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PREVALENCE OF OVERWEIGHT AND OBESITY IN TEENAGERS: THE REALITY AND THE PARENTS PERCEPTION

PREVALÊNCIA DE SOBREPESO E OBESIDADE EM ADOLESCENTES: A REALIDADE E A PERCEÇÃO DOS PAIS

PREVALENCIA DE SOBREPESO Y OBESIDAD EN ADOLESCENTES: LA REALIDAD Y LA PERCEPCIÓN DE LOS PADRES

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ABSTRACT

Introduction: The study was developed in a Basic School of the Alentejano Coast, in teenagers of the 2nd cycle, aged between 10 and 12 years. The assessment of the nutritional status of these teenagers was a need felt by the school community, communicated to the Nursing team of the Community Care Unit, within the scope of School Health. At the same time, understanding the parents' concern and perception not only about weight but also about the level of food control of teenagers will be decisive in any intervention directed to the problem of obesity.

Objectives: To determine the nutritional status of teenagers, and to cross-reference it with the variables gender, age and year of schooling. Then assess the concern and perception of parents about their children's weight and level of food control.

Material and Methods: A descriptive-correlational observational study was carried out. The percentiles associated with the body mass index of 131 teenagers were determined and the questionnaire of eating behavior was applied to parents (56 observations). Given the qualitative nature of the variables, comparison tests of proportions were applied using Spearman's correlation coefficient and independence tests based on chi-square statistics.

Results: Had adequate weight, 61.1% and 38.9% overweight or obesity. Fifth year with higher prevalence of overweight, and the 6th year of obesity. Of the parents: 25% perceived their children with low weight, 62.5% with normal weight and 12.5% with overweight.

Conclusion: Population with high prevalence of overweight and obesity. Parents showed little concern about weight and distorted perception, classifying teenagers with less weight than they presented.

Keywords: Health Promotion; Nursing; Obesity; Overweight; Parents; Teenagers.

RESUMO

Introdução: O estudo desenvolveu-se numa Escola Básica do Litoral Alentejano, em adolescentes do 2.º ciclo, com idades entre os 10 e 12 anos. A avaliação do estado nutricional destes adolescentes foi uma necessidade sentida pela comunidade escolar, comunicada à equipa de Enfermagem da Unidade de Cuidados na Comunidade, no âmbito da Saúde Escolar. Simultaneamente, compreender a preocupação e perceção dos pais não apenas quanto ao peso mas também quanto ao nível de controlo alimentar dos adolescentes será determinante em qualquer intervenção direcionada à problemática da obesidade.

Objetivos: Determinar o estado nutricional dos adolescentes, e cruzar o mesmo com as variáveis sexo, idade e ano de escolaridade. Seguidamente, avaliar a preocupação e perceção dos pais quanto ao peso dos filhos e nível de controlo alimentar.

Material e Métodos: Efetuou-se um estudo observacional descritivo-correlacional. Determinaram-se os percentis associados ao índice de massa corporal de 131 adolescentes e aplicou-se o questionário do comportamento alimentar aos pais (56 observações). Dado o cariz qualitativo das variáveis, aplicaram-se testes de comparação de proporções, através do coeficiente de correlação de Spearman e testes de independência baseados na estatística qui-quadrado.

Resultados: Apresentaram peso adequado, 61,1% e 38,9% sobrepeso ou obesidade. O 5.º ano com maior prevalência de sobrepeso, e o 6.º ano de obesidade. Dos pais: 25% percecionaram os filhos com baixo peso, 62,5% com peso normal e 12,5% com sobrepeso.

Conclusão: População com elevada prevalência de sobrepeso e obesidade. Os pais demonstraram pouca preocupação com o peso e perceção distorcida, classificando os adolescentes com peso inferior ao que efetivamente apresentaram.

Palavras-chave: Adolescentes; Enfermagem; Obesidade; Pais; Promoção da Saúde; Sobrepeso.

RESUMEN

Introducción: El estudio fue realizado en una Escuela Básica de la Costa Alentejana, en adolescentes de 2.º ciclo, con edades entre 10 y 12 años. La evaluación del estado nutricional de estos adolescentes fue una necesidad sentida por la comunidad escolar, comunicada al equipo de Enfermería de la Unidad de Atención a la Comunidad, en el ámbito de la Salud Escolar. Al mismo tiempo, se intentó comprender la preocupación y percepción de los padres no solo sobre el peso sino también sobre el nivel de control dietético de los adolescentes será crucial en cualquier intervención dirigida al problema de la obesidad.

