

*Manifest anxiety in overweight and obese adolescents**

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RESUMEN

La obesidad es un problema de salud serio en México, y se presenta junto a un alto número de comorbilidades psicológicas, por lo que se propuso evaluar la presencia de ansiedad en población de adolescentes en relación a su peso y talla. En el presente estudio participaron 601 adolescentes de ambos sexos, quienes completaron la Escala de Ansiedad Manifiesta en Niños, además de proporcionar datos sociodemográficos y ser evaluados en talla y peso. Los resultados son consistentes con otros estudios que muestran asociación entre IMC, ansiedad y género, además de advertir de una fuerte relación entre la ansiedad fisiológica y obesidad.

Palabras clave: sobrepeso, obesidad, ansiedad, adolescentes.

ABSTRACT

Obesity is a serious health problem in Mexico, and it is manifested within a large number of psychological co-morbidities. The main purpose of this paper was to assess the presence of anxiety in adolescent population in relation to their weight and size. In this study, the sample consisted of 601 adolescents who completed the Revised Children's Manifest Anxiety Scale. They also provided socio-demographic data and were evaluated in size and weight. The results are consistent with other studies that show associations between BMI (Body Mass Index), anxiety and gender, but they also warn about a strong relationship between physiological anxiety and obesity.

Keywords: overweight, obesity, anxiety, adolescents.

Introduction

The World Health Organization considers obesity as a public health problem and classifies it as a chronic disease characterized by several complications. This health problem affects general population in Mexico, being adolescents a risk population. In the last years there has been a significant increasing in the overweight and obesity rates in Mexican adolescents, being higher in women group (Gutiérrez, et al., 2012).

Overweight and obesity in childhood and adolescence predispose to several damages to the body depending on its evolution, where there can be found abnormalities of the spine, hips and feet, high blood pressure, high cholesterol, high triglycerides, diabetes, renal disease, cerebrovascular accidents, etc. (Bell, et al., 2011; Carroll, Bhandari, Zucker & Schramm, 2006; Korbman, 2007; Romero, et al., 2007).

In addition to this, children and adolescents who are overweight or obese may suffer from emotional disturbances such as low self-esteem, anxiety, depression (Bell, et al., 2011; Janicke, Harman, Kelleher & Zhang, 2008), abuse by peers and family, discrimination and in some cases, poor academic performance (Ponce, 2006; Sawyer, Harchak, Wake & Lynch, 2011).

In a longitudinal study with overweight and obese children, it was found that they had a higher risk of emotional maladjustment in adulthood. In addition, the obese women in this group showed in their adulthood a high prevalence of mood disorders and anxiety (Sanderson, 2011).

Several studies have shown that social and cultural factors can influence the mood and the manifestation of anxiety disorders in obese youth (Simon, et al., 2006). Jorm, Rorten, Cristensen, Jacomb, Rodgers & Parslon, (2003)

reported that in the case of obese women, there is an association between their obesity with increased feelings of anxiety, depression and less positive affect.

Studies by Anderson, Cohen, Naumova and Must (2006) and by Pastore, Fisher and Friedman (1996) reported similar findings, where a significant difference in anxiety is evident when comparing groups by gender, being higher the anxiety in women. However, Pastore et al. warn that anxiety in young obese did not differ from those with a normal weight, when comparisons exclude gender differences.

Anxiety is the disorder with a higher presence in obese children, who can also present other emotional problems, which are exacerbated when parental conflict prevails (Vila et al., 2004). Adolescence is a stage of life which is often sensitive to the criteria that society dictates about beauty and acceptance. In the past, obesity was synonymous with beauty, while today it is a symbol of ugliness. It previously was a symbol of health, but nowadays it culturally represents disease (Rodriguez, 2006). Also, in some societies beauty stereotypes have been marketed by fashion, technology and have been modified by the current cultural practices around the body, influencing directly in the construction of body image, identity, self-satisfaction, while it generates other psychological disorders, as well as a stigmatization of the obese body (Montero, 2001).

Although a higher body mass index (BMI) is associated with psychological conditions such as stress, anxiety and depression, not all overweight and obese adolescents show these alterations. Pastore, Fisher and Friedman (1996) warned that there are no differences in anxiety when weight groups are compared. The current study was conducted in order to

investigate the relation between anxiety and BMI in a population of Mexican adolescents, to determine if there is a relationship among weight and gender groups in our population as established by the studied literature. The higher comprehension about the Mexican adolescent population and the manifestation of anxiety in association with weight can be crucial to harness the efforts of the prevention campaigns where the emotional and physical health of this population must be addressed as a part of a national health problem.

Method

This study used a correlational descriptive design and a convenience sample was used.

