

OBESITY, DIET AND RESTRAINED EATING IN A MEDITERRANEAN POPULATION ¹

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OBJECTIVE: To evaluate links between obesity, gender and restrained eating in a representative sample of adolescents in Catalonia (Spain).

DESIGN: Several surveys and measurements are applied to a sample of adolescents from schools in the city of Barcelona.

SUBJECTS: 525 subjects (57% girls and 43% boys) aged from 15-18 from 22 schools in the city of Barcelona.

MEASUREMENTS: Weight, height, ideal weight, percentage of relative weight as measurement of obesity, subscale "Diet" of the Eating Attitudes Test as measurement of concern for dieting, and subjects' negative or affirmative responses to the question as to whether they were following a diet at the time of the study.

RESULTS: The prevalence of obesity in the sample is of 17.1%. 14.3% presented mild obesity and 2.9% presented moderate obesity. Not one case of severe obesity was recorded. Dieting greatly affects normal-weight infant-juvenile populations in Spain. Girls are more concerned about dieting and are more likely to follow a diet independent of the extent to which they are overweight. Obese subjects are more likely to have higher concern for diet and to be on a diet than those of normal-weight. The restrained behaviour observed in obese subjects, is not related to the type of restraint which is evaluated using tools such as the "Diet" subscale of the EAT.

CONCLUSION: We coincide in reporting a lower prevalence of obesity in Spain (an European sample) than in the United States. But the obesity's prevalence is not insignificant. It would appear that the degree of excess weight and the restraint boundary have no linear relationship. The prevalence of restrained eating behaviour among young adolescents in Spain is high. Given the dangers of such attitudes, it is becoming increasingly necessary to develop preventive programmes to combat them.

Keywords: obesity; diet; dietary concern; restraint

Introduction

The pressure exerted by society on its members to strive for "the body beautiful" is particularly strong in Western cultures, where an ever increasing value is placed on the possession of a healthy slim body. Since the sixties, being slim, especially for the woman, has come to be considered one of the most important elements in the definition of beauty¹⁻⁵.

A direct consequence of this social pressure has been the appearance, even at very early ages, of an extreme concern regarding weight. Many adolescents, above all females, compare themselves with society's aesthetic model, and feel fat and worried by the weight and size of their bodies, or with some aspect of them⁶⁻¹⁰. The discontent is such, that the dissatisfaction felt by young girls towards their bodies has been characterised as a "normative discontent"³.

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It comes as no surprise to find, therefore, a proliferation of means available for achieving the perfect figure. This is clearly illustrated by the soaring sales recorded by nutrition books, with titles such as "Losing Weight is Easy" and "The Perfect Diet", which in spite of experts' criticisms, soon top the list of best-sellers. In a similar vein, there has been constant growth in liposuction surgery, a boom in the number of gymnasiums and the manufacture of keep-fit paraphernalia during the 80s, and the multi-million sales of diet foods, many of dubious effect.

Experts condemn such attitudes, which in many cases lead to serious health problems. In recent years the dangers linked to dieting and food restraint have been the subject of many studies. Most subjects lose some weight by intensive dieting, but sooner or later they end up putting it back on again¹¹. Such weight fluctuations, known as the «yo-yo effect», contribute enormously to an increase in metabolic efficiency, making subsequent weight loss considerably more difficult¹². Weight fluctuations can even increase health risks, including coronary disease leading to death¹³, and abdominal adiposity¹⁴, which can have serious long-term risks for the health¹⁵. Furthermore, excessive dieting and an extreme weight anxiety are of considerable importance in initiating eating disorders such as anorexia and bulimia nervosa¹⁶⁻²⁴.