Objetivos: Determinar el estado nutricional de los adolescentes, y cruzarlo con las variables sexo, edad y año de escolaridad. Luego, evalúe la preocupación y percepción de los padres sobre el peso y el nivel de control dietético de sus hijos.
Material y Métodos: Se realizó un estudio observacional descriptivo-correlacional. Se determinaron los percentiles asociados al índice de masa corporal de 131 adolescentes y se aplicó el cuestionario de conducta alimentaria a los padres (56 observaciones). Dada la naturaleza cualitativa de las variables, se aplicaron pruebas de comparación de proporciones utilizando el coeficiente de correlación de Spearman y pruebas de independencia basadas en el estadístico chi-cuadrado.
Resultados: Presentaron peso adecuado, el 61,1% y el 38,9% tenían sobrepeso u obesidad. El 5to año con mayor prevalencia de sobrepeso, y el 6to año de obesidad. Padres de familia: el 25% percibía a sus hijos con bajo peso, el 62,5% con peso normal y el 12,5% con sobrepeso.
Conclusión: Población con alta prevalencia de sobrepeso y obesidad. Los padres mostraron poca preocupación por el peso y percepción distorsionada, clasificando a los adolescentes con un peso inferior al que realmente presentaban.
Descriptores: Adolescentes; Enfermería; Exceso de Peso; Obesidad; País; Promoción de la salud.

INTRODUCTION

According to the World Health Organization (WHO), overweight and obesity are defined as an excessive accumulation of fat deposition by successive positive energy balances, in which the amount of energy ingested is greater than the amount of energy expended[1]. Obesity then appears to be defined as a chronic disease in which excess accumulated body fat can reach degrees capable of affecting health and constitute an important risk factor for the development and worsening of other diseases, especially cardiovascular diseases, reducing quality of life and implying high costs associated with health care[1].

It is proven that lifestyles condition individual health throughout the life path of people[2,3], deserving, in this context, the younger age groups, particular attention.

Obesity in children and teenagers, like the rest of the population, results from the interaction between intrinsic factors, such as genetics and physiology, and with extrinsic factors, such as their social relationship with the community, which are considered determinant in increasing the incidence and prevalence of obesity[4].

According to the World Bank Group, since 1975 global obesity has tripled, accounting for the annual loss of 4 million lives[5]. In 2016, more than 1.9 billion people, aged 18 and over, were overweight and of these, about 650 million obese. In percentage terms, 39% of the world population is overweight and 13% are obese[1].

In this context, and worryingly, it is emphasized that the worldwide prevalence of overweight and obesity in children and teenagers has been increasing at an alarming rate, especially in developed countries[6]. It is estimated that about 340 million people aged between 5 and 19 are overweight or obese[1,7].

Currently, Portugal is one of the main European countries with the highest prevalence of overweight, both in adults and in children and teenagers[2,4,8], reaching more than a quarter of teenagers and more than half of the adult population[2].

Evaluating the country by the hierarchical division of the territory into regions (Nomenclature of Territorial Units for Statistical Purposes II), it is verified that the prevalence of overweight is higher in the North (58.6%) and lower in the Alentejo region (53.4%)[9].

At this juncture, several studies point to obesity as one of the most difficult pathologies to treat, being the most frequent nutritional disorder in teenagers[10-12]. It is verified, then, that preventing obesity is much more important than treating it[13]. Therefore, the implementation of strategies aimed at prevention and early diagnosis is of irrefutable importance.

Although it is consensual the use of body mass index (BMI) in kilogram per meter square, as an anthropometric parameter recommended by the WHO for the assessment of nutritional status, different criteria have been used to determine childhood obesity[14]. Child growth curves, based on the gender-age-BMI relationship, described as percentiles (P), have been a fundamental instrument to monitor the state of nutrition and growth of children and teenagers[15]. These curves cover the infant-juvenile population, aged 5-19, and constitute a reconstruction of the previously recommended growth reference[14].

