Body image dissatisfaction and its association with antropometrics parameters, weight status and self-esteem in Chilean schoolchildren.

Pedro Delgado-Floody,[1] Felipe Caamaño-Navarrete,[2] Daniel Jerez-Mayorga,[3] Iris Paola Guzmán-Guzmán,[4] Alfonso Cofré-Lizama,[5,6] Cristian Martínez-Salazar.[1]

[1]Department of Physical Education, Sport and Recreation, Universidad de La Frontera (Temuco, Chile). [2]Faculty of Education, Universidad Católica de Temuco (Chile). [3]Faculty of Rehabilitation Sciences, Universidad Andres Bello (Santiago, Chile). [4]Faculty of Chemical-Biological Sciences, Universidad Autónoma de Guerrero (Guerrero, México). [5]School of Psychology, Faculty of Social Sciences, Universidad Santo Tomás (Temuco, Chile). [6]Universidad Mayor (Chile).

Summary: Although an increasing number of children are becoming obese, the psychological comorbidities associated with obesity are not well established. This research was aimed at determining if there is association between body image dissatisfaction with anthropometrics parameters, weight status and self-esteem in children from public schools. The sample comprised 712 schoolchildren age 11.94 ± 1.16 years (351 girls and 361 boys). Self-esteem, body image dissatisfaction, body fat (BF), body mass index (BMI), Waist circumference (WC) and waist to height ratio (WHtR) were evaluated. 372 children (52.2%) presented normal weight, 201 (28.2%) children presented overweight and 139 children (19.5%) presented obesity. There were no differences in proportions between boys and girls ($p = 0.778$). Girls presented a higher proportion of body image dissatisfaction ($p = 0.0045$). The children with obesity presented the highest proportion with low or very low self-esteem ($p < 0.001$) and presented a higher proportion of body image dissatisfaction ($p<0.001$). The body image dissatisfaction was associated with overweight/obesity status (OR = 4.12, $p < 0.001$), WtHR (OR = 3.53, $p < 0.001$) and self-esteem (OR = 2.91, $p = 0.03$). In conclusion the body image dissatisfaction in the sample of study was associated with antropometric parameters and self-esteem.

Key words: Body image, self-esteem, obesity, schoolchildren.

Resumen: Insatisfacción con la imagen corporal y su asociación con parámetros antropométricos, estatus corporal y la autoestima en escolares chilenos. A pesar de que un número creciente de niños se está volviendo obeso, las comorbilidades psicológicas asociadas con la obesidad no están bien establecidas. Esta investigación tuvo como objetivo determinar si existe asociación entre la insatisfacción con la imagen corporal con parámetros antropométricos, el estatus corporal y la autoestima en niños de escuelas públicas. La muestra comprendía a 712 niños en edad escolar 11,94 ± 1,16 años (351 niñas y 361 niños). Se evaluaron la autoestima, la insatisfacción con la imagen corporal, la grasa corporal (GC), el índice de masa corporal (IMC), la circunferencia de la cintura (CC) y la relación cintura estatura (RCE). 372 niños (52,2%) presentaron peso normal, 201 (28,2%) sobrepeso y 139 niños (19,5%) presentaron obesidad. No hubo diferencias en las proporciones entre niños y niñas ($p = 0.778$). Las niñas presentaron una mayor proporción de insatisfacción con la imagen corporal ($p = 0,0045$). El grupo obeso presentó la proporción más alta con baja o muy baja autoestima ($p <0.001$) y presentó una mayor proporción de insatisfacción con la imagen corporal ($p <0.001$). La insatisfacción con la imagen corporal se asoció con el estado de sobrepeso/obesidad (OR = 4.12, $p <0.001$), RCE (OR = 3.53, $p <0.001$) y autoestima (OR = 2.91, $p = 0.03$). En conclusión, la insatisfacción con la imagen corporal en la muestra de estudio se asoció con parámetros antropométricos y la autoestima.