Participants

The sample consisted of 601 young students in secondary education (middle school) among 11 and 16 years, with a mean of 13.07 years (SD = 0.89), 56.9 % female and 43.1 % male. The 37.4 % of participants attended first grade, 34.4 % were in second grade and 28.1 % were in the third grade.

Instruments

(Demographic Sheet) The subjects were asked to complete a demographic sheet asking for information on date of birth, age, grade, gender, and where the surveyor registered the weight and height. Body mass index (BMI), as a measure of body fat, was calculated from the formula weight in kilograms/height in squared meters (Keys, Fidanza, Karvonen, Kimura & Taylor, 1972). As appropriate BMI for each age varies in childhood and adolescence through normal development process, the weight range of the participating adolescents was categorized based on the standards of the World Health

Organization (World Health Organization, 1995), which establishes that a BMI lower than the 5th percentile (based on the tables given for age and gender) indicates underweight, a BMI between the 5th and 85th percentiles indicates normal weight, between 85 and 95 percentiles the subject is overweight, and BMI values above the 95th percentile indicates obesity.

The Revised Children's Manifest Anxiety Scale (CMAS -R) (Reynolds & Richmond, 1997). It consists of four subscales and 37 items designed to assess the level and nature of anxiety in children and adolescents. It is designed to be applied individually or in groups of children aged 6-18 years. The total anxiety score is calculated by the sum of the positive responses of the subscales of physiological anxiety, restlessness/hypersensitivity and social concerns/concentration. The physiological anxiety subscale is an index of the child's expression to physical manifestations of anxiety, it is composed by 10 items (1, 5, 9, 13, 17, 19, 21, 25, 29 and 33). The restlessness/hypersensitivity subscale suggests the presence of nervousness, fear or hypersensitivity to environmental pressures. This subscale is composed by 11 items (2, 6, 7, 10, 14, 18, 22, 26, 30, 34 and 37). The social concerns/concentration subscale expresses concern about the self-comparison with others and difficulty in concentration, it is composed by 7 items (3, 11, 15, 23, 27, 31 and 35). Lying subscale is used to determine the imprecision of self-reports, is composed by 9 items (4, 8, 12, 16, 20, 24, 28, 32 and 36). The authors reported an adequate internal consistency, with a value of 0.83 estimated by the Kuder-Richardson formula for dichotomous items, also providing concurrent and divergent construct validity evidence in different groups. In the current study, it was employed the Uruguayan version of the Scale translated by Rodrigo and Luisardo in 1992 and published by Manual Moderno (in

Spanish language). In the standarization of the scale with the Uruguayan population, the values of internal consistency reported are similar to the original scale (Richmond, Rodrigo & Luisardo, 1989).

(*Precision Balance*, Tanita BC Innerscan 418) It is a digital scale up to 200 kilograms, with intervals of 100 grams. It has a system of weighing load cells and measurement by bioelectric impedance-500 Ohms.

(*Stadiometer*) A SECA wall column Stadiometer was used, with a measuring range of 200 centimeters.

Procedure

According to recommendations on ethics in research with human beings made by the American Psychological Association (APA, 2002) and the Mexican Society of Psychology (Sociedad Mexicana de Psicología, 2007), the present study was carried out relying on the prior informed consent of the adolescents' parents, and with their consent and voluntary participation of the studied population.

Once informed consent was obtained, the **Revised Children's Manifest Anxiety Scale** was used in self-report format and applications were made in the presence of evaluators. When participants finished filling out the questionnaire, they were asked to attend to the measurements registration (height and weight). The Tanita scale and the stadiometer were used for measuring height and weight, taking the measures a young trainee of the last semester of the Public Health and Nutrition College, leading participants to a designated space for this purpose, with good lighting, and an adequate control in the entry and exit of participants and recording measurements to every person.

Statistical analysis

Prior to data analysis the scores of the subscales that make up the anxiety scale were estimated. By adding the scores of the Lie scale, percentiles corresponding to groups of men and women by age were estimated to determine inclusion in the data analysis. From an initial sample of 849 participants, protocols with a score on the lie scale > 13 were removed (248), because the scores above 13 indicates the deliberate falsification of answers according to the authors (Reynolds & Richmond, 1997). The remaining 601 cases were analyzed with SSPS 21 where in descriptive analyzes were used, including measures of frequency, central tendency and distribution, risk analysis. We determined the reliability of the scale, and analysis of group differences and correlations were performed.

Results

The body mass index mean in the sample was 22.47 ($SD = 4.68$). By weight groups distributions estimated on the basis of the percentile rank corresponding to the BMI for age of the participants, 2.3% are underweight (14 participants), 38.8% normal weight (233 participants), 29.3% overweight (176 participants) and 29.6% are obese (178 participants). The groups of overweight and obesity together correspond to 58.9% of the studied population (354 participants).