According to the WHO, the extension of the curves allowed an adaptation to the child's growth pattern and the limits of overweight and obesity for adults, and represent a more international pattern, regardless of ethnicity or socio-economic status. The BMI thresholds that define the classification as low weight correspond to BMI < P3, as normal or adequate weight between P3 ≤ BMI < P85, overweight between P85 ≤ BMI < P97 and obesity BMI ≥ P97[14].

Adolescence is a stage of human development that is characterized by drastic changes at all levels, being defined by the WHO as the individual aged between ten and twenty[16]. In this, exuberant physical changes occur, accompanied by a substantial increase in cognitive and affective abilities, as well as a restructuring of the socialization process[15,17].

Due to its significant changes, the adolescent is moldable and is receptive to the influences of the social and family models that surround him. The family is often considered as one of its main sources of influence, about attitudes and behaviors related to health[18].

In this sense, it is important to assess the ability of parents to perceive the real nutritional status of their children and allow the support of possible interventions to prevent and treat obesity. Parents play an essential role in the diagnosis and treatment of their children's overweight[19]. Their inability to express concern and have a distorted perception about their children's overweight are the main reasons for the increase in childhood obesity[20,21].

If the parents are not able to perceive, for the adolescent's age, the overweight that the adolescent presents, or does not recognize the health risks associated with it, the programs for the prevention and treatment of juvenile obesity will not achieve the success coveted[21,22].

The present study was developed in a Basic School of the Alentejano Coast, in teenagers who attend the 2nd cycle, aged between 10 and 12. The assessment of the nutritional status of these teenagers was a need felt by the physical education pedagogical team, within the scope of a school project called FITschool. This need was transmitted to the nursing team responsible for School Health in the municipality of Santiago do Cacém, regarding the activities developed in the Community Care Unit of the Local Health Unit of the Alentejano Coast (ULSLA).

The School is recognized as the place of choice for the implementation of health-promoting activities[23]. In this context, in addition to being able to cover many students, from different socio-economic classes and in a short period of time, the entire school community, as well as parents or guardians (PoG) can and should be involved in a possible Community intervention[24].

Considering that the study population is in an early stage of adolescence, parents still often control their children's lifestyles. Thus, understanding the concern and perception of parents/PoG not only regarding weight, but also regarding the level of food control will be crucial in any intervention aimed at the problem of youth obesity.

With the present study, it was intended to determine the nutritional status of teenagers, through BMI data and their calculation of the Percentile associated with child and adolescent growth curves[15], and to cross the same with the variables gender, age and year of schooling. Next, it was intended to assess the concern and perception of parents about the weight of their children and level of food control.

MATERIAL AND METHOD

This is a descriptive-correlational observational study.

The BMI-associated percentiles of 131 teenagers in the 2nd cycle, attending this school year and divided into seven classes, were determined. Initially, according to anthropometric data, descriptive analysis of the variables associated with the percentile was carried out, namely gender, age and differentiation among teenagers of 5th or 6th year. Access to anthropometric data was made available by the pedagogical team responsible for the FITschool program, with the anonymity of the participants. The file delivered consisted, differentiated by class, the gender of the adolescent, age, height, weight and BMI.

Then, the population was broken down into the following categories: low weight, normal or adequate weight, overweight and obesity. It should be noted that anthropometric data were evaluated in the school environment, by physical education teachers and in the first quarter of the 2020/2021 school year. The material resources used for this evaluation were the same for the entire target population.

BMI was evaluated according to WHO criteria, adopted by the Directorate-General for Health[15], and translated into percentiles.

All data collection documents were anonymous, and information was therefore not recorded to identify participants. The information collected was processed in the form of aggregated data, and only information relevant to the study concerned was requested.

The parents/PoG of the teenagers applied the questionnaire of eating behavior[25], through digital means, in which some of the questions aimed to ascertain their perception and concern about the weight of the children, as well as the perception about the level of food control exercised at home and outside it, obtaining 56 observations. This questionnaire was made available in December 2020 and remained available until January 31, 2021.

It is important to refer to the non-random character of the samples, since the questionnaire was made available to the entire population, who had the possibility and freedom to answer or not. Nevertheless, it was considered that since the representative sample of the study population was the result, the results could be inferenced for it, that is, for teenagers in the 2nd cycle.

