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Impact of Sociodemographic Characteristics, Nutritional Status and Perceived Stress in Body Weight Concern of Female College Students

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Abstract

Aim: to estimate the contribution of nutritional status, perceived stress and sociodemographic variables in college students' body weight concern. **Method:** participated 850 Brazilian students of one public university. Information such as age, area of study and schedule of the undergraduate course, body weight and height, economic status, household's education level, household, studies funding and medication intake due to studies and labour activity were collected. Perceived stress and body weight concern were assessed, respectively, with the Portuguese versions of the Perceived Stress Scale (PSS) and the Weight Concerns Scale (WCS). The impact of several variables on body weight concern was verified by a causal model developed using Structural Equation Modelling. The goodness-of-fit of the model was evaluated using chi-square ratio index and degrees of freedom (χ^2/df), Comparative Fit Index (CFI), Normed of Fit Index (NFI), and Root Mean Square Error of Approximation (RMSEA). The contribution (β) and significance of causal pathways were evaluated using the z-test critical ratios ($p < .05$). **Results:** a significant contribution of the variables perceived stress, economic status and

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nutritional status in college students' body weight concern was verified. The fit of the final model was adequate (χ^2/df = 4.38; CFI = .91; GFI = .93; RMSEA = .06) and explained 19% of the variability in body weight concern with a positive impact of nutritional status, perceived stress and economic status. **Conclusion:** the results should serve as an alert to researchers in this area of study and health professionals, highlighting the importance of performing the diagnosis of such manifestations and/or propose prevention strategies.

Keywords: body image, weight concern, stress, students, nutritional status.

1. Introduction

The concept of body image refers to the perceptions and attitudes experienced by human beings, in relation to their bodies. This concept encompasses the experiences and significances prevailing throughout life, and is built under numerous circumstances and frequent transformations that occur in a unique and dynamic way (1). Literature addresses body image as a multidimensional construct, mostly influenced by behavioural, affective, attitudinal and perception components. (2). Despite the lack of agreement between authors, each of the body image components consists of specific dimensions, among which, weight concern.

Satisfaction and dissatisfaction with body weight often stem from the rules imposed by society (3). Socioeconomic characteristics (4-7), nutritional status (8-12) and other conditions such as stress (13-17) are also reported as being related to weight changes, body perception and eating behavior.

Although body dissatisfaction is common to both sexes, Sepulveda et al. (18) claims that women are more vulnerable, mainly during adolescence and/or early adulthood. This phase overlaps university admission, and is related to independency achievement, new group and context adaptation process, and to great pressure and anxiety states, that may contribute to the arise of changes related to physical appearance and eating behaviour (19). Wichianson et al. (20) point out that at least 60% of female university students live with great levels of stress, contributing to anxiety states and changes in body image perception. Additionally, Vella-Zarb and Elgar (21) sustain that university attendance may lead to weight gain and, hence, to greater body dissatisfaction, negative eating attitudes, and increased concern about body image. Accordingly, this study aims finding the impact of nutritional status, perceived stress and sociodemographic variables in weight concern of female university students.

2. Model and Analysis

Study Design and Sample Recruiting

Observational study, transversal type, with a non-probability sampling. All female students, aged over 18 years, enrolled in the year 2012 in undergraduate courses (Pharmacy-Biochemistry, Letters, Pedagogy, Public Administration, Economy and Social Sciences) of the Faculties of Pharmaceutic Sciences and Sciences and Letters, Universidade Estadual Paulista – Unesp, campus Araraquara, São Paulo, Brazil, were invited to participate.

The minimum sample size was estimated from sample determination for finite population, using a mean prevalence of body image distortion in women of 3% (22, 23), a significance level of 5%, a sampling error (E) of 25% and a total population (N) of 1097 individuals. Considering these parameters, the minimum estimated sample included 708 female college students. Bearing in mind a non-response rate of 20%, the subjects' number was updated to 850. Participated in this study 1,084 female college students, however, only those who completed all items of all the assessment instruments were included. The final sample comprised 850 participants.

Study Variables and Measurement Instruments

In order to characterize the sample, several information was asked, namely, age, schedule of the undergraduate course, nutritional status, economical level, education level of the householder, household, studies funding, medication intake due to study or labour activities.

