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PhD:
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Name of Student:
Maria Helena Regalo da Fonseca

Thesis Subject:
Adolescent Obesity
A contribution towards better understanding the psycho-social factors associated to obesity and excess weight in Portuguese adolescents.

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Specialty:
Paediatrics

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Classification:
Unanimously approved with Distinction and Praise

Jury:
The president of the jury was the President of the FMUL Scientific Council, Professor Henrique Bicha Castelo, and present were the Professors Robert Wm Blum, from Johns Hopkins, Baltimore, USA, António José Mónica Silva Guerra, University of Oporto, Maria Margarida Gaspar de Matos, from the Technical University of Lisbon, and João Carlos Gomes-Pedro, Daniel Branco Sampaio, Maria Isabel Augusta Cortes do Carmo and Paulo Magalhães Ramalho from the University of Lisbon.

SUMMARY

Obesity is a multifactorial, multisystemic, and chronic condition. The high prevalence of obesity in adolescence and its potentially serious psychosocial and physical consequences have made it one of the great contemporary public health issues.

In addition, the medical, behavioural and psychological consequences have been well established, including the high prevalence of low self-esteem, poor body image, social stigmatization, and depression, all of which may strongly and negatively influence the adolescent development.

Compared with normal weight peers, overweight and obese adolescents express concerns associated with weight more frequently, and are more involved in health compromising behaviours, such as chronic dieting and binge eating. Furthermore, several authors have shown that child and adolescent obesity is associated with lower health-related quality of life including physical, psychosocial, emotional, social and school functioning, when compared with non-obese young people of a similar age.

For an adolescent medicine provider, taking care of obese adolescents is both a fascinating and challenging journey:

1. We are dealing with a chronic condition with huge impact on body image, thus the normal adolescent issues of body image distortation that comes at puberty are magnified;

2. Although obesity-associated morbidities occur more frequently in adults, significant consequences of obesity as well as the antecedents of adult disease already occur in overweight children and adolescents;
3. Psychosocial co-morbidities, being the earliest and the most common, while often discounted by parents and professionals alike, may be determinant in negatively influencing adolescent development.

With the objective of better understanding adolescent obesity, and based on the data from the Portuguese Health Behaviour in School-aged Children (HBSC) survey, we decided to empirically investigate some psychosocial and lifestyle indicators which may help distinguishing obese and overweight adolescents from their peers.

HBSC is a WHO collaborative study started in 1982, now including 41 countries and regions across Europe and in North America. Data collection occurs every four years. The overall goal of the study is providing evolving information on the health and health-related behaviours of young people as well as their social contexts. In Portugal data have been collected three times: 1998, 2002, and 2006 and included 6903, 6131 and 4877 6^{th}, 8^{th}, and 10^{th} grade students respectively, corresponding to 11, 13 and 16 years of age on average. Schools were randomly selected from a national roster of public schools, stratified by region (five Education Regional Divisions). The sampling unit used in this survey was the classroom. In each school classes were randomly selected in order to meet the required number of students for each grade, which was proportional to the number of same grade mates for each specific region according to the data provided by the Ministry of Education.

Those Portuguese adolescents defined as obese (body mass index, BMI, ≥ 95^{th} centile) based on self-reported weight and height, were found to be less physically active than their non-obese peers. They were more likely to report having a poor appearance and being on diet. Girls especially expressed greater difficulty in making new friends, and considered themselves less healthy than their non-overweight peers. Based on the findings, it was possible to identify the main factors that explain how adolescents perceive themselves and are predictive of body image. Body image was assessed by using an instrument consisting of seven female and seven male body silhouettes that are increasingly overweight. This 7 point scale was categorised into three groups (thin, average and overweight). The identification of an overweight picture as similar to one's own body shape was significantly more frequent among teens with higher BMI values based on self-reported weight and height, and among those reporting dieting. It was also significantly more frequent among younger adolescents, what is concordant with the fact that both obesity and overweight were more prevalent in the younger age groups (11 and 13 year olds). Multiple linear regression was used to explore associations with the perception of body image (considered in this particular analysis as a 7-point interval variable). Age, diet behaviour, physical appearance and BMI were significantly associated with perceived body image. BMI, diet behaviour, and physical appearance were positively associated. Age was negatively associated.

A perceived need to diet (whether real or imagined), poorer self-perceived health status, and potential social isolation, all may induce an extra developmental strain on the overweight adolescent.

