

Excess weight and health-related quality of life in Latin American adolescents

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Summary

The purpose of the study was to identify differences in the components of health-related quality of life (HRQL) across weight status in samples of adolescents from three cities in Argentina, Brazil, and Chile. The *Kidscreen-52* questionnaire was administered to 1357 adolescents between 12 and 17 years of age (48.6% of them male) in selected samples in the three countries. To define the weight status (eutrophic, overweight, obesity) we used the gender-and-age-specific body mass index cut-offs recommended by the *International Obesity Task Force – IOFT*. Analysis of covariance was used to make comparisons between strata formed by controlling the scores associated with the city/country of origin, sex and age. Considering all adolescents in the study, 35.2% of girls and 28.6% of boys were overweight, of which 6.4% and 4.7%, respectively, showed to be obese. Magnitude of the prevalence increases with age, being these values more pronounced among the boys. Compared to eutrophic adolescents, the obese adolescents presented scores significantly more injured in the ten components of HRQL. The overweight adolescents showed significantly lower values than eutrophic adolescents in the components equivalent to *Physical Well-being, Psychological Well-being, Moods and Emotions, Self-Perceptions, Social Support and Peers, School Environment, and Social Acceptance/Bullying*. In addition, the comparison between overweight and obese adolescents showed statistically significant differences for the components of *Physical Well-being, Self-Perceptions, and Social Acceptance/Bullying*. Therefore the evidences found indicate to the importance of monitoring and intervening in HRQL components related to the proposed programs for the reversal of overweight/obesity and weight control.

Key words:

Health education.
Overweight. Obesity.
Adolescent health.
Latin America.

Exceso de peso corporal y calidad de vida relacionada con la salud de adolescentes latino-americanos

Resumen

El objetivo del estudio fue identificar diferencias en los componentes de la calidad de vida relacionada con la salud (CVRS) según el estado ponderal en una muestra de adolescentes de tres ciudades localizadas en Argentina, Brasil y Chile. Se aplicó el cuestionario *Kidscreen-52* a 1.357 adolescentes con edades comprendidas entre 12 y 17 años (48,6% chicos) en muestras seleccionadas en los tres países. El estado ponderal (eutrófico, sobrepeso y obesidad) fue definido mediante el índice de masa corporal, utilizándose los puntos de corte sugeridos por la *International Obesity Task Force*. Para establecer comparaciones entre los estratos formados, se utilizó el análisis de covarianza mediante el control de las puntuaciones asociadas a la ciudad/país de origen, sexo y edad. Considerando la totalidad de los adolescentes reunidos en el estudio, el 35,2% de las chicas y el 28,6% de los chicos presentaron exceso de peso corporal, de los cuales, 6,4% y el 4,7% respectivamente, mostraron ser obesos. Se observó aumento en las prevalencias de sobrepeso y obesidad con la edad, sobretodo en el grupo de los chicos. En comparación con los adolescentes eutróficos, los adolescentes obesos obtuvieron puntuaciones significativamente más comprometidas en los diez componentes de CVRS. Los adolescentes con sobrepeso mostraron valores significativamente menores que los adolescentes eutróficos en los componentes de *Bienestar Físico, Bienestar Psicológico, Estado de Ánimo y Emociones, Autopercepción, Amigos y Apoyo Social, Entorno Escolar y Rechazo Social/Bullying*. Además, en la comparación entre adolescentes con sobrepeso y obesos, las diferencias demostraron estadísticamente significativas para los componentes de *Bienestar Físico, Autopercepción y Rechazo Social/Bullying*. Por consiguiente, las evidencias encontradas apuntan hacia la importancia de monitorizar e intervenir en los componentes de CVRS relacionados con la propuesta de programas dirigidos a la reversión del sobrepeso/obesidad y al control del peso corporal.

Palabras clave:

Educación en salud.
Sobrepeso. Obesidad.
Salud del adolescente.
América Latina.

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Introduction

Over the past few decades, the prevalence of excess weight and obesity in young demographics has become established as a worldwide epidemic¹. Despite more developed countries recently revealing a stabilising trend in the amount of young people with excess body weight², in Latin American countries cases of children and adolescents with excess weight and obesity continue to grow at an alarming rate³. Available literary data suggests that there are currently between 42.5 and 51.8 million young people aged up to 19 years living in Latin America that are overweight or obese, which corresponds to approximately 20-25% of the total of this demographic⁴.