Palabras clave: Imagen corporal, autoestima, obesidad, escolares.

INTRODUCTION

School-age obesity is associated with psychosocial problems such as deficiencies in social co-existence and quality of life. It has been observed that obese children tend to have affective problems, mainly low self-esteem, body dissatisfaction and depression (1), affecting their academic performance, as well as social and family interaction. In addition, obese children with declining levels of self-esteem present significantly higher rates of sadness, loneliness, and anxiety, and they are more likely to engage in high-risk behaviors such as smoking

or alcohol consumption (2). Therefore, there is growing interest in the psychosocial aspects of obesity, especially as they affect children and adolescents.

Children with emotional and behavioral problems have a high risk of academic failure (3), which is evident in primary school. With the added problems of body image dissatisfaction and self-esteem produced by childhood obesity (4), the situation becomes more complex due to the high percentages of obese schoolchildren globally. A negative perception of one's body image and low self-esteem increases psychological distress (5).

Body image refers to a person's sense of their physical appearance and body function. A negative body-image self-evaluation may result in psychosocial dysfunction (6) in both genders and has become an important public health issue (7). Body image dissatisfaction is a good predictor of several mental health risks (8), including eating disorders and depression (9). Likewise, the self-esteem refers to a person's self-assessment and may be different in diverse contexts such as family, school and society. Low self-esteem is one of the main psychosocial factors related to childhood overweight and is significantly related to the bullying (10).

Although an increasing number of children are becoming obese, the psychological comorbidities associated with obesity are not well established. Therefore,this research was aimed at determining if there is association between body image dissatisfaction with anthropometrics parameters, weight status and self-esteem in children from public schools.

MATERIALS AND METHODS

Participants: A cross-sectional study involved 712 schoolchildren (351 girls and 361 boys), 11.94 ± 1.16 years of age from four public schools of the Araucanía region, Chile. The sample was selected for convenience purposes, and assessments were made regarding age, sex, anthropometric aspects, body image dissatisfaction and self-esteem. The research was carried out in public schools. The study design is described in Figure 1.

Inclusion criteria required participants to present informed consent by their parents and themselves, to

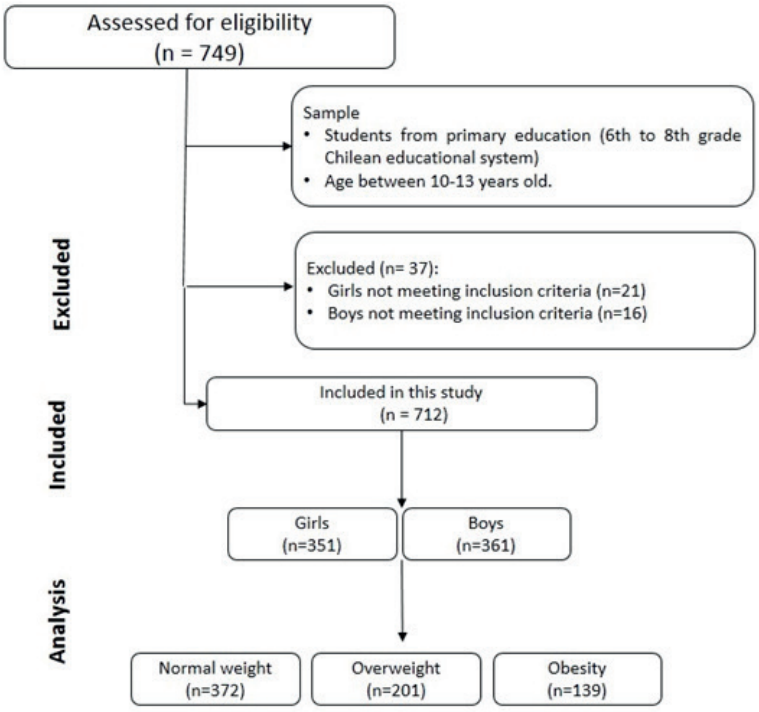

FIGURE 1. Study design

be enrolled in the school being studied and to be 10–13 years of age. The exclusion criteria were the presence of musculoskeletal disturbances; physical, sensory or intellectual disabilities; and non-compliance with the inclusion criteria.

