

Body image, eating attitudes, depressive symptoms, self-esteem and anxiety in pregnant women of Juiz de Fora, Minas Gerais, Brazil

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Abstract *The experiences of change that pregnant women live through can have a negative effect on their bodily attitudes and the associated variables. This study aimed to establish the influence on pregnant women's body image of their eating attitudes, depressive symptoms, self-esteem, anxiety and body mass index. This is a quantitative, cross-sectional study, of 386 pregnant women of a range of child-bearing age – from 18 to 46 (mean 29.32 ± 6.04) – of the city of Juiz de Fora, in the state of Minas Gerais, Brazil. Instruments were applied to evaluate body attitudes, food attitudes, depressive symptoms, self-esteem and anxiety. Anthropometric and obstetric data were collected. Descriptive, comparative and correlational statistical analyses were made. The findings indicated significant correlations between body attitudes and: inadequate eating attitudes ($r = 0.478$), depressive symptoms ($r = 0.387$), low self-esteem ($r = 0.431$) and high BMI ($r = 0.339$). In addition, these variables together exerted an influence measured as 41.4% on the negative body image of the pregnant women. Thus, it is recommended that pregnant women should be assessed nutritionally and psychologically and given orientation in these aspects, in order to detect and prevent psychopathology, with a view to optimal maternal and child health.*

Key words *Pregnancy, Depression, Food behavior, Nutritional state, Adult*

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Introduction

Pregnancy is a period in which a woman experiences profound physical, physiological and social changes¹⁻³. With the arrival of the child, the mother-to-be goes through a readjustment of her life conditions, with the transition in her social role: as well as being a daughter, the woman is now to be a mother^{4,5}. In this phase of life the pregnant woman can go through emotional instability, fear and anxiety^{2,5-7}.

Among the physical changes during pregnancy: nails and hair grow faster; the body is hotter, and can produce more sweat; stretch marks can appear; cellulitis and varicose veins can get worse; and skin pigmentation can also change⁸. Added to this, the pregnant woman experiences substantial alterations in the form and weight of her body over a short period of time^{2,9}. The recommended weight gain, for example, can vary between 7 and 18 kg, depending on with the woman's initial nutritional state⁸. Although these changes are a natural part of pregnancy, when women find themselves pregnant they experience conflicts with their values and concepts of beauty and sensuality¹⁰, which can affect their attitudes in relation to their own bodies.

The body image of pregnant women has attracted the attention of today's researchers, especially internationally¹¹⁻¹⁵. Authors have agreed to define this construct as the mental representation of the body^{16,17}. The attitude dimension is part of the bodily image and is related to behaviors, thoughts and feelings in relation to physical appearance^{16,18}.

In previous studies significant associations were identified between the negative body image in pregnant women and certain characteristics, including: high body mass index (BMI)¹⁹; inappropriate food attitudes^{20,21}; depressive symptoms^{14,22}; low self-esteem^{10,23}; and high levels of anxiety²⁴. Such associations are worrying because they can have negative consequences for health, both for the mother and for the fetus¹⁵, such as: low birth weight; delayed infantile development; premature birth; and in some cases, abortion²⁵.

Kamysheva *et al.*²³, based on the theory of Thompson *et al.*²⁶, developed a theoretical model that considered various factors related to the body during pregnancy. The authors concluded that depression, self-esteem and BMI can set off negative body attitudes in pregnant women. And anxiety, due to creating sensations of nervousness, concern and apprehension²⁷, can be the source of negative stimuli for pregnant women's body image.

A recent review study, by Meireles *et al.*²⁸, identified only one investigation that assessed the body image in samples of Brazilian pregnant women. Further, Meireles *et al.*²⁹ assessed elements of the attitudinal dimension of the body image of pregnant women and took into consideration various anthropometric, obstetric, social-demographic and economic variables. The authors identified that BMI was the most important predictor for a negative body image in their sample and further indicated the need for studies to verify the influence of other factors on body image, such as psychological factors.