Excess body weight has an immediate repercussion on the metabolic health of young people, which is the case of dyslipidemia, hypertension and glucose intolerance, therefore defining the metabolic syndrome⁵. Having a heavier body weight also increases the risk of the appearance and development of cardiovascular, respiratory, endocrine, hepatic, gastrointestinal, orthopaedic and neurological disorders⁶. Other consequences of excess weight and obesity are psychosocial aspects, including low self-esteem, a negative self-image, discrimination, stigmatisation, social exclusion and depression⁷. Worse still, it is estimated that depending on the age of the onset and magnitude of the excess body weight, approximately 30% to 80% of young overweight or obese people can become obese adults⁸.

As well as the co-morbidities and the psychosocial consequences linked to excess body weight specific to early ages, with serious immediate and future risks to the young people concerned, their family members and society in general, another issue highlighted by researchers in this field refers to the influence that the condition of excess weight/obesity can have on the perception of health-related quality of life components (HRQL). In this respect, it has been confirmed that the relationship between excess weight/obesity and the eventual deterioration of HRQL is sufficiently established in adults⁹ and young obese people undergoing clinical treatment¹⁰. However, few studies have been found that aim to research the relationship between HRQL components and the weight condition in a demographic of young people, and fewer still in Latin American countries. The few studies available in literature reveal data from English-speaking cultures, and in some cases they use different measurement instruments to identify the HRQL components, with contradictory results^{11,12}.

The aim of this study was to identify differences between the different HRQL components in alignment with the weight condition

(eutrophic, excess weight and obesity) in a sample of adolescents from three cities, located in Argentina, Brazil and Chile. From the very outset, the hypothesis was established that adolescents with excess weight and obesity would reveal more affected equivalent HRQL components than their eutrophic peers.

Material and method

A transverse descriptive study was carried out on a population of adolescents, that during 2009 were studying between sixth grade and tenth grade in three different Latin American urban state schools. The cities chosen for the study were San Miguel de Tucumán, located in the province with the same name in the north west of Argentina; Londrina, located in the region of Paraná, in southern Brazil; and Valparaíso, which is in province of the same name in central Chile. According to data from the Head of Statistics of the Education Secretaries from the three cities, at the time the studies were carried out, around 38, 70 and 53 thousand students respectively were registered for these levels of studies.

The intervention protocols used were approved by the Research Ethics Committee of the State University of Londrina, Brazil (Decree no. 073/2007) and followed the regulations of Ruling 196/96 of the National Health Council of Brazil regarding research involving humans.

Sample and selection of subjects

With regards to the sample size, a confidence interval of 95% was taken into account, an unknown success prevalence ($p = 50\%$), a design effect of 1% and precision effect of 3%. Despite a size of 1,320 subjects being calculated, the final sample comprised 1,357 adolescents aged from 12 to 17 years (698 girls and 659 boys), distributed proportionally in accordance with the school year of each of the three cities/countries studied. A random selection was made of four schools in each city/country, and a probability sample procedure was used by conglomerates to select the adolescents in the schools, using the number of students as references in terms of sex, age and school level (Table 1).

The adolescents selected for the sample were informed of the nature and objectives of the study, under the principle of anonymity and non-influence of school performance. Consent was given by all participants and their tutors. The study inclusion criteria were: to be aged between 12 and 17 years, to be able to read and fill out the questionnaire, and to be present in class on the day indicated for data collection.

Table 1. Composition of the sample selected in the study considering the three classification criteria: cities/countries, sex and age (n = 1357).

Age	Tucumán, Argentina (n=327)		Londrina, Brazil (n=588)		Valparaíso, Chile (n=442)	
	Girls (n=168)	Boys (n=159)	Girls (n=303)	Boys (n=285)	Girls (n=227)	Boys (n=215)
12-13 years (n=443)	55	52	99	93	74	70
14-15 years (n=525)	65	62	117	110	88	83
16-17 years (n=389)	48	45	87	82	65	62

Data collection

The data collection in the three Latin American cities/countries followed the same procedures and was undertaken from May to September 2009. The indicators of excess weight and obesity were defined based on the body mass index (BMI), by dividing the body weight measurements in kilograms by the height in square metres (kg/m^2), using the cut points for sex and age suggested by the *International Obesity Task Force – IOFT*¹³.

To establish the averages corresponding to body weight, an anthropometric scale was used with a precision of 100 grammes, which was checked after every ten weighs. To carry out the height measurements, an aluminium stadiometer was used with a 1 mm scale, following the procedures suggested by the World Health Organisation¹⁴.