Age was collected in reference to complete years. The area of the undergraduate course was classified in Health Sciences and Human and Social Sciences. The schedule of frequency of the undergraduate course could be daytime, afternoon, evening or full-time.

The participants´ nutritional status was determined using Body Mass Index (BMI), based on the specified weight and height measures. Nutritional status was classified according to the World Health Organization framework, using cut-off points for adult (≥ 20 years) (24) and adolescent (18-20 years) (25) individuals. Economic level and householder education level were estimated using the Associação Brasileira de Empresasde Pesquisas (ABEP)´s proposal (26).

Female students were asked about their household, namely, if they lived alone, with colleagues or with their family. Studies funding included family support, scholarship or own resources. Medication

intake was assessed using a dichotomic scale; the type of medication ingested was not questioned, since that data didn't fit the purpose of the study.

Weight concern was assessed using the Portuguese version of the Weight Concerns Scale – WCS, validated in college students (λ=0.54-0.78; χ^2/gl=4.16; CFI=0.99, GFI=0.99, RMSEA=0.06) (27). This is a unifactorial scale, comprising five questions with a seven point Likert-type response scale.

Stress was measured using the Portuguese version of the Perceived Stress Scale – PSS, also validated in college students in a previous study by Dias et al. (28) (λ=0.38-0.74 χ^2/gl=6.22; CFI=0.93, GFI=0.96, RMSEA=0.08). This is a 10 item unidimensional instrument, organized in a five point Likert-type scale.

It should be noted that the inclusion of the mentioned instruments, in this study, was approved by the original authors.

Procedures and Ethical Considerations

The assessment instruments were completed in paper-and-pencil versions, by the students, during regular classes' schedule, after consent from the respective head teacher. Students were informed that their participation was voluntary and Free Prior Informed Consent was obtained.

In order to assure the anonymity and confidentiality of the participants, the questionnaires were simply identified by a code number, they could use later to access the study results.

This work was approved by the Research Ethics Committee of the Faculdade de Ciências Farmacêuticas - Unesp (protocol CEP/FCF/CAr n.º16/2010).

Statistical Analysis

Psychometric Properties

First, the adjustment of the WCS and PSS's factorial structures to the sample was assessed, previously to their inclusion in the predictive model, since the sample included only those female students who had fulfilled all items of the instruments. Confirmatory factor analysis using the maximum likelihood method was performed and the following indexes were used: chi-square to degrees of freedom ratio (2/df), the Comparative Fit Index (CFI), the Normed of Fit Index (NFI) and the Root Mean Square Error of Approximation (RMSEA). Model fit was considered adequate when $2/df \leq 2.0$, CFI and NFI ≥ 0.90, and RMSEA ≤ 0.10 (29). Internal consistency was measured using standardized Cronbach´s Alpha (α) and considered adequate when $\alpha \geq 0.70$ (30), while convergent validity was tested by means of the Average Variance Extracted (AVE) and the Composite Reliability (CR), assumed as adequate if AVE ≥ 0.50 and CR ≥ 0.70 (29, 31).

Structural Model

Structural Equation Modelling was used in order to verify the impact of sociodemographic characteristics, nutritional status and perceived stress on weight concern. A causal model was built; weight concern, as assessed by WCS, was defined as the core construct, and the variables perceived stress, age, nutritional status, course schedule, householder education level, economic level, having a labour activity concomitant with studying, medication intake due to studying/labour, household and studies funding source were the tested independent variables.

The model fit was assessed using the fit indexes χ^2/df, CFI, NFI and RMSEA. Contribution (β) and significance of causal pathways were obtained by Z test. A 5% significance level was set for decision making purpose.

The analyses were computed using IBM SPSS Statistics (v.21, SPSS An IMB Company, Chicago, IL) and AMOS 21.0 (IBM SPSS Inc, Chicago, IL).

Analysis and Discussion

The participants had a mean age of 20.52 (SD=2.27) years. The sample characterization is shown in Table 1.

Table 1. Samplecharacterization. Araraquara, São Paulo, Brazil, 2012.