All procedures performed in studies involving human participants were in accordance with the ethical standards of the University de La Frontera committee and have been performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

Instruments: Students were evaluated with bare feet and wearing the least amount of clothing possible. Size (m) was estimated with a Seca® model 214 height rod (Hamburg, Germany), graduated in mm. Body mass (kg) were evaluated using a TANITA scale, Scale Plus model UM - 028 (Tokyo, Japan). Body mass index (BMI) was obtained by dividing body weight by height in meters squared (kg/m2) and was used to estimate the degree of obesity according to the international rating criteria given by the Centers for Disease Control and Prevention (CDC) according to corresponding ages and percentiles related to sex. Childhood obesity is defined as having a BMI equal to or greater than the 95th percentile for children of the same age and sex; being overweight is defined as having a BMI between the 85th percentile and the 95th percentile (11).

Waist circumference (WC) was measured using a Seca® model 201 (Hamburg, Germany) tape measure at the umbilical scar level. The waist to height ratio (WHtR) was obtained by dividing the WC by the child's height and was used to estimate fat accumulation in the central area of the body. A ratio greater than 0.5 is generally accepted as a universal cutoff for central obesity (12).

The Body Shape Questionnaire (BSQ)(13) was used to identify body image dissatisfaction. The questionnaire was composed of 34 items scored on a 6-point Likert scale (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = very often and 6 = always). Scores can range from 34 to 204 points and are divided as follows: a) less than 81 = no dissatisfaction with body image; b) 81–110 = mild dissatisfaction; c) 111–140 = moderate dissatisfaction and d) greater than 140 = extreme dissatisfaction. In this study the questionnaire obtained an internal consistency of Cronbach's alpha = 0.80. The BSQ has been used in Chilean children population with overweith and obesity (14).

To measure schoolchildren's self-esteem, we used the TAE-Student: Self-Esteem Test (15), via a general self-report. A point is added for each positive answer and 0 points for negative answers. The sum of the gross score is transformed to a T score according to norms by age. The students are identified according to the following categories: normal self-esteem (score greater or equal to 40 points), low self-esteem (score 30–39 points) and very low self-esteem (scores equal to or less than 29 points). The level of internal consistency reached in this questionnaire presented an Cronbach's alpha = 0.83.

Procedure: Previously trained research assistants visited selected schools during the 2017 Chilean school year and carried out the assessments on those children who presented parental consent and their own assent. Anthropometric assessments were conducted in a favorable space facilitated by the school, with optimum temperature and reliable privacy. Surveys were completed in classrooms on different days than the anthropometric evaluations. One survey was conducted per day. The evaluations took place during physical education classes and in the morning.

Statistical Analysis

Statistical analysis was performed using STATA v11.1 software. The continuous variables were expressed as mean and standard deviation. Differences between groups were determined using an analysis of variance (ANOVA) test. Qualitative variables were expressed in proportions and compared between groups with the chi-squared test. To establish the association among body image dissatisfaction with self-esteem and anthropometric variables, we calculated the odds ratio (OR) and confidence interval (95% CI). Values of $p < 0.05$ were considered statistically significant.

TABLE 1. Anthropometric and psychosocial characteristics in schoolchildren.

Variable	Total (n=712)	Girls (n=351)	Boys (n=361)	p-value
Age (years)	11.94±1.16	11.88±1.13	11.99±1.18	0.215
BMI (kg/m^2)	21.65±3.98	21.90±3.80	21.45±4.16	0.156
WC (cm)	73.79±10.74	73.00±9.80	74.44±11.4	0.106
WHtR (WC/ size)	0.48±0.07	0.48±0.06	0.48±0.7	0.497
BID (score)	54.60±26.96	55.69±26.3	53.69±27.7	0.090
Self-esteem (score)	51.65±13.37	53.30±14.38	50.29±12.4	0.202

Data shown represent median (mean ± standard deviation), p values <0.05, statistically significant Mann-Whitney U-test. BMI: Body mass index. WC: Waist circumference. WHtR: Waist to height ratio. BID: Body image dissatisfaction.