The main objective of the present study, thus, was to verify the influence of food attitudes, depressive symptoms, self-esteem, anxiety and BMI on pregnant women's body image. Further, as a secondary objective, the study sought to analyze the prevalences of inappropriate food attitudes and depressive symptoms.

Methods

Design of the study

This investigation presents a cross-sectional delineation and was carried out in the municipality of Juiz de Fora, in the state of Minas Gerais, Brazil. Data was collected in October, November and December 2014.

Sample

The study population comprised pregnant women who were receiving pre-natal attention with obstetricians serving in the private and public sectors of the city of Juiz de Fora, Minas Gerais. Ten doctors were contacted, based on convenience, and after explanation of the objectives and methods of the survey, all agreed to the survey being carried out. The resulting data were collected in three private consulting rooms or clinics, and four public institutions (Primary Healthcare Units or hospitals), of various districts of the city.

To estimate the number of pregnant women in the municipality, the recommendation of the Brazilian Health Ministry was used, which indicates that it is necessary to add 10% to the number of live births of the previous year³⁰. In 2013 it was estimated that 6,454 children were born alive in Juiz de Fora, and that the percentage of pregnant adolescents was 16.2% (figures supplied by the Health Department of the municipal

Prefecture). This being so, based on the proposed calculation³⁰, and subtracting the percentage of adolescent pregnancies, in 2004 the number of adult pregnant women in Juiz de Fora would be 5,849. For the sample calculation, as well as using this number, a prevalence of 50% of bodily dissatisfaction was used²⁷, with confidence interval of 95% and 5% sampling error. The result was an ideal minimum sample of 361 adult pregnant women.

To reach this number, the doctors stated the best days and times for collection of data at each location, in accordance with each doctor's attendance agenda. On these days, the researchers attended the locations and, for convenience, invited those pregnant women who were waiting to be seen to participate in the survey. After explanation of the study and acceptance to participate through signature of an Informed Consent Form, the patients received the questionnaires and answered individually in the waiting room itself, or in a room neighboring the consulting room made available by the doctor. We note that the participants received the same verbal orientation and any questions were answered. No limit period of time was set for filling in of the questionnaires.

The criteria for inclusion adopted were: pregnant women, in the full range of childbearing age, who agreed voluntarily to participate in the survey and signed the informed consent form. Women who gave incomplete data were excluded.

This study was approved by the Human Research Ethics Committee of the Federal University of Juiz de Fora (UFJF).

Instruments

The *Body Attitudes Questionnaire* (BAQ), validated for the adult Brazilian female population by Scagliusi et al.³¹, was used to assess some aspects of the pregnant women's bodily attitudes. This self-reporting questionnaire comprises 44 items on a Likert-type scale with five reply options ("I totally agree" to "I totally disagree"). For the calculation of the total BAQ score the markings under each one of these items are added. This number can vary from 44 to 220 points. Higher score indicates greater feelings about: physical attraction, self-depreciation, total fat, body saliencies, perception of fat on the lower part of the body, and strength.

To assess inappropriate food attitude, the *Eating Attitudes Test – 26* (EAT-26) was used – validated for Brazilian adults by Nunes et al.³².

The questionnaire comprises 26 questions each with six response options, varying from zero (infrequently, almost never, and never) to three (always). The EAT-26 score is the sum of its items, and can vary from zero to 78. A score of 21 or over indicates possible inappropriate food attitudes.

To investigate the presence of depressive symptoms the *Beck Depression Inventory* (BDI), was used, validated in Brazil by Gorenstein and Andrade³³. The instrument comprises 21 items with four response options (0, 1, 2, 3) and the total score is obtained by counting of each item corresponding to the alternatives indicated by the subjects, varying from zero to 63 points. Since this sample does not have a characteristic of 'diagnosed', scores above 15 were used to detect dysphoria (sudden and transitory change in mood), and the term 'depression' was used for subjects with score above 20, as recommended by Kendall et al.³⁴.