The reliability for the *Revised Children's Manifest Anxiety Scale* was estimated by Kuder Richardson formula, observing an adequate internal consistency ($K-R_{20}=0.77$). In estimating the internal consistency of the scale, the Cronbach's alpha coefficient obtained was similar to that of the Uruguayan population ($\alpha=.831$), while the values of the subscales were as follows: physiological anxiety $\alpha=.684$, restlessness/hypersensitivity $\alpha=.713$ and social concerns/concentration $\alpha=.683$.

To determine the prevalence of anxiety a score cutoff $T > 60$ was taken over the total score of the scale. The prevalence of anxiety ($T > 60$) in obese adolescents is 68.7 %, while the prevalence of anxiety in non-obese ($T > 60$) is 31.3 %. In estimating the strength of association between being obese and developing anxiety, it is observed that overweight and obese youth are 1.6 times more likely to report anxiety than non-obese young people in this study ($OR = 1.6$, 95 % $CI = 0.933-2.769$, $p > .001$).

The total score of anxiety was taken from the physiological anxiety, restlessness /hypersensitivity and social concerns /concentration subscales. Spearman correlations were performed between the anxiety score with each of the subscales and the variables of age, grade, gender and BMI. The total anxiety score correlated positively with each of the subscales that made up the questionnaire, as well as BMI. A negative correlation with gender (See Table 1) was observed. The body mass index correlated with gender ($r = .092$, $p = .024$).

Table 1. Correlations of variables with the anxiety score

| | R | p |
|-----------------------------------|------------|-------|
| Physiological anxiety | 0.817(**) | 0.000 |
| Restlessness/ Hypersensitivity | 0.754(**) | 0.000 |
| Social Concerns/ Concentration | 0.748(**) | 0.000 |
| Body Mass Index | 0.086(*) | 0.036 |
| Gender | -0.192(**) | 0.000 |
| Age | -0.029 | 0.477 |
| Grade | -0.035 | 0.395 |

** The correlation is significant at the 0.01 level

* The correlation is significant at the 0.05 level

Source: Authors

The Mann-Whitney-Wilcoxon test (used in non-parametric samples) was performed to determine the presence of gender differences in the analyzed variables. Men and women studied had statistically significant differences ($p < .05$) in the variables of BMI in the overall anxiety and in the subscales of physiological anxiety and restlessness /hypersensitivity. No statistical significant gender differences were found in the subscale of social concerns/concentration (see Table 2).

Table 2. Average ranks of variables and group differences by gender

| | Average rank women | Average rank men | z | p |
|-----------------------------------|--------------------|------------------|--------|-------|
| Body Mass Index | 314.94 | 282.59 | -2.261 | 0.024 |
| Physiological anxiety | 319.95 | 275.98 | -3.111 | 0.002 |
| Restlessness/ Hypersensitivity | 339.12 | 250.66 | -6.247 | 0.000 |
| Social Concerns/ Concentration | 307.28 | 292.70 | -1.051 | 0.293 |
| Anxiety score | 329.93 | 262.80 | -4.710 | 0.000 |

Source: Authors

Preliminary analyzes show that overweight and obese adolescent girls are 1.5 times more likely to have anxiety compared to those found in normal weight ($OR = 1.471$, 95% $CI = 807-2681$, $p > .001$); while overweight and obese boys are 1.7 times more likely to experience anxiety than those with normal weight ($OR = 1.656$, 95% $CI = 712-3853$, $p > .001$).

Comparing weight groups, it was observed a statistically significant difference in the physiological anxiety subscale between the groups of overweight-obese participants and the underweight-normal weight participants. Although the average rank of the total score of anxiety as well as the subscales of restlessness /hypersensitivity and social concern/concentration were

higher in the group of overweight and obese participants than those in the group of normal weight and underweight, however, statistically significant differences between these groups (see table 3) are not observed.

Table 3. Average ranks of the variables and group differences by weight groups

| | Average rank G1 | Average rank G2 | z | p |
|-----------------------------------|-----------------|-----------------|--------|-------|
| Physiological Anxiety | 282.86 | 313.66 | -2.165 | 0.030 |
| Restlessness/ Hypersensitivity | 291.38 | 307.71 | -1.146 | 0.252 |
| Social Concern/ Concentration | 288.47 | 309.75 | -1.524 | 0.128 |
| Anxiety score | 285.01 | 312.15 | -1.892 | 0.058 |

G1= Underweight/Normal weight, G2= Overweight/Obese
Source: Authors

Discussion

The results of this study on the association between BMI, anxiety and gender are consistent with the ones shown in other studies from other countries (Anderson, et al., 2006; Jorm, et al., 2003; Pastore, et al., 1996 and Vander, 2012). It seems that in this Mexican sample, being female is a risk factor to present overweight or obesity as to present higher levels of general and physiological anxiety, and showing restlessness and hypersensitivity to distressing events. Diverse psychosocial factors may explain why overweight women have a higher prevalence of emotional disorders and anxiety (Sanderson, et al., 2011).