The cross-sectional nature of the study design does not enable us to draw conclusions about the direction of causality. Neither do the questions in the HBSC allow for the direct assessment of health-related quality of life. We were able, however, to assess life satisfaction through a measurement technique known as the “Cantril ladder”, which uses a ten-step ladder with the top rung being the highest and the bottom rung the poorest life satisfaction. Consistent with previous research, when asked to indicate the step of the ladder at which they would place their lives at the moment, overweight and obese youth placed themselves on a lower step than non-overweight peers.

The study is unique in having examined the exposition of obese adolescents to alcohol consumption patterns which are associated with heightened risk of injury. Based on the results, obese adolescents reported both more regular drinking and having been drunk more times than their non-obese counterparts.

While there has been extensive previous research on the specific psychosocial factors associated with obesity in young people, the present paper builds upon the existing literature and in doing so proposes the concept that obesity is similar to other chronic conditions of adolescence, especially related to alcohol use and abuse. Growing evidence suggests that adolescents with other chronic conditions are likely to engage in risky behaviour at rates similar to if not higher than their healthy peers, and alcohol has been recognized as the substance most frequently used by young people with a variety of chronic conditions, with little variation by diagnosis. Thus, when it comes to alcohol use it appears that the obese adolescent may have a profile similar to their chronically ill peers.

A deeper understanding of the social aspects of growing up and becoming an adult being overweight is needed. How does the experience of being overweight as a teen impact one’s capacity of engaging in age-appropriate social networks? Are efforts to develop a robust personal identity affected by the fact of being overweight?

Unhealthy weight control behaviours were significantly more commonly reported by those who were dieting and among those who, although not being on diet, felt that they should be. Moreover, unhealthy weight control behaviours increased proportionate to the reporting of increased weight. Our findings indicate that overweight youth engage more in both healthy and unhealthy weight control behaviours than their non-overweight peers, and this was especially true for females. Unhealthy weight control behaviours were also more prevalent among younger youth and among those reporting drinking everyday. This correlation is understandable as risk factors tend to cluster. Given what we know, the identification of daily alcohol consumption in an overweight adolescent is a red flag for unhealthy weight control behaviours.

Except for those who are underweight, most paediatricians do not regularly screen for unhealthy weight control behaviours yet, unless the adolescent is underweight. Our findings support the need to raise awareness among clinicians that unhealthy weight control behaviours are common. Because they are associated with both medical and psychological health risks, routine screening is warranted. Special attention needs to be directed toward youth at greatest risk for disordered eating, including overweight youth.

One of the challenges of undertaking research that uses self report of weight and height to calculate BMI is missing data, an issue that has largely been ignored in the literature since traditionally those with missing data are excluded from analyses. In the present sample of 6131 adolescents who completed the questionnaire in 2002, 661 (10.8%) did not report their weight and/or height. Gender was not associated with missing data. However, a large array of predictive factors of missing BMI values were identified: age below 14, a sedentary lifestyle, body image dissatisfaction, father absence, lack of friends of the opposite sex, and a perception of low school achievement. The strongest predictor of missing values for weight and/or height was younger age. So too, the adolescents who have been excluded from the analysis because of missing values for BMI were less connected with parents and friends. The presence of a father and having friends of the opposite sex was associated with half the likelihood of having missing weight and/or height data by about half.

For reasons of convenience and cost, large scale studies frequently use self-reported weight and height as an alternative to actual anthropometric measures, to screen for overweight and obesity. However, studies that have examined the accuracy of self-reported weight and height are not in agreement regarding its validity. Given the controversy, we decided to determine the validity of BMI based on self-reported weight and height, using BMI calculated from measured body weight and height as the standard measurement, in a subset of a nationally representative sample of Portuguese adolescents. With the same sub-study we further examined whether the degree of agreement is influenced by potential variables, such as, age, gender, grade, and body image. For this sub-study twelve schools were randomly selected from the list of schools which took part in the 2006 HBSC survey, stratified by region, proportionally to the size of each Regional Division: three from the north, three from the Lisbon region, three from the centre, one from Alentejo, and two from Algarve. The same classes that were selected to answer to the 2006 questionnaire administered three months before, were asked to participate in the study. Of the total 462 students included in this sample (Mean age 14.0, SD = 1.9), 233 were girls, and were distributed as follows: 32.5% attending the 6^{th} grade, 32.7% the 8^{th}, and 34.8% the 10^{th}, corresponding to approximately 10% of the sample that participated in the 2006 HBSC survey.