The variable *self-esteem* was evaluated using the *Rosenberg Self-esteem Scale* (RSS)³⁵. This comprises 10 items, with four Likert-type options for response (a = I strongly agree, b = I agree, c = I disagree, d = I strongly disagree). The answers can vary from zero to three and the final score from zero to 30 points. The higher the score, the higher the subject's level of self-esteem.

For analysis of the subjects' level of anxiety the short version of the *Brazilian State-Trait Anxiety Inventory* (STAI)³⁶ was used. This instrument evaluates both anxiety in terms of state (how the subject feels at that moment) and in terms of trait (how the subject feels usually). The questionnaire has a total of 12 affirmations on a Likert-type scale, with response options from one to four. The final score is obtained from the sum of the items, and can vary from 12 to 48. A low score indicates a low level of anxiety, and a high score indicates a high level of anxiety.

Through the medical records of the subjects, anthropometric data (data on body mass and height) were obtained, for calculation of BMI – the result of dividing body mass in kilograms by height in meters squared (kg/m^2)⁸. This information was collected by the doctors responsible for the patient in the consulting rooms of the private sector or the public sector of the city of Juiz de Fora, Minas Gerais. Note that at the time of requesting participation in the survey, the weighing machines and height measurement devices employed were checked. All the locations used balances and height measurement devices of the *Filizola* brand, which were duly calibrated.

Analysis of the data

For the statistical analyses, the software *SPSS* was used, and in all cases the level of significance adopted was $p < 0.05$. Mean, standard deviation, median, minimum, maximum, and inter-quartile interval were calculated for each variable of the study. Also, for the category variables, frequently (absolute and relative) was analyzed. For all the instruments used, internal consistency was measured using the Cronbach alpha coefficient. This analysis showed values of 0.84, 0.80, 0.89, 0.85 and 0.75, for BAQ, EAT-26, BDI, RSS and STAI, respectively. All the values were considered to be adequate ($\alpha > 0.70$)³⁷.

This was followed by the Kolmogorov Smirnov normality test³⁸, and inspection of asymmetry and kurtosis of the scores obtained. None of the variables presented values for asymmetry of kurtosis indicating severe violations of normal distribution of the data, which justifies the use of parametric tests. The Pearson correlation was used to verify associations between the parameters evaluated (BAQ, IMC, EAT-26, BDI, RSS and STAI).

Finally, a multiple linear regression was carried out to verify how much the variables of the study influence the subjects' body attitudes. The *forward* technique was chosen to allow insertion of one variable at a time, respecting both the magnitude of the Pearson correlation coefficient from the largest to the lowest value, and also the theoretical models proposed by Thompson et al.²⁶ and Kamysheva et al.²³. The multicollinearity between the variables was tested for the purpose of verifying the influence that one variable could have on the result of the others. Based on this analysis, the values for Variance Inflation Factor

(VIF) did not indicate problems of multicollinearity ($VIF > 5$). Thus, all the variables associated with the body attitudes of the subjects were included in the regression model.

Results

In total 417 pregnant women, who frequented pre-natal consulting rooms in the city of Juiz de Fora, took part in the study. After exclusion of those that had incomplete data ($n = 31$), the result was a final sample of 386 volunteers (average age in complete years 29.32 ± 6.04). Of these, 198 were interviewed in public sector health facilities and 188 in private sector health facilities.

Table 1 gives the descriptive data of each variable of the survey (age, IMC, BAQ, EAT-26, BDI, RSS and STAI).

Table 2 gives the values of the Pearson correlation test. Statistically significant correlations/associations were identified between all the variables of the study, except age. Based on these data, it was found that the correlations between the BAQ (outcome variable) and the other variables of the study were considered positive and of moderate magnitude. No strong correlation was identified between the variables studied and the BAQ. This result highlights that the construct *body image* is complex and multifaceted, and that multiple factors need to be considered for understanding of the body attitudes of the pregnant subjects.