RESULTS

Regarding weight status, 372 children (52.2%) presented normal weight, 201 (28.2%) children were overweight and 139 children (19.5%) were obese. There were no differences in proportions between boys and girls (p = 0.778). In comparisons by sex, the anthropometric and psychosocial variables did not present significant differences (p > 0.05) (Table 1).

Boys and girls presented a similar distribution according nutritional status (p = 0.778). Girls presented a higher proportion of body image distasfaction (p = 0.0045) but in self-steem did not present significant differences (Table 2).

TABLE 2. Proportion of schoolchildren according to psychosocial variables, weight status and adominal obesity

Variable	Total (n=712)	Girls (n=351)	Boys (n=361)	p-value
Body image dissatisfaction			0.045	
No	618 (86.8)	300 (85.5)	318 (88.1)	
Mild	52 (7.3)	25 (7.1)	27 (7.5)	
Moderate	26 (3.7)	16 (4.6)	10 (2.8)	
Extreme	16 (2.2)	10 (2.8)	6 (1.7)	
Self-esteem				0.362
Normal	550 (77.2)	272 (77.5)	278 (77.0)	
Low	131(18.4)	64 (18.2)	67 (18.6)	
Very low	31(4.4)	15 (4.3)	16 (4.4)	
Nutritional status				0.778
Normal (≥ p5)	372 (52.2)	184 (53.0)	188 (52.0)	
Overweight (≥ p85)	201(28.2)	98 (27.6)	103 (28.7)	
Obese (≥ p95)	139(19.5)	69 (19.4)	70 (19.3)	
WtHR				0.396
No risk (<0.5)	499 (70.1)	244 (69.5)	255 (70.6)	
Risk (≥ 0.5)	213 (29.9)	107 (30.5)	106(29.4)	

The data shown represent n (proportions), p value determined by Chi2 test represent differences of proportion between sex. p <0.05 considered statistically significant.

TABLE 3. Proportion of schoolchildren according to psychosocial variables and weight status.

Girls	**Normal** (n=184)	**Overweight** (n=98)	**Obese** (n=69)	p-value
Self-esteem				<0.001
Normal (%)	150 (81.5)	74 (75.5)	48 (69.6)	
Low (%)	29 (15.8)	19 (19.4)	16 (23.2)	
Very low (%)	5 (2.7)	5 (5.1)	5 (7.2)	
Body image dissatisfaction				
No (%)	173 (94.0)	81 (82.7)	46 (66.7)	<0.001
Mild (%)	9 (4.9)	8 (8.2)	8 (11.6)	
Moderate (%)	2 (1.1)	5 (5.1)	9 (13.0)	
Extreme (%)	0 (0.0)	4 (4.1)	6 (8.7)	

Boys	**Normal** (n=188)	**Overweight** (n=103)	**Obese** (n=70)	p-value
Self-esteem				
Normal (%)	155 (82.4)	76 (73.8)	48 (68.6)	<0.001
Low (%)	28(14.9)	22(21.4)	16 (22.9)	
Very low (%)	5 (2.7)	5 (4.9)	6 (8.57)	
Body image dissatisfaction				
No (%)	176 (93.6)	88 (85.4)	50 (71.4)	<0.001
Mild (%)	10 (5.3)	10 (9.7)	10(14.3)	
Moderate (%)	2 (1.1)	3 (2.9)	6 (8.6)	
Extreme (%)	0 (0.0)	2 (1.9)	4 (5.7)	

The data shown represent n (proportions), p value determined by Chi^2 test, $p < 0.05$ considered statistically significant.