The HRQL components were identified and scaled by applying the *Kidscreen-52* questionnaire¹⁵. In the specific case of Argentinian and Chilean adolescents, a translated and transculturally adapted Spanish-language version of *Kidscreen-52* was used¹⁶. For the Brazilian adolescents, a translated and adapted *Kidscreen-52* version for the South American Portuguese language was used¹⁷.

The *Kidscreen-52* questionnaire consists of 52 questions orientated towards the perception of 10 HRQL components in children and adolescents (Table 2). The responses to these questions are recorded using a Likert-type scale from one to five points (with the extremities being from “not at all” to “a lot” or from “never” to “always”), with the aim of identifying the frequency of behaviours/feelings or, in some cases, the intensity of specific attitudes, in the period of the week prior to filling out the questionnaire. The results of each component are counted using a syntax, which takes into account the responses of a group of questions that make up each field, with the questions being equally weighted. The final equivalent markers from each component are recoded into a measurement scale, with a variation between 0 and 100, with 0 being the least perception and 100 being the greatest perception of HRQL of the component in question¹⁵.

The *Kidscreen-52* questionnaire was applied on just one occasion, individually for each student, by a single researcher in each Latin American city/country, in the school centre and during class time. The study participants received the questionnaire with instructions and recommendations so they could fill it out with no time limit. The participants' queries were clarified by the researcher present for the data collection. The average time taken to fill out the questionnaire was 30 minutes. In terms of the reliability of the questionnaire used for the adolescents from the three selected cities, the internal consistency values via the Cronbach co-efficient α varied between 0.71 in the *Self-perception* component, and 0.89 in the *Economic Resources* component, with an average overall value of 0.82.

Statistical analysis

The statistical handling of the data was carried out using the IT package *Statistical Package for the Social Science*, version 21. With regards to the equivalent indicators of excess weight and obesity, the stratified point proportions were estimated in accordance with the sex (boys and girls), age (12 to 13 years, 14 to 15 years and 16 to 17 years) and city/country of origin of the adolescents (Tucumán-Argentina, Londrina-Brazil, Valparaíso-Chile).

In terms of the data referring to the HRQL components, initially the frequency distribution was analysed via the Kolmogorov-Smirnov test. Considering that the data revealed a normal frequency distribution, parametric statistic resources were used, by calculating the average and standard deviation. Later, to establish comparisons between the scores given to the HRQL components associated with the presence of excess weight and obesity, the co-variance analysis was used (ANCOVA), adjusted by sex, age and city/country of origin of the adolescents, accompanied by the Scheffe multiple comparison test to identify the specific differences.

Table 2. Components of the *Kidscreen-52*.

Components	Items	Brief description of the content
1. Physical well-being	5	Participation in physical activity, energy and physical aptitude.
2. Psychological well-being	6	Positive feelings and satisfaction with life.
3. Mood and emotions	7	Depressing and stressful emotions.
4. Self-perception	5	Self-perception and satisfaction with bodily appearance.
5. Autonomy	5	Opportunities to create and manage their social and leisure time.
6. Relationship with parents and family life	6	Quality of the relationship with their parents and in the family environment.
7. Friends and social support	6	Nature of relationships with others.
8. School environment	6	Satisfaction regarding their competence and school performance.
9. Social rejection/bullying	3	Aspects regarding feelings of rejection by peers.
10. Economic resources	3	Perception in terms of the quality of available economic resources.

Results

Figure 1 reveals the prevalence of excess body weight (excess weight + obesity) estimated in the sample of adolescents analysed. Considering the total number of adolescents participating in the study, 35.2% of the girls and 28.6% of the boys displayed values of excess body weight, of which 6.4% and 4.7% respectively displayed obesity values. When the different ages were taken into account, the trends of increasing excess weight and obesity were confirmed with the passing of years, especially in the group of boys. In relation to the cities/countries of origin of the adolescents, the lowest percentages of girls and boys with excess weight and obesity were observed in San Miguel de Tucumán/Argentina, and the highest were identified in adolescents from Valparaíso/Chile.

Table 3 displays the information associated with the multi-variable analysis of the scores given to the HRQL components depending on weight, adjusted by city/country of origin, sex and age. In comparison to eutrophic adolescents, it has been revealed that obese adolescents display considerably more adversely affected scores in the ten HRQL components. In the case of adolescents with excess weight, they revealed significantly lower values than eutrophic adolescents in the components relating to *Physical well-being*, *Psychological well-being*, *Mood and emotions*, *Self-perception*, *Friends and social support*, *School environment* and *Social rejection/bullying*. Furthermore, in the comparison of adolescents with excess weight and obesity, the differences turned out to be statistically significant for the *Physical well-being*, *Self-perception* and *Social rejection/bullying* components.