A multiple forward linear regression analysis was then carried out based on the associations shown, with the BAQ used as a criterion variable. These results are in Table 3. The EAT-26 was the

Table 1. Descriptive analysis of the variables *age*, *IMC*, *BAQ*, *EAT-26*, *BDI*, *RSS* and *STAI* in pregnant women of Juiz de Fora, Minas Gerais, Brazil.

	Possible variation	Mean	SD	Median	Minimum	Maximum	Interquartile interval
Age (complete years)	> 18	29.32	6.04	29.50	18	46	25-33
BMI (kg/m ²)	-	27.16	6.75	26.8	18.7	47.70	23.6-30.8
BAQ	44-220	121.39	17.30	120	74	179	108-133
EAT-26	0-78	13.82	9.36	12	0	60	7-19
BDI	0-63	10.46	8.84	8	0	49	4-14
RSS	0-30	5.78	3.89	6	0	16	3-9
STAI	12-48	31.74	5.60	32	21	48	28-36

SD - Standard deviation; BAQ - Body Attitudes Questionnaire; BMI - Body Mass Index; EAT-26 - Eating Attitudes Test-26; BDI - Beck Depression Inventory; RSS - Rosenberg Self-esteem Scale; STAI - Brazilian State-Trait Anxiety Inventory.

Table 2. Correlations between the variables BAQ, IMC, EAT-26, BDI, RSS and STAI in pregnant women of Juiz de Fora, Minas Gerais.

Variables	BAQ	Age	BWI	EAT-26	BDI	RSS	STAI
BAQ	-						
Age	0.050	-					
BMI	0.339*	0.103*	-				
EAT-26	0.478*	0.085	0.135*	-			
BDI	0.387*	-0.015	0.131*	0.258*	-		
RSS	0.431*	-0.100*	0.124*	0.170*	0.550*	-	
STAI	0.331*	-0.177*	0.188*	0.302*	0.494*	0.403*	-

BAQ - Body Attitudes Questionnaire; BMI - Body Mass Index; EAT-26 - Eating Attitudes Test-26; BDI - Beck Depression Inventory; RSS - Rosenberg Self-esteem Scale; STAI - Brazilian State-Trait Anxiety Inventory. * $p < 0.05$

Table 3. Forward linear regression analyses using BAQ scores as criterion variable in pregnant women of Juiz de Fora, Minas Gerais.

	Block	R ²	Adjusted R ²	F	p-value
EAT-26	1	0.228	0.226	113.544	0.0001*
RSS	2	0.354	0.351	105.075	0.0001*
BDI	3	0.364	0.359	72.930	0.0001*
BWI	4	0.420	0.414	69.004	0.0001*

EAT-26 - Eating Attitudes Test-26; RSS - Rosenberg Self-esteem Scale; BDI - Beck Depression Inventory; STAI - Brazilian State-Trait Anxiety Inventory. BMI - Body Mass Index; * $p < 0.05$.

best predictor of variance of the BAQ (22.6%). When the variables RSS, BDI and BMI were added, this prediction rate increased to 41.4%. We note that anxiety did not add explanation power to the model, and for this reason was excluded at the end of the regression.

Finally, prevalences were ascertained for the factors that had identifiable cut-off points in the questionnaires. In relation to the EAT-26 classifications, 20.5% ($n = 79$) of the subjects presented inappropriate food habits. Based on the cutoff point for the BDI, 78.8% ($n = 304$) of the subjects were classified as not having depressive characteristics, 9.1% ($n = 35$) were assessed as presenting dysphoria, and 12.2% ($n = 47$) as presenting depression.

Discussion

The study's main aim was to establish the influence of food attitudes, depressive symptoms, self-esteem, anxiety and BDI on pregnant women's body image self-perception. According to the regression results, the values for EAT-26, RSS,

BDI and BMI exercised an influence factor of 41.4% in prediction of BAQ scores. In the case of STAI, although there was association with BAQ, in the regression model it did not add predictive value. This association is not related to the possible multicollinearity with the other independent variables, but due to the low predictive value of the variable *anxiety* on body attitudes.