Characteristic		n	%
Course Area	**Course**		
Health Sciences	Pharmaceutical Sciences	343	40.35
Human and Social Sciences	Public Administration	144	16.94
	Social Sciences	59	6.94
	Letters	103	12.12
	Pedagogy	145	17.06
	Economic Sciences	56	6.59
Economic Level (R$)			
A and B (2,656.00 – 11,480.00)		722	84.94
C (962.00 – 1,459.00)		115	13.53
D and E (415.00 – 680.00)		13	1.53
Householder Education Level			
Illiterate/3rd grade of Fundamental Education		9	1.06
4th grade of Fundamental Education		60	7.06
Fundamental Education		61	7.18
Secondary School		301	35.41

Higher Education	419	49.29
Nutritional Status		
Low weight	48	5.65
Normal weight	659	77.53
Overweight	106	12.47
Obesity	37	4.35
Course Schedule		
Daytime	144	18.14
Afternoon	59	7.43
Evening	103	12.97
Full-time	488	61.46
Household		
Alone	120	14.12
Family	297	34.94
Friends/colleagues	433	50.94
Studies Funding		
Own	117	13.76
Family	682	80.24
Scholarship	51	6.00
Medication Intake		
Yes	232	27.29
No	618	72.71
Labour activity		
Yes	618	72.71
No	232	27.29

* currency conversion Real-American Dollar converted 6 May 2013 (R$ 1.00 = USD$ 0.50).

The instruments fit was considered adequate (WCS: χ^2/df=4.16; CFI=0.99; GFI=0.99; RMSEA=0.06 and PSS: χ^2/df=6.22; CFI=0.93; GFI=0.96; RMSEA=0.08). Convergent validity was found adequate for WCS (AVE=0.49; CR=0.83) but not for PSS (AVE=0.32; CR=0.82). Both instruments showed adequate internal consistency (WCS: α=0.77 and PSS: α=0.83).

The structural model revealed adequate fit to the data (χ^2/df=3.80; CFI=0.88, GFI=0.92, RMSEA=0.06). Table 2 shows standardized and non-standardized estimates, as well as the significance of the causal pathways of the proposed model.

Table 2. Standardized and non-standardized estimates and significance of the causal pathways.Araraquara, São Paulo, Brazil, 2012.

Pathways			β	Standard error	β standardized	p	r^2
WCS	←	PSS	0.273	0.062	0.180	<0.001	0.180
WCS	←	Schedule	-0.063	0.067	-0.036	0.353	-
WCS	←	Age	0.007	0.013	0.019	0.594	-
WCS	←	Medication	0.033	0.056	0.021	0.560	-
WCS	←	Labour activity	0.072	0.077	0.039	0.352	-
WCS	←	Nutritional status	0.480	0.053	0.332	<0.001	-
WCS	←	Economic level	0.117	0.049	0.100	0.017	-
WCS	←	Household	0.014	0.041	0.012	0.730	-
WCS	←	Funding	0.008	0.071	0.004	0.908	-
WCS	←	Householder education level	0.030	0.037	0.034	0.420	-

We observe that perceived stress (p<0.001), economic level (p=0.017) and nutritional status (p<0.01) make a significant contribution to weight concern, in female college students.

Accordingly, the model was refined, and the final causal structure is shown in Figure 1.