Indeed, excessive food restraint is one of the main characteristics of anorexia nervosa, while episodes of hyperphagia are typical of bulimia nervosa and the compulsive eating behaviour of some obese persons. With regard to the latter, in the mid-1970s a theoretical model was proposed, which has been established as a model for intake regulation applied along the continuum from normal to pathological behaviour, and at all intermediate stages. This "theory of restraint" was initially developed by Herman²⁵, and from it Herman and Polivy²⁶⁻²⁷ developed the "boundary model for the regulation of eating". According to this empirically tested model, dieters have a cognitive dietary boundary which is self-imposed, and which induces them voluntarily to maintain a behaviour of food restraint, contrary to their physiological hunger impulses. As long as their intake does not exceed this boundary, a restrained eating behaviour is maintained. However, once the self-imposed dietary boundary is breached, due, for example, to a non-controlled intake episode (preloaded), a so-called «counter-regulation» phenomenon is produced, in which, the dieter, now disinhibited, eats until sated, thereby developing an episode of hyperphagia²⁶, in a way very similar to that which occurs in «abstinence syndrome violation» described in addictions. The phenomenon of counter-regulation can also be produced by alcohol consumption²⁸, or emotional states such as anxiety²⁹ and depression³⁰. While as previously noted, the model purports to be applicable to the continuum of eating behaviours, most research has focused on the origin of episodes of hyperphagia in bulimia.

The model's omission of obesity is noteworthy, particularly if we consider that the restraint theory was initially developed by Herman²⁵ to explain those differences in the eating behaviours of obese and normal-weight subjects identified by Schachter et al.³¹⁻³³. According to Schachter et al., the obese present greater "externality", which means their consumption is more closely controlled by external cues than by physiological sensations of hunger and/or satiety. Thus, the obese will eat more when the food is seen to be appetizing, they will consume greater quantities of food, prepare fewer daily meals, though more copious, the speed of ingestion will be greater, they will increase consumption when faced with negative emotional states, etc. According to Herman²⁵, given that the degree to which the subject is overweight has been

positively correlated with the level of restraint, it is the differences in restraint which underlie the differences between obese and normal-weight subjects, i.e. greater external control in the case of the most restrained. This theory has subsequently been propounded by Herman and Polivy²⁶, who suggest that the tendency shown by obese subjects towards externality results from their tendency to dietary restraint. Thus, it is the restraint, rather than the degree of excess weight, which is the crucial variable governing the behaviour of the obese. It is perhaps this confusion between obesity and restraint which led to the omission of obesity from the model.

However, recent empirical research has shown that obese subjects do not behave in the same way as restrained eaters, in that the phenomenon of counter-regulation described above is not observed in the obese³⁴⁻³⁵. This has led to the suggestion that the restraint theory is more applicable to bulimic than to obese subjects.

Most of these studies have been carried out in North American populations. Given the idiosyncratic cultural patterns regarding the food of each country, and even those that exist between the regions of the same country, this phenomenon needs to be studied using autochthonous populations, before generalisations might be made.

Few studies in this field have been undertaken in Catalonia (Spain). Indeed, there is even little epidemiological research available on the prevalence of eating disorders and attitudes in Mediterranean populations - a necessary precursor to further research. If research using young populations is sought, the paucity is even more apparent, though mention should be made of the study undertaken by Raich, Rosen, Deus, Pérez, Requena and Gross³⁶ on a population of more than 3000 secondary school students aged between 14 and 19 in Catalonia. Here, it was found that the prevalence of diets and symptoms of eating disorders are not as alarming as those reported in the United States of America, although it seems that about half the population expressed a concern in losing weight. Further research undertaken by Raich, Sánchez-Carrecedo and Mora³⁷ described the food habits of the population in their earlier study, but neither restraint nor excess weight variables were included.

Our research seeks to make up for some of these shortcomings by studying links between obesity and restrained eating in a representative sample of adolescents in Catalonia. This study is just one within the much wider OBA Project (Obesity, Bulimia, Anorexia) which, over the last few years, has been developed by the faculties of Psychology and Medicine of Barcelona University and the Autonomous University of Barcelona, and the Hospital Clinico in the same city. Primarily epidemiologically based, the project seeks to study which variables are related to the appearance and maintenance of eating disorders, in order that effective preventive programmes might subsequently be developed. Such research is of great need in Catalonia for the reasons outlined above.