The obese group presented the highest proportion with low or very low self-esteem ($p < 0.001$). Therefore, the obese group presented a higher proportion of body image dissatisfaction ($p < 0.001$) (Table 3).

Table 4 shows that body image dissatisfaction was associated with overweight/obesity status (OR = 4.12, $p < 0.001$), WtHR (OR = 3.53, $p < 0.001$) and self-esteem (OR = 2.91, p = 0.03).

TABLE 4. Association between body image dissatisfaction with anthropometric parameters and self-esteem according to gender in Chilean children-adolescents.

Variables	Body image dissatisfaction		
	Total (n=712)	Girls (n=351)	Boys (n=361)
Variable	OR (IC 95%), p-value	OR (IC 95%), p-value	OR (IC 95%), p-value
Overweight/obesity	4.12 (2.45-7.21), <0.001	3.49 (1.63-7.45), 0.001	5.28 (2.42-11.50), <0.001
WtHR (%)≥ 0.5	3.53 (2.01-6.18), <0.001	4.0 (1.75-9.11), 0.001	3.37 (1.62-7.85), 0.001
Self-esteem	2.91 (1.24-1.84), 0.03	2.67 (0.24-1.84), 0.02	3.22 (0.49-1.84), 0.03

The data shown represent the Odds Ratio (OR) IC95%, 95% Confidence Intervals and the p-value. $p < 0.05$ are considered statistically significant. BMI; Body mass index, WtHR; Waist to height ratio.

DISCUSSION

This research was aimed at determining if there is association between body image dissatisfaction with anthropometrics parameters, weight status and self-esteem in children from public schools.

Body image dissatisfaction was predominant in children with obesity, central obesity (WtHR ≥0.5) and girls, principally. Likewise, higher anthropometric parameters such as BMI were significantly associated with body image dissatisfaction, as found in a study with British schoolchildren in which those with higher adiposity had lower body estimates in boys and girls from different ethnic groups (16). A study carried out in Chile, which related anthropometric parameters with body image dissatisfaction in schoolchildren of different urban and rural ethnic groups, reported similar results, with higher BMIs, WCs and levels of body image dissatisfaction. These parameters were associated with increased risks of eating disorders (17).

In this study, the overweight and obesity conditions were associated with body image dissatisfaction, with results similar to those in a study in which girls from primary schools in the United States were evaluated, in this study BMI was shown to be a significant indicator of body image dissatisfaction because greater body mass implied exposing themselves to mockery (18). A recent study in Chile reported similar results in which obesity was associated with higher levels of body image dissatisfaction and other negative physical and anthropometric factors for children's health (14). Another study, reported that obese youth, regardless of gender, reported a poorer quality of life and higher rates of body image dissatisfaction compared with their normal-weight counterparts (19). A study in Portugal showed a significant association between obesity and body dissatisfaction as subjects with overweight and obesity were more dissatisfied with their body image and wished to be thinner (20).

In this study, a high percentage of students had low or very low self-esteem; this was associated with overweight and obesity conditions. Results similar to those were found in a meta-analysis which reported an association between obesity and self-esteem (21). Australian students of a similar age to those in the present investigation reported that obesity affects the self-perception of children who enter adolescence, especially for girls (22). It is important to consider, however, that children with obesity are more likely to be victimized by their peers in general and have family problems and less perceived social support; obesity is even considered a predictor of higher suicide rates (23). For this reason, the results are alarming and indicate the need to include the topic of body image in the school curriculum.

Body image dissatisfaction in this study was associated with obesity and abdominal obesity (i.e. abdominal obesity WtHR ≥0.5) and self-esteem, similarly an investigation was conducted to investigated prospective risk factors for increases in body dissatisfaction in adolescents. It was reported that BMI was a predictor of increases in body dissatisfaction, and low self-esteem may contribute to an increase in negative self-evaluation generally and in negative evaluation of the body particularly (24). A recent study in China reported that the majority of the female participants indicated a preference to be more slender. Body image dissatisfaction was negatively correlated with self-esteem and subjective well-being and was positively correlated with negative emotions (25). A study carried out in Brazil concluded that self-esteem influenced body dissatisfaction in adolescent girls (26).