These findings corroborate both the theoretical model proposed by Thompson et al.²⁶ for the population in general and also the model developed by Kamysheva et al.²³ for the population of pregnant women, in that both indicate the influence of various factors in the quest for an ideal body. Thompson et al.²⁶ pointed out that socio-cultural factors can exercise influence in the quest for an ideal body, and can be felt in a different manner by different individuals. Thus, it is possible that some develop eating disorders or body image disorders, demonstrating the influence of certain mediation factors. The theoretical model of Kamysheva et al.²³ adds the influence of depression, self-esteem and the BMI on negative body attitudes in pregnant women. On this aspect, it seems that the way in which the pregnant

woman assesses her own value, her emotional state and her appropriateness in terms of body weight influences the way in which she relates to her own body.

The EAT-26 was the best predictor of negative body image, accounting for 22.6% of the variance in body attitudes. Corroborating this result, the relationship between body and food attitudes has already been analyzed in the literature^{3,20,39}. This association is worrisome, since both negative body image and inappropriate food attitudes are symptoms that lead to food disorders²⁷.

Self-esteem added predictive power to the regression model: it and the EAT-26 together accounted for 35.1% of the variance of the BAQ. Studies by Kazmierczak and Goodwin¹⁰ (in Polish women in the seventh to ninth months of pregnancy) and Kamysheva et al.²³ (in Australian women in their fifteenth to twenty-fifth week), proposed theoretical models evaluating both variables. The first found that body image was considered a mediator of self-esteem. The second found influence of low self-esteem on negative bodily attitudes, corroborating this present study. This merits the attention of investigators, since negative assessment of such factors can have consequences such as: premature birth, lower mother-fetus attachment and early termination of breastfeeding⁴⁰⁻⁴⁴.

Added to the food attitudes and self-esteem, depressive symptoms explained 35.9% of the variance of the pregnant women's body attitudes. Depression has been related to body image in surveys with this public^{2,14,22,45}, principally due to the negative impacts that the latter can have on the health of the mother and the baby. In the present study, depression was considered to be one of the predictive factors for negative feelings about the body. However, since this is a cross-sectional study, it is not possible to relate any cause and effect. Thus, it is suggested that these variables should be taken into consideration in future longitudinal studies in Brazil.

Finally, the final model of the regression included BMI, in which all the variables together provided an explanation capability of 41.4%. Studies have been made relating BMI to the body image of pregnant women^{13,22,46-48}. These studies agree that the greater the BMI, the greater the discontentment with the body. We note that in the case of pregnant women, having an appropriate BMI reflects the health not only of the mother but also of the fetus.

As a secondary objective, this study sought to analyze the prevalences of inappropriate food

attitudes, and depressive symptoms. In relation to the prevalence of the EAT-26, the findings indicated that 20.5% of the subjects presented inappropriate food attitudes. Similarly, Soares et al.³⁹ found a prevalence of 17.3% of these conducts among Brazilian pregnant women. At the same time, Lai et al.²⁰ assessed Chinese pregnant women and found that 9.8% of them reported food disorder symptoms. This discrepancy can be justified due to the social context between the west and the east that value different aesthetic patterns³⁹. It is also noted that, while Soares et al.³⁹ and Lai et al.²⁰ used the *Eating Disorder Examination Questionnaire* and the *Eating Disorder Inventory-2*, respectively, this present investigation used the EAT-26. This choice is justified by the fact that this is an instrument much used in Brazilian surveys⁵⁰⁻⁵².

It can also be noted that, in the study of validation of the EAT-26 for the adult population of Brazil, Nunes et al.³² pointed out that it is possible that the aesthetic pattern directed toward slimness in women might contribute to a high score in this instrument. Some items reflect food practices that have become very common in the population in general, helping to achieve an overestimate of the prevalence of food conducts that are harmful to health. The act of 'paying attention to the number of calories of the foods that I eat' and avoiding 'eating foods that contain sugar' are more frequent today than in the period when the instrument was created⁵³. Thus, there is a higher possibility of positive answers and consequently a higher mark on the questionnaire.