Method

Subjects

A total of 573 subjects were studied from the 17 schools of second year B.U.P. (*Bachillerato Unificado Polivalente* - academic study) and from the 5

schools of F.P. (*Formación Profesional* - vocational training) in the city of Barcelona forming part of the total population of the OBA Project. The sample is representative of the 15 to 17 year-old age group (mode=15). The schools were selected by a process of random sampling by conglomerates (schools) chosen proportionally according to the district of the city, type of school (state or private) and whether the school was E.G.B. (*Educación General Básica* - primary education), B.U.P. or F.P. Due to the nature of the study variables, some sample subjects had to be excluded so as to avoid the influence certain unusual variables might have on the study's results. Thus, subjects with ages outside the study interval were eliminated, as were those whose height fell outside the centile intervals 5-95 of the tables used to calculate ideal weight³⁸ (failure to do so would have considerably weakened reliability), those with a weight 20% below that of their ideal weight, and those who fulfilled the criteria of bulimia evaluated in the study, according to DSM-III-R criteria. Following these adjustments, a total of 525 subjects remained. 57% of the sample was female (300) and 43% male (225).

Table 1 to be inserted at this point

Measurements

The weight and height of the subjects were measured with scales/measuring bar model SICA-713, Max. 130kg, Min. 2kg, SD=0.2kg. In calculating ideal weights we used the tables developed by the National Centre for Health Statistics³⁸, while the measure for the "obesity" variable was the percentage of relative weight.

In evaluating food restraint we employed two indices. Firstly, the subscale "Diet" of the Eating Attitudes Test³⁹ was used to evaluate dietary concern. The EAT was initially designed to measure anorexic attitudes to food, and today is one of the most universal tools for evaluating eating disorders⁴⁰. Subjects' negative or affirmative responses to the question as to whether they were following a diet at the time of the study were also recorded.

Procedure

Once the schools had been selected, they were contacted at the beginning of March 1992, in order to arrange the time and place for the conducting of the survey. The research team had previously trained a group in the procedure to follow, and included university teachers involved in the OBA project, paid students and other collaborators. Written instructions were also provided. The surveys were conducted in one group of schools between April and May, 1992. Owing to the approaching June exams and the summer holidays, the remaining schools were left until the months of October and November of the same year. The data were subsequently inspected and adjustments were made.

Our data are supported by multiple regression analysis, which is highly adaptable to the characteristics of our variables, and by the statistical

technique χ^2 . We include statistically significant data, with 95% confidence intervals, and prevalence ratios (relative risk). The statistical analysis was conducted using the program SPSS/PC version 4.1.

Results

Ideal weights were recorded by two independent observers, thus providing a very high interobserver reliability ($r=0.99$, the mean difference being 75gr, which is not statistically significant $t=1.11$; $df=30$; $p=0.274$).

As a function of the percentage of relative weight, and applying Stunkard criteria⁴¹, 3 levels of obesity can be distinguished; mild obesity = 20-40% overweight; moderate obesity = 41-100% overweight; severe obesity >100% overweight. 14.3% of the sample -75 subjects- presented mild obesity and 2.9% -15 subjects- presented moderate obesity. No cases of severe obesity were observed. The remaining 82.9% of the population -435 subjects- have a "normal" relative weight, that is between 20% underweight and 20% overweight. The data are included in figure 1.

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Although in general a greater number of cases involving mild and moderate obesity are observed in boys than in girls the difference is not significant ($\chi^2=2.99$; $gl=2$; $p=0.22$). Figure 2 shows the distribution of weight levels according to sex.