Of the psychological components, body dissatisfaction is the component most strongly related to childhood obesity (4), and low self-esteem may be due in part to dissatisfaction with body size or concerns about being overweight that negatively affect the social and attitudinal perception that the children have on their own body (27). In a study in which Korean schoolchildren were evaluated, obese children showed greater body dissatisfaction and lower self-esteem than those of normal weight and those who were overweight but without higher levels of depression. In addition, obese children with body dissatisfaction had significantly lower self-esteem and higher levels of depressive symptoms than normal weight children or obese children without body dissatisfaction (4).

Limitations: The study has some limitations: i) age was not considered as an adjustment variable for the body image dissatisfaction, ii) the sample was study was intentional and iii) we did not compare schoolchildren with different physical activity patterns. Beside, the students evaluated were from low socio-economic status and presented high levels of segregation which affects psychosocial and emotional variables for their development (28). These factors, together with educational segregation, can increase mental health problems in vulnerable children.

CONCLUSION

This study showed the body image dissatisfaction of schoolchildren was associated with CMR, overweight/obesity status and self-esteem. It is important to consider that all of these variables affect the integral development and mental health of children and are associated with factors of greater complexity that alter their social behavior and academic performance, especially in a society in which the body is considered a reference of personal identity, overwhelmed by social pressure. These results suggest the need to carry out new research on different factors that may be affecting children in the educational system.