The Eating Behavior Questionnaire was adapted from the Questionnaire of Infant Eating Habits and the Questionnaire for The Assessment of Determinants of Eating Behavior[25]. This instrument is properly adapted and validated in the Portuguese population, and a prior request for authorization was made to the author, whose opinion was favorable.

An analysis of the frequency distribution and correlations between the variables studied was performed. It should be noted that the data on nutritional status refer to a population (n= 131), and the data collected with the questionnaire are sampled (n= 56), so the values could not be directly comparable, using comparison tests of proportions. Since the variables were qualitative, Spearman's correlation coefficient[26] and independence tests based on chi-square statistics were used.

With the independence test, it was intended to verify whether two characteristics of a given population can be considered independent, being analyzed for this purpose, a random and representative sample of this population. In this sense, contingency tables were made.

The value of Spearman's coefficient is not based on the values that the variables assume, but rather on the position that corresponds to these values after performing a prior sorting of the data. This coefficient values the correlation between positions and not between the values that the variables assume.

The analyses were performed using the Software SPSS 24.0.

To carry out the present study, all ethical requirements were met in accordance with the Helsinki[27] Declaration and its "Guide Document on the analysis of Clinical Research Projects by a Health Ethics Committee" adopted by LHUAC. The company obtained a favorable opinion from LHUAC'S Health Ethics Committee and its Board of Directors.

It was also obtained as sent by the School Group Ing and its Pedagogical Council, after sending several documents that supported the present study.

Free and Informed Consent was also prepared, intended for parents, and submitted for prior approval to the School Board. This was completed by the legal representatives of the teenagers who were part of the investigation, not only because the participants were minors, but to request their voluntary participation in the questionnaire.

RESULTS

Of all teenagers, it was found to be before a majority female population, in which 71 individuals were female and 60 male, which, in relative frequency, resulted in 54.2% and 45.8% respectively.

Regarding the age variable, the target population was defined betwe-en 10 and 12 years, with a higher absolute frequency at 11, represented by 73 individuals (46%) and a lower frequency at 12 years of age, accounting for only 12 individuals (9.2%). Forty-six individuals (35.1%).

When analyzing the population according to the variable year of schooling, it is perceived that the majority attends the 5th year, being its absolute frequency of 91 individuals (divided by 5 classes), that is, 69.5% of the population. Attending the 6th year there are 40 individuals (divided into 2 classes) representing 30.5% of the study population.

Observing the percentile, it was found that approximately 61.1% of the population, that is, 80 individuals presented weight within the normal parameters for their age. None of the teenagers found low birth weight and the remaining 38.9% represented the problem of juvenile obesity in the study population. Of this last value, 24 individuals were overweight and 27 were obese, which corresponds to 18.3% and 20.6% respectively, of the entire target population (Fig. 1↗).

Considering the percentile calculated according to the gender variable, it was found that males have a higher prevalence of obesity (n= 20), when compared to females. Conversely, girls outnumbered boys in the overweight category (n= 18). However, if we unite the two categories of health concern (overweight and obesity), the difference is homogeneous in the gender variable, with 26 males to 25 females.

Looking at the total target population, in which the effective number of males is lower, it is observed that this group has a higher prevalence of weight in the overweight and obesity categories when compared to females. In this context, 43.3% of males were overweight or obese against 35.3% of females (Table 1↗).

Crossing now, the percentile with the variable year of schooling, it was easily decanted that in the 5th year of schooling there is a higher prevalence of overweight (n= 17) and in the 6th year of obesity (n= 12) (Fig. 2↗). However, when analyzing the two worrisome categories, per year of schooling, 32 cases of overweight or obesity were observed in the 5th year and 19 cases in the 6th year. Considering that the effective number of teenagers

attending the 5th grade is much higher than the 6th grade, the difference in percentile versus year of schooling was considered acceptable.

Bearing in mind that approximately 39% of the study population was overweight or obese, it became pertinent to cross-reference the histogram data (Fig. 1↗) with one of the questions present in the food behavior questionnaire and which conveys the perception of parents/PoG regarding the weight of their children, allowing the choice of one of the following categories: weight less, normal weight and extra weight.

