1,2)	-		1,15(091-1,45)	-
Weekly		1,04(0,77-1,39)	-		1,22(0,94-1,57)	-
Rare		1,08(0,77-1,52)	-		1,1(0,84-1,45)	-
Alcohol Consumption						
None		-	-		1	1
Moderate		-	-		1,19(1,02-1,39)*	1,12(0,96-1,31)
Excessive		-	-		1,93(1,47-2,52)***	1,89(1,44-2,47)***
Smoking						
Never smoked		1	1		1	1
Former smoker		1,53(1,23-1,9)***	1,51(1,22-1,88)***		1,2(1,01-1,42)*	1,26(1,06-1,5)**
Current smoker		0,86(0,68-1,1)	0,86(0,67-1,09)		0,59(0,48-0,72)***	0,64(0,52-0,79)***

***p-value < 0.001; "**" p-value < 0.01; "*" p-value < 0.05. UW – underweight; EW - excess weight.

Source: Elaborated by authors.

tivity, and in turn, a cycle of ceaseless pursuit of the "perfect" body could increase body image dissatisfaction. However, there is apparently no consensus on this point in the literature[42].

The intensity of physical activity can impact its association with body image in men. Two meta-analyses found that vigorous physical activity had a heavier impact than light activity[43,44]. However, a recent meta-analysis by Bassett-Gunter et al.[13] suggested that low to moderate physical activity was positively associated with body image in men and found no association with vig-

orous activity. Thus, there is no consensus that heavy physical activity is the best path to achieve a larger body or to reach one's goal of decreasing the amount of body fat[13]. This relationship may explain the association between moderate and light physical activity and increased odds of body image dissatisfaction due to underweight and to excess weight. However, one should consider the limitations of the instrument used to quantify physical activity, which refers to the intensity and duration of weekly leisure-time physical activity and commuting but does quantify how long the individual practices that type of physical activity, which bears a direct relationship to the body changes that physical activity can cause[16].

Santos Silva et al.[24] did not find a statistically significant association between body image dissatisfaction and physical activity in women; in men, the association was only important for those who were dissatisfied with their body image due to excess weight. However, the study did not differentiate the type of physical activity, classifying the individuals dichotomously according to leisure-time physical activity. Nikniaz et al.[34] found that women who overestimated their body size were more likely to participate in physical activity programs. This may be due to the fact that body image dissatisfaction makes them more prone to their pursuit of the ideal body.

Fruits and vegetables are important components of a healthy diet, because they are foods with low energy density in relation to their volume and favor maintenance of healthy body weight[45]. The current study showed higher odds of body image dissatisfaction from underweight associated with lower weekly consumption of fruits in women, which could be related to lower calorie intake and lead to underweight and the observed dissatisfaction. Another possibility would be an association with eating disorder. However, in the ELSA-Brasil population, the prevalence of this disorder is only around 6%[46], while other Brazilian studies have pointed to 15 to 22%[47] in patients seeking weight loss treatment. In addition, Lucan[48] notes that the benefit of eating fruits and vegetables is due to the substitution of unhealthy foods. However, this effect is due not only to fruits and vegetables alone, but also to the consumption of other healthy foods such as whole products.

Excessive alcohol consumption by men was associated with body image dissatisfaction due both to underweight and to excess weight. This may be related to the type of alcoholic beverage. Beverages with high alcohol content such as cachaça, whiskey, and liqueurs may be associated with underweight if these beverages are consumed in the place of foods. On the other hand, the consumption of beverages with lower alcohol content such as beer may be associated with higher calorie intake due to the beer itself and the foods that tend to go with it[49, 50]. A sensitivity analysis was performed with the type of alcoholic beverage consumed as the variable. Individuals that were dissatisfied because they felt underweight showed three times higher odds of excessive consumption of distilled alcoholic beverages and non-significant results for the consumption of wine and bottled or draft beer. As for dissatisfaction due to excess weight, the odds were 1.49 for the excessive consumption of bottled or draft beer (data not shown).

Former smokers, both men and women, showed higher odds of body image dissatisfaction due to excess weight. A study that assessed body image without specifying the direction of dissatisfaction found an association between smoking and body image dissatisfaction in university students of both sexes in the United States[51]. Similar to the current study's results, students that smoked were more dissatisfied with their body image when compared to non-smokers.

Some limitations should be addressed. We only found a few studies that used the 15- figure Kakeshita scale in the adult population, and in the age bracket explored here, probably since the scale was developed recently. Most of the studies cited in this discussion used the Stunkard scale, which uses fewer figures, only nine of which were not based on BMI, which may limit comparison of the results. The way the results were categorized from the figure rating scales presented in the literature, among individuals dissatisfied with their body image, are aggregated in the same group, independently of the degree of dissatisfaction. That is, the difference could have been only one figure or a difference of up to 14 figures in the scale used in our study. This classification may limit the results, decreasing the strength of association between body image dissatisfaction and the various factors. Importantly, the results come from cross-sectional data, so it is only possible to establish statistical associations between the outcome and the exposure variables, and not to establish a causal relationship to explain these associations. The data are also somewhat dated, since the analyses refer to data collected at the cohort baseline (2008-2010).

Despite the above-mentioned limitations, the scales have proven to be important tools for

assessing body image perception and the degree of satisfaction[52]. This method has also been identified as a diagnostic tool that allows identifying individuals and/or groups at risk of developing eating disorders, or attitudes and behaviors that can have negative health effects[53]. Since this study involves a large number of study variables, an important point was the quality control conducted before and during the data collection. This is a strength of the ELSA-Brasil Study, which included various prior procedures (training and standardization of the team of examiners and supervisors, pretest of the instruments, and the instructions manual, among others), and throughout the study, guaranteeing the data's reliability and validity. Another strength was the small number of variables that showed missing data and the strategies used to guarantee adherence to the study.

Conclusion

In short, the results showed important differences according to sex. In women, low schooling and weekly consumption of fruits increased the odds of dissatisfaction from underweight, while moderate physical activity decreased the odds. Dissatisfaction due to feeling overweight was seen in couples, individuals with light physical activity, and former smokers. Factors associated with dissatisfaction due to perceived underweight were secondary schooling, excessive alcohol consumption, and light or moderate physical activity. Meanwhile, light and moderate physical activity were also associated with increased odds of dissatisfaction due to excess weight. These findings corroborate that unhealthy habits and behaviors can influence body image dissatisfaction. Thus, measures to change potentially modifiable factors, with campaigns reinforcing the importance of healthy behaviors, can help improve the perception of a healthy body, decreasing the individuals' dissatisfaction with their own bodies.

Collaborations

LS Albuquerque participated in the conceptualization, formal analysis, writing, review and editing. MJM Fonseca participated in the conceptualization, formal analysis, methodology, writing, review and editing. RH Griep participated in the methodology, writing, review and editing. EML Aquino, LO Cardoso e D Chor participated in the review and editing. All authors have read and agreed to the published version of the manuscript.

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