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The concern for dieting expressed in the scores obtained on the subscale "Diet" of the EAT was high. Observation of the score frequencies of this variable indicated a higher concentration of frequencies in lower scores (see figure 3).

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This alerted us to the possibility that an additional point on the "Diet" subscale does not have the same significance for low as for high scores. Thus, we established a new *ad hoc* categorical variable which includes various levels of dietary concern, in order that a better clinical interpretation of the results might be obtained. A score of 0 indicates "no concern" and corresponded to

22.7% of subjects (see figure 3). The group with scores over 8 constituted 19.8% of the population and was denominated the group showing "deep concern". In between these two groups was the group showing "moderate concern" and which comprised 57.5% of the population. The frequency distribution is shown in figure 4.

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The girls recorded significantly higher scores on the "Diet" subscale of the EAT ($t=9$; $df=1;523$, $p=0.00001$). They recorded 4.7 points more than the boys (CI 95%: 3.6 to 5.7), which is noteworthy as the mean score for all subjects for this variable was 5.05 (SD=6.29). In the group of subjects showing "deep concern" for dieting 89.4% ($n=93$) are girls and 10.6% ($n=11$) are boys; while 31% ($n=93$) of the total girls showed "deep concern", compared to only 4.9% ($n=11$) of the boys (see figure 5).

Figure 5 to be inserted at this point

The difference is highly significant ($\chi^2=65.25$; $df=2$; $p=0.00001$), so that the girls proportion for showing deep concern for dieting was 6.3 times higher than that for boys (95% CI: 3.5 to 11.6).

As part of the data collection, the question "Are you on a diet?" was put to 521 subjects; 15.7% ($n=82$) responded affirmatively. 86.6% ($n=71$) of these responses were given by girls and 13.4% ($n=11$) by boys. Thus, 24% of the girls were following a diet to lose weight compared to only 4.9% of the boys (see figure 6).

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This difference between the sexes is also highly significant ($\chi^2=33.7$; $df=1$; $p=0.000001$). Thus, the girls proportion for being on a diet was 4.9 times higher than that for boys (95% CI: 2.66 to 9.04).

12% of the normal-weight subjects were following a diet in an effort to lose weight at the time of the study, compared to 34.1% of the obese subjects (see figure 7)

Figure 7 to be inserted at this point.

This difference is highly significant ($\chi^2=25.2$; $df=1$; $p=0.000001$). The obese subjects proportion for being on a diet was 2.8 times higher than that for normal-weight subjects (95% CI: 1.9 to 4.2). This is equally true for girls ($\chi^2=18.7$; $df=1$; $p=0.00002$) as for boys ($\chi^2=16.8$; $df=1$; $p=0.00004$). These data do not vary significantly if different relative weight levels are included (mild obesity ? $\chi^2=0$; $df=1$; $p=1$ / moderate obesity ? $\chi^2=0$; $df=1$; $p=1$), as is illustrated in figure 7.

In analyzing the concern for dieting, a highly significant correlation exists between the increase in relative weight and the increase in score on the "Diet" subscale of the EAT (sex adjusted ? F global $F=59.1$; $df=2;522$; $p=0.00001$ / $t=5.61$; $df=522$; $p=0.00001$). Thus, we can state that for each additional unit of relative weight, the subjects score 0.08 units more (95% CI: 0.05 to 0.12) on the "diet" subscale of the EAT, as illustrated by the regression line in figure 8.

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Considering the obesity variable as dichotomous, it is observed that obese subjects score 3.3 points more (CI 95%: 1.95 to 4.6) on the "Diet" subscale of the EAT than normal weight subjects do (sex adjusted ? F global $F=54.4$; $df=2; 522$; $p=0.00001$ / $t=4.9$; $df=522$; $p=0.00001$). As with the sex variable, the result is noteworthy, considering that the mean score on this subscale is 5.05 (SD=6.29). The result does not vary greatly when different levels of obesity are considered (sex adjusted ? F global $F =36.2$; $df=2; 521$; $p=0.00001$ / mild obesity ? / $t=4.5$; $df=521$; $p=0.00001$ / CI 95% ? 1.9 to 4.7 / moderate obesity ? / $t=2.2$; $df=521$; $p=0.03$ / CI 95% ? 0.2 to 3.1).