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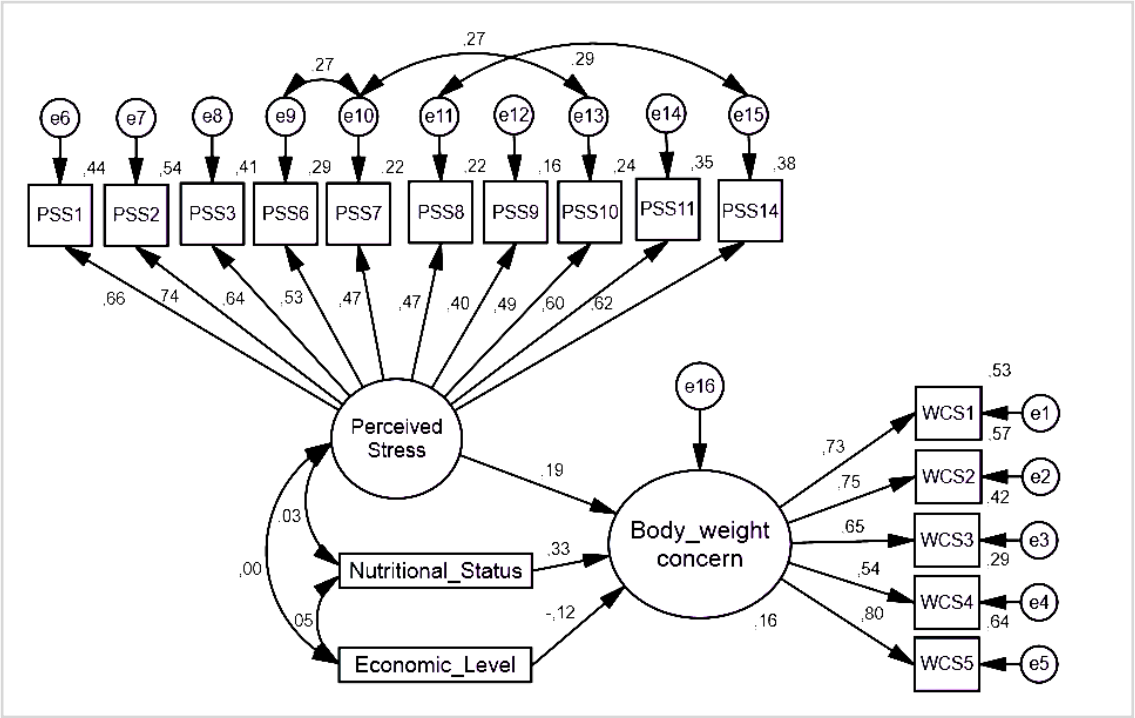

Figure 1. Factorial Structure of the refined causal model.Araraquara, São Paulo, Brazil, 2012 (χ^2/df=4.37; CFI=0.91; GFI=0.93; RMSEA=0.06).

The adequate fit of the factorial structure to the sample may be observed. The model explains 19% of variability in weight concern, with a positive impact of nutritional status, perceived stress and economic level.

This study shows the significant contribution of the variables nutritional status, economic level and perceived stress for weight concern in female college students. Although the explained variance of the model was lower than desired, we expect that this result may act as a start for scholars in the area of weight concern research. Such results are valuable as they allowed identifying variables which may be added to research or health education protocols, aiming to prevent negative consequences caused by extreme concerns with weight, such as eating behaviour disorders.

It is worth highlighting the methodological proposal followed in this study, namely, structural equation modelling, an unusual technique in Nutrition domain research. We aim to demonstrate its relevance in building and interpreting predictive models, using latent and manifest variables.

The low explanatory power of our model (Figure 1) suggests the need to include additional variables that may be related to body image concern. In this study, we found that female students from higher economic levels, with higher levels of perceived stress and showing an altered nutritional status stated greater weight concern. Thus, these variables should be included in further studies.

The association between body dissatisfaction and socio-economic level is influenced by many factors, such as access to food, awareness about healthy food choices, the habit and/or opportunity for practicing physical activity, and the access to health care (4). Although this relation appears in literature, studies show some controversial results. In this study, there was a direct association between economic level and weight concern, similarly to other studies (7, 32, 33). The authors note that less advantaged individuals tend to accept weight and eating behaviour changes as a way of social scaling, based on the increase of purchasing power and of the access to certain types of food (5). Therefore, weight concern does not relate to body dissatisfaction or body image changes, enlightening the inverse relation between economic level and weight concern found in our study.

Within higher education context, cumulative stress, related to puberty and academic demands, is often found (34), which may lead, in certain situations, to an excessive and compulsive consumption of food, and, consequently, to weight gains and body dissatisfaction (35). Several studies link stress states to body dissatisfaction (14, 17, 36), especially in women, when compared to men (17).

Nutritional changes are referred in the literature as being directly related to an increase in body dissatisfaction (8, 9, 37), which might result in eating behaviour alterations. Female college students are

highly susceptible to nutritional status changes, due to eating behaviour alterations, stress increase and distress associated with university admission. A study by Girz et al. (38) found that 62,2% of female students gained weight across their college years (4,1 kg on average) together with an increase in body dissatisfaction. These results are in line with those found by Gillen and Lefkowitz (11) and Grooper et al. (12).

3. Conclusions

To conclude, results from this study support a model of direct influence of perceived stress and nutritional status, as well as of inverse influence of economic level, in female college students´ weight concern. These results draw attention to the importance of diagnosing and preventing eating behaviour problems, and should be reflected by researchers and health professionals working in this domain and with this population.

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