

Use of anti-obesity drugs among college students

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SUMMARY

Objective: To evaluate the use of anti-obesity drugs among students attending a public university. **Methods:** This was a cross sectional random study of 664 college students. Drug use, socioeconomic, and anthropometric variables were observed. Body mass index (BMI) and waist circumference (WC) were classified according to World Health Organization criteria. **Results:** Current or previous use of anti-obesity drugs was reported by 6.8% of students. Amphetamine and sympathomimetic amines (40.5%) were the most commonly used drugs. Among those who reported use of anti-obesity agents, 62.2% were female. Only 31.1% of medications were prescribed by doctors. Mean BMI and WC were higher among students reporting the use of such drugs, but 47% of them were classified as eutrophic by BMI, and 76.5% had normal WC measure. **Conclusion:** The use of anti-obesity drugs among college students is of concern, particularly due to the high proportion of drug use without indication or prescription.

Keywords: Anti-obesity agents; use of drugs; students; prevalence.

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INTRODUCTION

Obesity is considered a global epidemic¹, which is recognized as a risk factor for many undermining and high social cost diseases, such as type 2 diabetes, hypertension, stroke, heart disease, dyslipidemia, and some types of cancer².

The World Health Organization estimates that in 2015 approximately 2.3 billion adults will be overweight and more than 700 million will be considered obese³. In Brazil, overweight and obesity prevalence are universally growing and reached in 2002-2003 about 40% and 12.7%, respectively, according to estimates of a Brazilian survey (*Pesquisa de Orçamentos Familiares* [POF]⁴) of the adult population. In the city of Teresina, according to estimates of the same survey, the overweight and obesity prevalence for male and female were 41.5%-7.8% and 36.3%-9.5% (respectively).

Pharmacological treatment of obesity is indicated when the individual has body mass weight (BMI) > 30 kg/m² or disease associated with overweight, BMI > 25 kg/m² in situations where treatment with diet, physical activity, and behavioral modifications was unsuccessful⁵. Drug therapy for obesity includes the use of agents involved in the control mechanism of energy intake, or agents related to the shift of normal nutrient metabolism or that increase energy expenditure⁶. The anti-obesity agents most commonly used are sibutramine and orlistat, both available in clinical practice for nearly a decade⁷. Sibutramine blocks the reuptake of norepinephrine and serotonin reducing food intake, and also stimulates thermogenesis in brown adipose tissue in animals⁸. Orlistat is a more stable and partially hydrolyzed analog of lipstatin (tetrahidrolipstatin), which acts by inhibiting gastrointestinal lipases through irreversible binding at the active site of lipase by covalent binding⁹.

In the prevailing epidemiological context of high prevalence of overweight and the fact that today the stereotype of beauty is the kind of lean and lanky body¹⁰, a high consumption of anorexigens has been observed in Brazil since 1988, estimated at 10 daily doses statistically defined (S-DDD) per thousand inhabitants¹¹. According to the Report of the International Narcotics Control Board (INCB), there was an increase of 500% in the consumption of anorexigens in Brazil since 1998, noting also that the consumption of stimulants in Brazil, mainly as anorexigens, is one of the highest worldwide¹², reaching in 2005 the highest rates of stimulants consumption calculated per 1,000 inhabitants (per day) in the Schedule IV of the 1971 Convention (12.5 S-DDD)¹³.

The reasons for the high consumption of anorexigens reflect not only the increased prevalence of obesity and overweight in Brazil over the past 40 years, but also the irrational and wide spread use of these and other drugs in the country¹⁴.

The young adult population, especially college students, stands out particularly with the role of higher education in the adoption of preventive actions and plans to give the un-

dergraduate an opportunity to contribute to the community they belong to¹⁵. From this perspective, a study of this population group acquires greater relevance when the goal is a true assessment of drug use in a group of young and opinion-maker individuals, which enables the provision of subsidies for future preventive measures in this population. Our aim was to evaluate the use of drugs for weight loss among students in a Brazilian federal university.

METHODS

This work was part of the research project entitled "Socio-economic, nutritional, and health profile of students at the Universidade Federal do Piauí (UFPI) – Brazil" and consisted of a descriptive cross-sectional study, with a probabilistic sample of 664 students. Sample size was calculated assuming a confidence interval of 95% and finite population of 11,152 students, according to the formula used by Martins¹⁶ for estimates of large sample proportion, and the margin of error found was 3.75%. The sample was proportional to the number of students attending the course, course period, and teaching center of UFPI (Center for Agricultural Sciences, Education Sciences Center, Center for Humanities and Arts, Natural Sciences Center, Center for Health Sciences, and Technology Center).

The instrument used for data collection was a questionnaire to attain information on socio-economic (age, sex, marital status, family income, and the mothers' level of education) and anti-obesity drug use. In addition, anthropometric measurements of body weight were taken (determined on a digital scale Plenna Acqua SIM-09190, with measuring capacity of 180 kg and variation of 0.1 kg), height (blood pressure anthropometric tape measure with a precision of 1 mm), and hip circumferences (measured with a fiberglass tape with precision of 1 mm).

Measurements of weight, height, and waist circumference were conducted with students barefoot, wearing light clothes and accessories that would not interfere with measurements, according to the recommendations in the Manual of techniques and procedures of the Brazilian Ministry of Health¹⁷. Waist circumference was measured at the midpoint between the last rib and the iliac crest, and waist and hip circumference measured at the largest circumference of the buttocks, with the tape held in a horizontal plane, without pressing soft tissues¹⁷.