Considering different degrees of concern for dieting, a greater proportion of obese subjects presented deep concern for dieting compared to normal-weight subjects (33.3% compared to 17%), being highly significant ($\chi^2=16.5$; $df=2$; $p=0.0002$)(see figure 9). Thus, the proportion of obese subjects showing deep concern for dieting compared to no concern and moderate concern was 1.65 times greater than normal-weight subjects (95% CI: 1.2 to 2.3).

Figure 9 to be inserted at this point.

The tendencies observed for varying degrees of excess weight are reproduced, although once again the results are very similar for mildly obese and moderately obese subjects (see figure 9). Similarly, these differences are reflected differently in boys and girls, although not significantly.

Discussion

The prevalence of obesity in the sample, 17.1%, is not insignificant.

Studies of Spanish populations have reported a varied prevalence of obesity. Thus, Palacios et al. (cf. Pato & Rodriguez⁴²) reported a prevalence between 20 and 30% in adults, and 9.2% in children. Valtueña⁴³ reported a prevalence of 9.6% among school children aged between 7 and 14. Alonso, Pàmies, Segovia, Arnedo, Dènia and Orti⁴⁴ reported a prevalence of 27.9% in school children from 6-14 in the city of Castellón de la Plana. This variation in data might be due in part to the diversity of indices used in calculating the extent to which subjects were overweight. This would seem to indicate the need for a universal index, which is more practical, reliable and valid. In this vein, we would support Saldaña's recommendation⁴⁵ for the use of the Body Mass Index in future research in that it seems to be both the most objective and most capable of giving precise estimates, and the one which offers solutions to most of the practical and methodological problems presented by standardised ideal weight tables.

However, several studies, including the present one, do coincide in reporting a lower prevalence of obesity in Europe than in the United States⁴⁶. In our population it is significant that not one case of severe obesity was recorded (>100% overweight). In the United States there is a large number of extremely obese subjects, for whom intensive treatment programmes have been developed, but the need for such treatment here is clearly not the same.

As has been reported time and again, girls show a much greater concern for dieting than do boys - indeed, according to our analysis, sex is the most significant variable (see figure 5). This difference is most apparent when we consider that the girls proportion for showing deep concern for dieting was 6.3 times higher than that for boys (95% CI: 3.5 to 11.6). The majority of studies agree on this point, indicating that concern for dieting is greater in women than in men, and suggesting that restrained eating begins at an early age, with particular repercussions during adolescence^{6, 8, 47-54}.

Our results are, somewhat disturbingly, closer to those obtained in the North American population than in the Spanish population in the study of Raich, Rosen et al.³⁶, in which the prevalence of dieting and various symptoms of eating disorders in samples of both populations were compared, also using the "Diet" subscale of the EAT as one of its measures.

Here, 15.7% of the population were following a diet - 4.9% of the boys compared to 24% of the girls (see figure 6), that is, the girls proportion for being on a diet was 4.91 times higher than that for boys (95% CI: 2.66 to 9.04). While few data are available on this aspect in Spain, comparisons with North American populations reveal higher indices, although the fact that 1 in 4 female adolescents in our sample is following some sort of diet to lose weight is somewhat alarming.

As is expected from previous studies, obese subjects are more likely to be on a diet than those of normal-weight. Thus, 34.1% of obese subjects were following some kind of diet, compared with 12% of normal-weight subjects (see figure 7). Here, the obese subjects proportion for being on a diet was 2.8 times higher than that for normal-weight subjects (95% CI: 1.9 to 4.2); so though while significant, the variable is not as important as that of sex.