In this question, 35 observations perceived the children with normal weight; 14 with low weight and 7 with overweight (overweight and obesity). In terms of relative frequency, 62.5% evaluated their student's weight as normal weight, 25% with low weight and 12.5% with extra weight.

It can be installed that the values cannot be directly comparable, as the number of observations is not the same. In this sense, only proportion comparison tests could be performed, following the normal distribution based on the following Z statistic:

$$Z=\frac{(\hat{p}_1 - \hat{p}_2) - (p_1 - p_2)}{\sqrt{p^*(1 - p^*)\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}} \sim N(0; 1) \qquad \text{Where} \qquad p^*=\frac{n_1p_1 + n_2p_2}{n_1 + n_2}$$

H0: Proportion of adolescents <P3 BMI= weight perception ratio less

H1: Proportion of adolescents <P3≠ weight perception ratio less

In this first test that aims at weight less, the statistic Z= -5.949. Assuming a significance level of 5%, it is clearly perceived that the null hypothesis should be rejected, that is, the perception of weight less is clearly higher than the indicator percentile of such state.

H0: Proportion of adolescents P3<BMI<P85= normal weight perception ratio

H1: Proportion of adolescents P3<BMI<P85≠ normal weight perception ratio

About normal weight, the statistic Z= 0.614, a value that is clearly located in the region of non-rejection of the null hypothesis, that is, in the so-called normal weight, shows no significant differences between perception and effective status.

H0: Proportion of adolescents P85<BMI<P97 and BMI>97= overweight perception ratio

H1: Proportion of adolescents P85<BMI<P97 and BMI>P97≠ weight perception ratio more

Finally, to understand whether the proportion of the perception about overweight is like the proportion of overweight and obese teenagers (total= 38.9%), the comparison test of proportions was performed, being Z= 3.578. This value falls on rejection of rejection (assuming 5% significance), and being positive, clearly points to a higher proportion of effective cases than those perceived.

Parents/PoG were also asked to assess their children's food by perceiving the level of control over them. In this situation, parents have demonstrated that they can provide their child with a healthy diet quite often (n= 23) or sometimes (n= 17), thus manifesting some uncontrol over this behavior. In the variable "I can control what my child eats outside the home" there were statistical similarities in the observations, since the parents assumed to control almost always or enough times the feeding of their child when he is away from home.

By referring us now to the household, and contrary to the previous variable, the parents assumed that they could not control their child's diet at home (n= 25 in the categories few times and never).

It was also found that parents/PoG do not feel concerned about the weight of their children (n= 27 in categories few times or never). This is very worrying, since we have 38.9% (Fig. 1↗) of the target population weighing overweight for their age and sex (Fig. 3↗).

It was considered that the parent's perception of their child's weight may influence other behaviors. In this sense, an analysis was undertaken based on independence tests between this variable and other variables of the questionnaire. This analysis is based on contingency tables and the chi-square independence test whose hypotheses are:

H0: Variables X and Y are independent of each other

H1: Variables X and Y are not independent of each other

Table 2↗ presents the contingency tables and the result of the chi-square test (Pearson chi-square) for the variables related to the concern with weight and perception of the level of food control.

The results clearly indicate that the null hypothesis of independence is only rejected for the variable "Food control outside the home", and there is evidence of independence of weight perception from the other variables analyzed. This indicates that, although it seems incongruous, the variable that represents the perception of adolescent weight is independent of most variables that represent questions about the perception of the level of food control.

DISCUSSION

The present study showed that the prevalence of overweight and obesity in the target population presents a significant and worrying percentage. Approximately 40% of these teenagers exceed the appropriate weight threshold for their age and gender.

If we compare with the most recent Portuguese evidence, it is observed that the national percentage value is slightly lower than that observed in this study. In Portugal, because of health-promoting policies, between 2008 and 2019, there was a significant reduction in overweight in early childhood, however, overweight increased in the adolescent population, assuming in 2017 a total of 23.6% in pre-obesity and 8.7% in obesity (total of 32.3%)[9].

In this context, a meta-analysis study conducted with Young Portuguese people between 9 and 11 years of age is also evidenced, which validated the prevalence of overweight and obesity in 19% to 35% of these, placing the Portuguese children's population with excess weight in the ranking of the first five European countries[21].