In these analyses there was no significant difference between boys and girls in the degree of inaccuracy in reporting weight. However, differently from the above cited studies, girls reported

height more inaccurately than boys, with self-reported height significantly higher than measured height. Only younger boys tended to overestimate their BMI.
Although BMI based on self-reported data was lower compared to BMI based on measured data both among girls and boys, prevalence of overweight and obesity based on self-report compared with measured values, was not significantly different. These findings suggest that self-reported weight and height (and BMI calculated from these values), are a quite reliable tool for identifying overweight and obese adolescents in large scale studies.

In addition to the above analyses, we studied the associations between BMI and health-related behaviours based on the HBSC surveys conducted in 1998, 2002, and 2006, and involving a representative sample of 17024 Portuguese public school students aged between 11 and 16. These surveys, carried out in a 8 year period (every four years between 1998 and 2006), bring together the most comprehensive national picture of the health and health-related behaviour of overweight young people to date.

Considering the whole sample of the three waves of the HBSC survey, overweight adolescents consistently perceived their school performance to be below average compared to their classmates. No significant differences were found between normal-weight and overweight youth concerning physical activity undertaken outside school hours. Overweight adolescents were far more likely to exhibit difficulties with their physical and emotional health when compared with their normal-weight peers. Moreover, they reported their health as fair or poor more often, were more likely than their peers to describe themselves as “unhappy”, and reported irritability or bad temper more frequently.

Throughout the three waves of the study overweight adolescents consistently reported dieting to lose weight more often than their non-overweight peers. We found a relevant percentage (6.4%) of normal-weight adolescents reporting being dieting with the purpose of losing weight and 17,2% not yet dieting, but considering they should lose some weight, and an even greater percentage of overweight and obese (34.6%) adolescents reporting not being on diet because they were satisfied with their weight. Research has shown that the initiation of frequent dieting is a known risk factor for disordered eating. Thus, there is reason for concern if normal-weight youth are attempting weight loss and if unhealthy weight control behaviours are being used by adolescents, regardless of their weight status.

In conclusion, the set of studies comprising this thesis are consistent with the idea that overweight adolescents when compared with their non-overweight peers, do have generally poorer health behaviours.

Obesity prevention and treatment efforts might benefit from systematically including a consistent and comprehensive monitoring of health status including health-related quality of life, and

addressing the broad spectrum of the psychosocial implications of being overweight as a teen, enhancing skill development for behavioural change, and providing support for dealing with potentially harmful behaviours.

Adolescence has been considered a critical developmental period when adolescents are adjusting to physical changes, establishing their personal identity, seeking greater independence and increasingly relying on peer groups. Clinical interventions might benefit from a global approach, tailored to the specific developmental needs of the obese adolescent and not only focused on weight control. The obese adolescent is a critical agent of change not simply one to receive treatments. Their roles include enhancing their own health promotion competences as well as being a crucial person for the development of competences within the social groups with which they interact (family, school, peer group). Based on our analyses, we conclude that the need for prevention and control of obesity in adolescence should be considered within a broader context of positive health and health promotion. The promotion of healthy lifestyles and the identification and reinforcement of protective health factors among youth is crucial, as it is by this age that they do either consolidate or may become weaker.

As a final conclusion, we believe that the knowledge acquired may positively inform the design of prevention and intervention programs, and also allow health professionals to be able to capitalize on key developmental periods (*touchpoints*) facing them as unique opportunities for promoting a positive adaptation. There is evidence that strategies for preventing and treating adolescent obesity should benefit from taking into account a deeper understanding of the psychosocial factors associated to obesity. Pre-adolescence may constitute one of those key periods for prevention strategies linked to health promotion, and a unique opportunity for discussing body satisfaction, lifestyle and socialization issues.

The identification of lifestyle and psychosocial indicators that may distinguish overweight and obese adolescents from their peers should inform pediatricians and health care planners on prevention strategies and influence the design of intervention interdisciplinary programs aimed to promote the health and well-being of the obese adolescent population.

This knowledge underscores the importance of incorporating, both in health promotion strategies and in weight control programs, components that taking into account body image and self-esteem, may facilitate the adaptation process of overweight youth to negotiate the social demands of adolescence.