REFERENCES

1. Wardle J, Cooke L. The impact of obesity on psychological well-being. Best Pract Res Clin Endocrinol Metab. 2005;19 (3):421-40.
2. Strauss RS. Childhood obesity and self-esteem. Pediatrics. 2000;105(1):e15.
3. Mundy LK, Canterford L, Tucker D, Bayer J, Romaniuk H, Sawyer S, *et al.* Academic Performance in Primary School Children With Common Emotional and Behavioral Problems. J Sch Heatlh. 2017;87(8):593-601.
4. Shin NY, Shin MS. Body dissatisfaction, self-esteem, and depression in obese Korean children. Journal Pediatr. 2008;152(4):502-6.
5. Duchesne A-P, Dion J, Lalande D, Bégin C, Émond C, Lalande G, *et al*. Body dissatisfaction and psychological distress in adolescents: Is self-esteem a mediator? J. Health Psychol. 2017;22(12):1563-9.
6. McDermott E, Mullen G, Moloney J, Keegan D, Byrne K, Doherty GA, *et al*. Body image dissatisfaction: clinical features, and psychosocial disability in inflammatory bowel disease. Inflamm Bowel Dis. 2015;21(2):353-60.
7. Gestsdottir S, Svansdottir E, Sigurdsson H, Arnarsson A, Ommundsen Y, Arngrimsson S, *et al*. Different factors associate with body image in adolescence than in emerging adulthood: A gender comparison in a follow-up study. Health Psychol Rep. 2018; 6(1):81-93.
8. Joseph C, LoBue V, Rivera LM, Irving J, Savoy S, Shiffrar M. An attentional bias for thin bodies and its relation to body dissatisfaction. Body Image. 2016;19:216-223.
9. Bhatt-Poulose K, James K, Reid M, Harrison A, Asnani M. Increased rates of body dissatisfaction, depressive symptoms, and suicide attempts in Jamaican teens with sickle cell disease. Pediatr Blood Cancer. 2016;63(12):2159-2166.
10. Danielsen YS, Stormark KM, Nordhus IH, Maehle M, Sand L, Ekornas B, *et al*. Factors associated with low self-esteem in children with overweight. Obes Facts. 2012;5(5):722-33.
11. Centers for Disease Control and Prevention, Overweight and obesity; Defining overweight and obesity. 2010.
12. Chung IH, Park S, Park MJ, Yoo EG. Waist-to-Height Ratio as an Index for Cardiometabolic Risk in Adolescents: Results from the 1998-2008 KNHANES. Yonsei Med J. 2016;57(3):658-63.
13. Cooper PJ, Taylor MJ, Cooper Z, Fairbum CG. The development and validation of the Body Shape Questionnaire. Int. J. Eat. Disord. 1987;6 (4): 485-494.
14. Delgado P, Martínez C, Caamaño F, Jerez D, Osorio A, García F, *et al*. Insatisfacción con la imagen corporal y su relación con el estado nutricional, riesgo cardiometabólico y capacidad cardiorrespiratoria en niños pertenecientes a centros educativos públicos. Nutr Hosp. 2017;34(5):1044-9.
15. Marchant T, Haeussler I, Torretti A. TAE: Battery to evaluate school self-esteem. Santiago: Ediciones Universidad Católica de Chile. 2002.
16. Duncan MJ, Al-Nakeeb Y, Nevill AM. Body esteem and body fat in British school children from different ethnic groups. Body Image. 2004;1(3):311-5.
17. Rosas Muñoz M, Delgado Floody P, Cea Leiva F, Alarcón Hormazábal M, Alvarez San Martín R, Quezada Gallego K. Comparison of the risks in eating disorders and body image among mapuches and not mapuches students. Nutr Hosp. 2015;32(6):2926-2931.
18. Vander Wal JS, Thelen MH. Predictors of body image dissatisfaction in elementary-age school girls. Eat Behav. 2000;1(2):105-22.
19. Gouveia MJ, Frontini R, Canavarro MC, Moreira H. Quality of life and psychological functioning in pediatric obesity: the role of body image dissatisfaction between girls and boys of different ages. Qual life Res. 2014;23(9):2629-38.
20. Coelho EM, Fonseca SC, Pinto GS, Mourão-Carvalhal MI. Factors associated with body image dissatisfaction in Portuguese adolescents: obesity, sports activity and TV watching. Motricidade. 2016;12(2).
21. Griffiths LJ, Parsons TJ, Hill AJ. Self-esteem and quality of life in obese children and adolescents: a systematic review. Int J Pediatr Obes. 2010;5(4):282-304.

22. Franklin J, Denyer G, Steinbeck KS, Caterson ID, Hill AJ. Obesity and risk of low self-esteem: a statewide survey of Australian children. Pediatrics. 2006;118(6):2481-7.
23. Brausch AM, Decker KM. Self-esteem and social support as moderators of depression, body image, and disordered eating for suicidal ideation in adolescents. JJ Abnorm Child Psychol. 2014;42(5):779-89.
24. Paxton SJ, Eisenberg ME, Neumark-Sztainer D. Prospective predictors of body dissatisfaction in adolescent girls and boys: a five-year longitudinal study. Dev Psychol. 2006;42(5):888-99.
25. Wang K, Liang R, Ma ZL, Chen J, Cheung EF, Roalf DR, *et al*. Body image attitude among Chinese college students. PsyCh journal. 2018;7(1):31-40.
26. Fortes LS, Cipriani FM, Coelho FD, Paes ST, Ferreira MEC. Does self-esteem affect body dissatisfaction levels in female adolescents? Revista Paulista de Pediatria. 2014;32(3):236-40.
27. Erickson SJ, Robinson TN, Haydel KF, Killen JD. Are overweight children unhappy?: Body mass index, depressive symptoms, and overweight concerns in elementary school children. Arch Pediatr Adolesc Med. 2000;154(9):931-5.
28. Contreras D, Sepúlveda P, Bustos S. When schools are the ones that choose: The effects of screening in Chile. Social Science Quarterly. 2010;91(5):1349-68.

Recibido: 19-11-2018
Aceptado: 05-04-2019