Thus, it is perceived that this problem remains a current problem, despite the community efforts and interventions directed to the Portuguese infant-juvenile population[3,28-30].

Because of juvenile obesity, associated with adolescent behavioral patterns, it is known that the disease process related to certain characteristics associated with lifestyles lasts in adulthood and translates into premature morbidity and mortality[2,9].

"Overweight, ... it is probably the main public health problem in Portugal, (...) having serious implications for the onset and course of different pathologies such as diabetes, brain and cardiovascular disease, osteoarticular pathology and the generality of cancers. Diseases, which, on the whole, represent the main health expenditure of the state Portuguese and the main burden of the National Health Service"[2: 9].

From the results obtained, regarding the gender variable, it was found that the male population presented a higher prevalence of obesity when compared to the female population. Conversely, girls outnumbered boys in the overweight category. It was interesting to verify that in this variable too the results corroborate the national and European panorama[4,24,31]. According to the study by Viveiro *et al*[32], the distribution of male teenagers presented higher values of overweight and obesity (21.5% and 12.4% versus 15.2% and 6.2%), compared to females.

Also, the perception of parents about the weight of their children, was of great interest. In the population studied, there were no teenagers with low weight and 25% of the parents perceive it in this way. Thus, they demonstrated a distorted perception of the weight of their children, classifying them with less weight than they presented.

In this context, the concern with weight also showed that if parents do not perceive their children according to reality, they will hardly worry about this, because it is not a conscious problem.

From several studies that address the perception of parents regarding the nutritional status of their children, it was found that their results are like the present analysis, although the majority was performed with children (of preschool age) or simultaneously with children and teenagers[21,33].

A cross-sectional[21] study conducted with 28 children aged two to five revealed a distorted perception of parents regarding their children's body weight, especially in children who were overweight, classifying them as underweight.

Another cross-sectional study[34], based on a sample of 213 children (from seven to 12 years old), concluded that, although 45% of the sample was overweight or obese, only 7.5% of parents classified their children in this category. These results proved to be a widespread phenomenon, regardless of race, ethnicity, educational level and socio-economic status.

Scientific evidence shows that most parents do not assume or demonstrate awareness that their children are overweight, and in this fact one of the greatest obstacles to combating obesity[13,19,21,35].

Looking at the level of perception of food control, it was noticed that in much of the literature consulted, only a low percentage of parents admit that their child does not have a healthy diet at home[34,22]. Disturbingly, parents who recognized their children's overweight stated that this nutritional disorder will disappear over time and that their children will become healthy adults[21,22].

The reasons why parents do not have the correct perception of their children's nutritional status need to be investigated in more detail. Many studies work different sample sizes, combining children and teenagers, and using various ways of questioning parents about their children's body weight, and it is difficult to consider the conclusions.

This study was based on the exclusive analysis of teenagers, and the perception of parents, not being generalized, reflects their way of thinking and consequently to act before the transmission of healthy lifestyles. The effective contribution was to show evidence, through a homogeneous population and less studied than early childhood, that these parents perceive their children in an underestimated way, mostly with adequate weight or low weight, showing no concern with their weight or the level of food control. In this specific context, the family nucleus remains essentially a reference in terms of eating habits, but in adolescence, individual preferences and choices begin to gain precedence over those of the family. Thus, it will be crucial to consider teenagers as the main target of a possible health-promoting intervention, consciously maintaining the involvement of parents, but now as complementary.

CONCLUSION

The prevalence of juvenile overweight situations is an indicator of health challenges that society will face in the future and that will have an impact on the sustainability of health systems.

Most health professionals and teenagers point to the family as the structuring element in the promotion of health and well-being and consequently in the adequacy of body weight.

The prevalence of overweight and obesity in the population studied was quite high and the fact that parents presented a distorted perception, classifying children with less weight than they presented, an obstacle to referral and treatment of juvenile obesity. It is understood that if this perception is distorted, the concern expressed with weight will be clearly diminished. The level of perception of food control was also independent of weight perception, except for food control outside the household. This may be since the majority of parents/PoG consider that their children are of normal weight, and therefore this is not a concern that leads them to change other behaviors about the feeding of teenagers.