Taking into consideration the specificities of the period of pregnancy, in the questions as to whether 'I cut my food into small pieces' and 'I take more time to eat my meals than other people', for example, pregnant women can mark the options 'always', since these behaviors influence their physical wellbeing. Small pieces of food, and meals eaten more slowly, can help avoid nausea and heartburn, and help the process of digestion⁴⁶. Added to this, how the question as to whether 'I vomit after eating' is answered may be considered for the pregnant woman as involving a consequence of the nauseas that are common at this phase, rather than a conscious even indicating less good health. In spite of this, this instrument showed good internal consistency for the sample in question ($\alpha = 0.80$).

In relation to the classification of BDI, 12.2% of the women evaluated presented depressive symptoms. According to a systematic review study by Lima and Tsunehiro⁵⁴, the prevalence

of depression can vary in accordance with the diagnostic method used, and also with which of the three-month periods of pregnancy is the subject of investigation. The authors also highlight that in Brazil this prevalence has varied from 12% to 38%. This present survey evaluated pregnant women from all the periods of pregnancy and they were within the lower limit of the variance indicated by Lima and Tsunehiro⁵⁴. We underline the recommendation that longitudinal studies should be carried out, to assess levels of depression in the different three-monthly periods of a pregnancy.

As is the case with the EAT-26, the BDI has some questions that can overestimate the depressive level of the pregnant woman. An example is item 10, which tries to portray the act of crying. Due to the natural emotional and hormonal changes of pregnancy⁵⁴, a pregnant woman may feel moved and cry more than a woman who is not pregnant. Thus this fact may possibly not be related directly to the depressive state. However, in the present survey, only 12.2% of the pregnant women evaluated were classified as having depressive symptoms, possibly due to the cautious classification used.

This instrument is applied clinically for the purpose of classifying the levels of depression of patients with diagnosed affective disorders. However, it is highlighted that the appropriate cutoff point depends on the nature of the sample and the objectives of the study. Since the pregnant women of the present survey do not have diagnosed pathology, the classification proposed by Kendall et al.³⁴, which is considered more cautious in this type of evaluation, was used. There are of course no physiological or biological parameters for assessing clinical manifestations of depression⁵⁵. BDI has been used to measure and characterize the phenomenon in objective and quantitative terms³³, including in pregnant women^{2,23,40}.

In spite of the contributions this study makes to a wider understanding of aspects of the body image of pregnant women, some limitations need to be pointed out.

First: the instruments used are not validated for this specific population – while on the other hand they do have the psychometric characteristics evaluated for the female adult Brazilian population. Also, the internal consistency was verified for all the instruments and was considered

adequate³⁷; and further, these instruments have already been previously used in other surveys assessing pregnant women^{2,23,24,40}. It is suggested that evaluation instruments for this specific population should be created and validated.

Second: it is clear that the cross-sectional nature of the study makes it impossible to establish a cause and effect relationship between the variables. At the same time, various studies have been made based on this same methodology^{10,19,23,24}.

Third, some of the correlations found, although statistically significant, were of moderate intensity. Thus, the results should be interpreted with care.

Finally, it is recommended that longitudinal studies should be carried out assessing psychological variables in pregnant women – since these values can undergo alterations over the period of a pregnancy.

It can be concluded that inappropriate food attitudes, low self-esteem, depressive symptoms and high BWI were related to and exercised influence on the negative body attitudes of the pregnant women evaluated. Anxiety, although correlated to a negative body image, did not significantly predict feelings related to the body in the sample of this study. Further, the findings indicate that 20.5% of the participants had food conducts damaging to health, and 12.2% had symptoms of depression. Nutritional and psychological evaluation and orientation are recommended for pregnant women for the purpose of detecting and preventing psychopathologies, in view of the relationship with maternal and child health.

Collaborations

JFF Meireles contributed with the conception and delineation of the project, analysis and interpretation of the data and writing of the article. CM Neves, PHB Carvalho and MEC Ferreira contributed with the analysis and interpretation of data and critical review of the article. All authors approved the version to be published.

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