The fact that obese subjects are more likely to follow a diet has frequently been reported. However, here it is interesting to note that obese subjects showing the greatest degree of excess weight are no more likely to be on a diet than those with mild obesity (see figure 7). It would appear that the degree of excess weight and the restraint boundary have no lineal relationship, as the model of Herman and Polivy²⁶⁻²⁷ would suggest.

Results show that a significant number of subjects follow a diet without being overweight. As various authors have previously observed^{48, 53}, it has been shown here that dieting greatly affects normal-weight infant-juvenile populations in Spain also.

Similarly, obese subjects recorded higher scores on the "Diet" subscale of the EAT. Thus, obese subjects score 3.3 points more (CI 95%: 1.95 to 4.6) on the "Diet" subscale of the EAT than normal weight subjects do. Once more, such differences are much more apparent in girls than in boys (see figure 9).

Both variables, sex and obesity, are significant in analyzing dietary concern and the following of diets. Our results suggest that girls are more concerned about dieting and are more likely to follow a diet independent of the extent to which they are overweight.

While the results reported here do not allow us to clarify the doubt as to whether the "restraint" variable plays the biggest role in determining the different eating behaviour of obese and normal-weight subjects, further analyses by the authors, not included here, would seem to suggest that this is not the case. In our study, obese subjects displayed eating habits in which restrained eating behaviour was similar to that displayed by subjects who had shown dietary concern, such as greater conscious resistance to situations of external pressure which induce eating, reduced consumption, a greater likelihood to follow a diet and poorer regulation of ingestion due to hunger⁵⁵. Of greatest significance is the fact that within the group of obese subjects, no differences were observed with regards to these aspects between those who had a deep concern and those who had no concern for dieting, while among normal-weight patients such differences do occur. This would seem to suggest that the restrained behaviour observed in obese subjects, is not related to the type of restraint which is evaluated using tools such as the "Diet" subscale of the EAT. Perhaps the key lies in the fact that in obese subjects, the restraint might be perceived as being "justified", by the very fact of their being overweight. We believe that Lowe's ideas⁵⁶ on the perception of dieting as self-imposed or externally imposed are highly relevant in this respect, in that the restraint shown by obese persons might be perceived by the subjects as self-imposed, and as a result they are able to regulate ingestion better than restrained subjects with normal-weight. Were this to be the case, one of the main clinical consequences which might be derived is that in treating obesity, if a positive energetic balance were to be observed between ingestion and calorie expenditure, diets which might be perceived as externally imposed should not be programmed. It follows from this that we would favour an approach which emphasises changes in life style, in such a way that the subject sees the changes in his eating patterns as something which he has undertaken personally, and which will form a part of his everyday behaviour. Clearly though caution must be shown and the hypothesis needs to be tested further before definite conclusions can be drawn.

Our results indicate the prevalence of restrained eating behaviour among young adolescents in Spain. Given the dangers of such attitudes, it is becoming increasingly necessary to develop preventive programmes to combat them. In this respect, the development of programmes by Polivy and Herman⁵⁷ which instead of helping subjects to lose weight, aim at helping them to give up dieting, seem to be of interest. Though such programmes would also have to include ways of combatting the strong social pressure exerted on its members to be thin. It is our duty, as health specialists, to make people realise the dangers of striving after the "body beautiful" regardless of the risks.

Regulations affecting both the advertising and consumption of tobacco and alcohol are increasingly more strict, while their associated health risks are well-known. Similarly, we need to act in order to prevent the development of restrained eating attitudes, by informing people of the dangers of striving for a perfect body at whatever cost. What is needed is greater control over those elements which exert pressure, including advertising. We are not unaware of the difficulties this entails, given that this would mean taking a stand against powerful food industries which promote the consumption of diet foods. However, the success achieved in regulating the powerful tobacco and alcohol industries should encourage us to continue informing people of the dangers.

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