The process of autonomy that begins during adolescence leads to health management no longer being done exclusively by parents, starting teenagers to be self-responsible for their health and for the behaviors associated with it.

It was found that obesity is more prevalent in males and overweight in females, and that despite the lower number of individuals attending the 6th year, the effective number of cases of obesity was higher in this year of schooling.

In this sense, a differentiated view, especially of the nurse, which aims at the development of strategies to promote the well-being of the family, through differentiated interventions related to healthy health behaviors, will be the way forward.

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Authors' contributions

TDM: Study design, collection, storage and analysis of data, review, and discussion of results.
EC: Study design, review, and discussion of results.
IA: Review and discussion of results.
All authors read and agreed with the version published in the manuscript.

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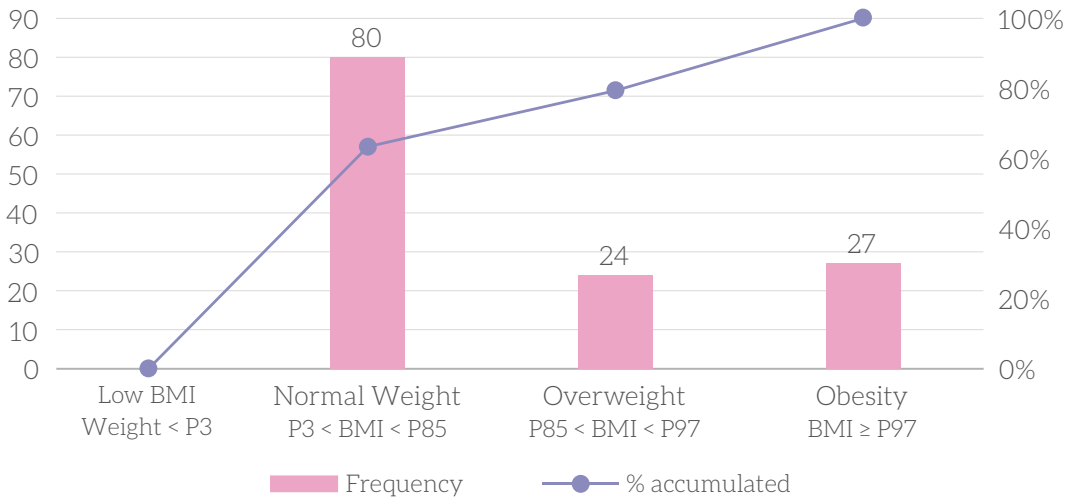

Figure 1 – Percentile-histogram calculated according to the cutoff points defined for the classification of adolescents.[5,6,7]

Table 1 – Percentile versus gender variable of the target population.[8]

Percentil	Gender		Total
	Male	Female	
Normal Weight P3 < BMI < P85	34 56.70%	46 64.80%	80 61.10%
Overweight P85 < BMI < P97	6 10.00%	18 25.40%	24 18.30%
Obesity BMI > or equal to the P97	20 33.30%	7 9.90%	27 20.60%
Total	60 100.00%	71 100.00%	131 100.00%

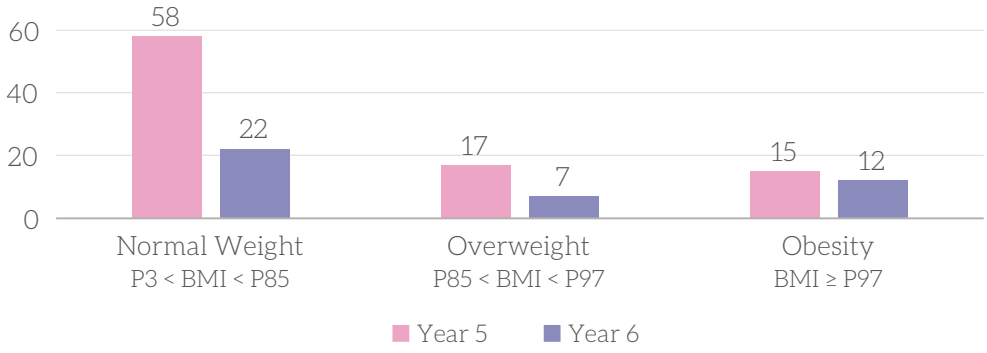

Figure 2 – Percentile versus year of schooling of the target population.