Discussion

This study analysed the scores given to the HRQL components in adolescents from three Latin American cities/countries, classified

in accordance with weight. The importance of the study is due to the possibility of considering, for the first time, the HRQL components of a multi-cultural sample of over-weight and obese adolescents using an internationally accepted instrument (*Kidscreen-52*), which can verify the urgent need to intervene, in that it is added to the traditional argument regarding the concern for subjective aspects linked to quality of life.

The results found revealed that, using the specific cut points for sex and age proposed by the IOTF, it is estimated that the prevalence of excess body weight (excess weight + obesity) in the sample analysed

Figure 1. Prevalence of excess body weight (excess weight + obesity) stratified in accordance with cities/countries, sex and age of a sample of Latin American adolescents.

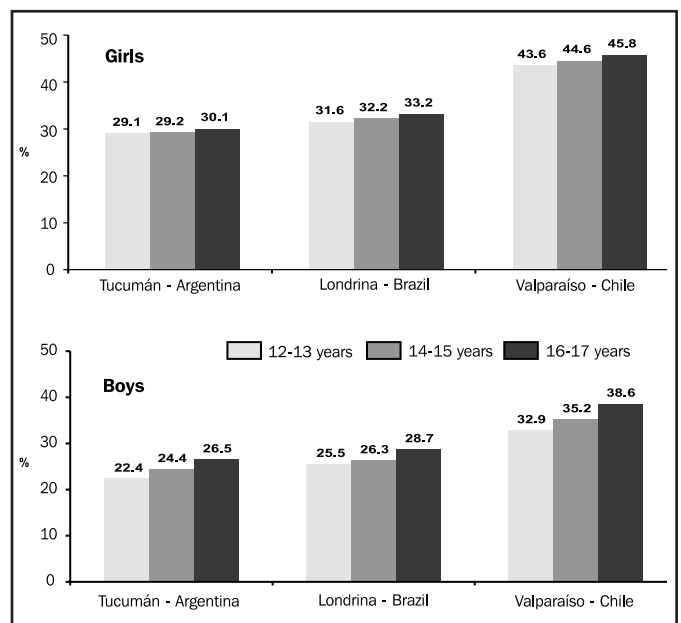


Table 3. Average, standard deviation and F test of the scores equivalent to the health-related quality of life components of the adolescents surveyed depending on their weight.

Quality of life components	Weight			F test	Post-Hoc Scheffé
	Eutrophic (a)	Excess weight (b)	Obesity (c)		
Physical well-being	78.65±17.85	69.58±16.98	57.79±15.65	45.218 (p < 0,001)	a > b > c
Psychological well-being	79.53±20.23	73.92±19.87	72.17±19.11	9.814 (p < 0,001)	b < a > c
Mood and emotions	86.03±19.54	78.31±18.14	77.89±18.87	10.492 (p < 0,001)	b < a > c
Self-perception	80.78±17.11	71.17±16.53	64.35±15.58	31.566 (p < 0,001)	a > b > c
Autonomy	81.34±21.38	77.85±20.46	74.54±19.93	8.738 (p = 0,001)	a > c
Relationship with parents and family life	80.89±22.19	77.96±21.79	73.77±20.81	8.195 (p = 0,001)	a > c
Friends and social support	86.47±20.65	78.78±19.32	77.24±19.65	10.093 (p < 0,001)	b < a > c
School environment	75.14±19.47	66.24±18.25	63.13±19.43	13.651 (p < 0,001)	b < a > c
Social rejection/bullying	76.18±19.72	65.02±18.51	58.51±16.72	40.382 (p < 0,001)	a > b > c
Economic resources	79.95±21.90	75.57±20.84	72.80±22.19	7.879 (p = 0,001)	a > c

Co-variance analysis through the control of points associated with the city/country of origin, sex and age.

(31.9%) was approximately four times greater than that found in studies carried out on a young demographic in China (7.7%)¹⁸, and on the other hand quite similar to that found in the United States (32.6%)¹⁹.