By one side, this allows to support the observations made by Sanderson et al. (2011) on Australian population, but differs from the findings reported by Jie Tang, Yukai Du, Huiping

and Zhuoya (2010) where young Chinese people who perceive themselves overweight, show higher anxiety symptoms except women. It is interesting to notice that there was no association between anxiety and actual weight status in this study with Chinese population.

In the analyzed sample, boys and girls who were overweight and obese are more likely to experience anxiety than those with normal weight. In addition, it is evident that physiological anxiety is associated with greater weight. This association could be understood as due to the physiological anxiety that can be mistaken with hunger, and therefore the adolescent can try to mitigate this anxiety with food (Bruch, 1973). In other studies it has been shown that the lack of interceptive awareness can lead to difficulties in discriminating among feelings of hunger and satiety, especially in people with eating disordered behavior (Fassino, Piero, Gramaglia & Abbate, 2004), while recent studies in a Mexican-American sample show no association between eating in the absence of hunger and obesity (Pérez, Jiménez, Alcántara, Armendáriz & Bacardí, 2014).

Important observations can be derived from this study for future work with Mexican adolescent population: We should pay attention to groups of overweight and obese girls, to intervene in a timely manner and help them to deal with the emotional problems that may be associated with their physical condition, which is manifested as anxiety in this study. This paper is warning to the health sector about physical concerns in young population living with obesity. We can not know which factor was first, anxiety or obesity, but the relationship in the variables is an evidence of the complexity in the work with the obese population, which can be highly motivated to lose weight but the prevalence of psychosocial factors such as anxiety or depression among

others, can affect in the results they are looking for (Meza & Moral, 2013).

On the other hand, since the physiological anxiety is not synonymous with hunger, the difficulty in recognizing this kind of anxiety can cause overeating behavior. That is why psychologists need to work with young people and teach them how to express their feelings, and distinguish between anxiety and hunger - satiety.

While childhood obesity is not a determinant factor for obesity in adulthood, weight trajectories must be observed as well as the characteristics of childhood, adolescence and adulthood, since several factors such as age, general health, physical and educational attainment of the mother activity; employment, educational achievement and emotional health, they all can affect weight changes (Sanderson, et al., 2011).

Obesity in this study is expressed as a risk factor for anxiety, which can be mitigated through multidisciplinary interventions since they have shown effectiveness in the reduction of weight, anxiety and other emotional problems associated with excess weight (García, 2010; Pompa, 2011).

The present study has some limitations that should be considered in future research. In the first instance we have a limited sample with the characteristic of being non-probabilistic and with a transversal cut, so that extrapolation of the results to a similar population of Spanish-speaking adolescents requires contrasting. All the findings should be taken as hypothesis. Other aspect to consider is that the age ranges

are limited, so we recommend extending them to obtain valid results for general population, including both children and adult population. It is also recommended to seek a representative probabilistic sample of both gender for future research and given the cross-sectional nature of the study, it would be interesting to conduct longitudinal studies to see the relationship between variables in addition to see the interaction with other variables that were not considered in the present work studied.

Another limitation is the self-reported nature of the data, which can introduce a degree of imprecision in the responses of adolescents. Finally, the dichotomous nature of the instrument used to assess the construct of anxiety is a limitation, which may have biased the reliability or validity of the data.

It would be advisable to conduct a study of adolescents contrasting diverse populations to determine the characteristics of obesity in young people who are overweight and obese and, it would also be advisable to explore another dimensions of anxiety, as the social one, which can contribute to an eating disordered behavior in vulnerable groups (Magallares, 2013) in which obesity is included (Thompson, Allyson, McCracken, Thomas & Ward, 2013).

We present this study as a starting point for a future research, as it is still a limited number of studies examining the relationship between these variables, which can be supplemented with other instruments for a better understanding on the obesity phenomenon in the design of intervention strategies.

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*Edith Pompa Guajardo
Cecilia Meza Peña*

Edith Pompa Guajardo**

Cecilia Meza Peña***

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- * El presente estudio se adelantó por las autoras con el fin de establecer la relación entre Ansiedad, género e IMC (Índice de Masa Corporal)
- ** Doctora en Filosofía. Especialista en Psicología. Facultad de Psicología, Universidad Autónoma de Nuevo León. Correspondencia: edithpompag@gmail.com
- *** Doctora en Filosofía. Especialista en Psicología Facultad de Psicología, Universidad Autónoma de Nuevo León. Correspondencia: cecilia.meza@gmail.com