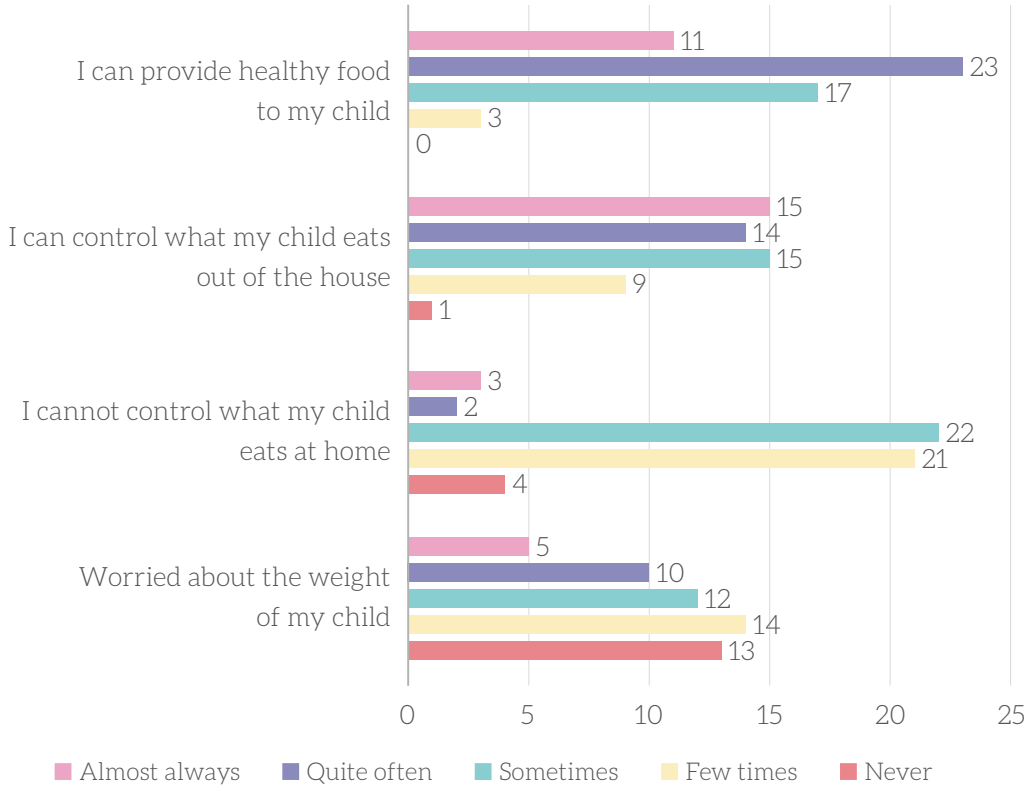

Figure 3 – Perception of parents/PoG regarding food and concern about the weight of adolescents.

Table 2 – Contingency table and independence test between weight perception, concern and level of food control.

Worried Weight

Perceived weight	Never	Few times	Sometimes	Quite often	Almost always	Total	Pearson Chi-Square
Weight less	2	2	4	4	2	14	12.216
Normal weight	11	9	6	6	1	33	*p*-value
Too much weight	0	3	2	0	2	7	0.142
Total	13	14	12	10	5	54	

No home food control

Perceived weight	Never	Few times	Sometimes	Quite often	Almost always	Total	Pearson Chi-Square
Weight less	0	7	6	0	1	14	11.165
Normal weight	4	14	12	1	1	32	*p*-value
Too much weight	0	0	4	1	1	6	0.193
Total	4	21	22	2	3	52	

Control feeding outside the home

Perceived weight	Never	Few times	Sometimes	Quite often	Almost always	Total	Pearson Chi-Square
Weight less	1	1	3	4	5	14	25.37
Normal weight	0	3	11	10	10	34	*p*-value
Too much weight	0	5	1	0	0	6	0.001
Total	1	9	15	14	15	54	

I can feed you healthy

Perceived weight	Never	Few times	Sometimes	Quite often	Almost always	Total	Pearson Chi-Square
Weight less	0	0	7	5	2	14	8.111
Normal weight	0	2	7	16	9	34	*p*-value
Too much weight	0	1	3	2	0	6	0.23
Total	0	3	17	23	11	54	