The prevalences of excess weight and obesity were not evenly distributed in the sample analysed in this study. The sex, age and city/country of origin of the adolescents revealed different implications in the identification of excess weight and obesity. Coinciding with data from other studies²⁰, a larger number of girls presented greater excess body weight. Added to all of this, in this case, the excessive accumulation of body weight remained practically stable from 12 to 17 years. In terms of the boys, the prevalences of excess weight and obesity rose as the age increased. According to information available in specialised literature, only the studies that displayed the greatest prevalences of excess weight and obesity revealed similar trends^{4,19}. In the other studies that were accessed, both boys and girls displayed greater prevalences of excess weight and obesity at younger ages^{18,20}.

Supporting the different information previously available in literature^{11,12,21-25}, the findings from this study point to the major negative influence that excess body weight can have on HRQL components. The adolescents classified as obese revealed lower scores in all the quality of life components present in the *Kidscreen-52*, compared to their eutrophic peers, thereby suggesting that the impact of this condition is global and must occur in the different parts of the daily life of adolescents. Despite the HRQL components not being projected to monitor all the areas that are specifically related to excess body weight²⁶, their weighting may bring together important information, such as how young people with excess weight or obesity perceive their health and well-being. In this particular field, the dimensions of the HRQL components translate as outstanding health aspects, which are not detected using traditional biological and clinical dimensions.

The condition of excess weight and obesity frequently causes teasing by classmates with lower body weight. The strong influence of the surroundings, along with the perception of irony, increases personal insecurity, damages self-esteem and emotional well-being, and hinders interpersonal relationships²⁷. As they get older, young people become increasingly aware of their surroundings, they perceive interpersonal differences more clearly, they make comparisons, prioritise self-criticism, and negative self-perception and personal dissatisfaction emerge²⁸. The reduction in self-esteem determines a greater influence of peers and a perception of less social acceptance, which can lead to a more introverted character²⁴, as well as, according to that revealed with the results found in this study, adversely affected psycho-social elements that deteriorate HRQL components.

On the other hand, the data from this study reveals that, in relation to the quality of life components equivalent to *Physical well-being, Mood and emotions, Self-perception* and *Social rejection/bullying*, even greater adverse effects are revealed in obese adolescents, whilst *Autonomy, Relationship with parents and family life* and *Economic resources* are components that reveal similar scores among eutrophic and over-weight adolescents. These findings back up some suggestions from previous

studies²³ that some HRQL components may be more affected than others as a result of excess body weight at a young age, with particular emphasis on physical, emotional and social aspects.

In the *Kidscreen-52* these fields consider items related to participation in physical activity, energy and physical aptitude, depressing and stressful situations, self-perception and satisfaction with bodily appearance, the nature of relationships with peers and feelings or rejection, i.e. issues that may eventually hinder participation in body weight control programmes, therefore establishing a vicious circle: greater accumulation of body weight - adversely affected HRQL components - less participation in intervention programmes - greater accumulation of body weight. Experimental studies that specifically involve clinical samples have proved this phenomenon^{29,30}.

Among the HRQL components included in *Kidscreen-52*, the greatest differences identified between eutrophic adolescents and those with excess body weight were in the physical area. This could be due to the difficulty reported by the adolescents with excess weight or obesity in participating in some kind of physical or sporting activity, related to metabolic limitations and orthopaedic problems, consequently inducing restrictions in possibilities of moving about. Less availability of energy and poor alignment of the lower limbs, accompanied by excessive over-loading generated by a greater body weight, are typical characteristics of young people with excess weight or obesity⁶, which decisively contribute to greater cardio-metabolic and muscular-skeletal discomfort, in general converting the performing of physical exercise into a great sacrifice.

This study is not extent of limitations. For example, it is important to indicate that the data equivalent to the HRQL components was self-reported by the adolescents themselves. Likewise, self-reporting is a habitual procedure in studies of this nature, as it is the most viable way of obtaining data related to quality of life in wide demographics. On the other hand, the vast sample size in some way enabled the eventual imprecision of calculated estimates to be minimised. Furthermore, the transverse approach of the data could have limited the identification of differences, without formulating the possibility of there being an inverse causality. Another limitation was the presence of possible undiagnosed co-morbidities associated with excess weight and obesity, which could have interfered in the quality of life of the adolescents with excess body weight.

To conclude, the results of this study suggest that adolescents with excess weight and obesity reveal more adversely affected specific HRQL components than their eutrophic peers. Even so, finding from this study indicate the importance of monitoring and intervening in HRQL components that target the proposal of programmes aimed at reducing excess weight/obesity and controlling body weight. Initiatives in this respect may be useful as references in assessing the effectiveness and actions established in intervention programmes, as well as helping understand the consequences of excess body weight for adolescents and conditioning public policies that specifically target this demographic.

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