Overall nutritional status was classified using the BMI based on the cutoff points proposed by WHO¹⁸, with normal weight defined as BMI > 18.5 and < 25 kg/m²; overweight as BMI ≥ 25 and < 30 kg/m²; and obesity as BMI ≥ 30 kg/m². The term overweight was used for grouping overweight or obese individuals (i.e. individuals with BMI ≥ 25 kg/m²).

Waist circumference (WC) was used in order to identify the distribution pattern of body fat using the cut-offs defined by Lean et al.¹⁹ and currently recommended by

WHO¹⁸, considering adequate or normal WC < 80 cm for women and < 94 cm for men, and with cut-off points described in action levels, both in clinical use and in health promotion programs, as follow: action level 1 or increased risk for morbidities associated with obesity (WC between 80 and 88 cm for women and between 94 and 102 cm for men), in which the individual should be advised to stop gaining weight and adopt a healthy lifestyle; and level 2 or very increased risk (≥ 88 for women and ≥ 102 for men), in which the individual should seek help from health care professional for weight loss and investigation of other risk factors. The waist-hip ratio (dimensionless) considered values higher than 0.8 in women and 0.9 in men¹⁸.

The study protocol was approved by the Ethics Committee of the Universidade Federal do Piauí. After elucidation about the study objectives and possible benefit and risks tied to his execution, all study participants signed an informed consent.

Data were processed in 5.0²⁰ EpiInfo and BioEstat 6.04b²¹ programs. Statistical analysis for associations between variables was performed by chi-square test of

association, and the unpaired t-test was used for mean comparisons. The level of significance was set at 5% ($p < 0.05$).

RESULTS

A total of 664 students were enrolled in the study, and 6.8% of them were using or have used anti-obesity drugs, with no statistically significant differences between sexes (Table 1). Only one third of these drugs was prescribed by doctors, especially among females ($p = 0.02$). The drugs most used were amfepramone, fenproporex hydrochloride, and sibutramine, which together accounted for 40.5% of the drugs used. Moreover, in the twelve months preceding the study, 17.8% of university students were using drugs for obesity treatment without prescription (Table 1).

The family income of 2.6% of the students was less than or equal to one minimum wage, however, more than half (55.1%) of respondents had a family income above five minimum wages. Investigation of marital status showed that 88.7% of students were single, and the largest proportion of non-drug users for weight loss ($p = 0.01$) was among those who had mothers with higher education (Table 2).

Table 1 – Use of anti-obesity drugs among students in a Brazilian public university, according to sex

| Variables | Sex | | | | Total | | p-value |
|---|--------|-------|------|-------|-------|-------|----------|
| | Female | | Male | | | | χ^2 |
| | n | % | n | % | n | % | |
| Use or have used weight-loss drugs?* | | | | | | | |
| Yes | 28 | 8.6 | 17 | 5.8 | 45 | 6.8 | 0.21 |
| No | 326 | 91.4 | 293 | 94.2 | 619 | 93.2 | |
| Total | 354 | 100.0 | 310 | 100.0 | 664 | 100.0 | |
| Who recommended the medication? ** | | | | | | | |
| Physician | 12 | 42.8 | 2 | 11.7 | 14 | 31.1 | 0.02 |
| Relative, friend, own initiative, others, or not stated | 16 | 57.2 | 15 | 88.3 | 31 | 68.9 | |
| Total | 28 | 100.0 | 17 | 100.0 | 45 | 100.0 | |
| What anti-obesity drug do you use or used? ** | | | | | | | |
| Amfepramone | 1 | 3.6 | 1 | 5.9 | 2 | 6.2 | 0.48 |
| Fenproporex hydrochloride | 4 | 14.3 | 1 | 5.9 | 5 | 15.6 | |
| Sibutramine | 5 | 17.5 | 1 | 5.9 | 6 | 18.7 | |
| Other or not stated | 18 | 64.6 | 14 | 82.3 | 32 | 59.5 | |
| Total | 28 | 100.0 | 17 | 100.0 | 45 | 100.0 | |
| Did you use anti-obesity drug in the last year without medical indication or prescription? ** | | | | | | | |
| Yes | 4 | 14.3 | 4 | 23.5 | 8 | 17.8 | 0.25 |
| No | 17 | 60.7 | 6 | 35.3 | 23 | 51.1 | |
| Not stated | 7 | 25.0 | 7 | 41.2 | 14 | 31.1 | |
| Total | 28 | 100.0 | 17 | 100.0 | 45 | 100.0 | |

*Question asked to all study participants. ** Question asked to individuals who use or have used weight-loss drugs.

Table 2 – Socio-economic characteristics of students at a public university, according to the use of anti-obesity drug

| Variables | Students | | | p-value χ^2 |
|-------------------------------------|----------|----|-------|---------------------|
| | n | c* | % | |
| Family income (minimum wage) | | | | |
| ≤ 1 | 17 | 2 | 4.4 | 0.58 |
| > 1 e ≤ 3 | 140 | 7 | 15.6 | |
| > 3 e ≤ 5 | 141 | 12 | 26.7 | |
| > 5 e ≤ 10 | 181 | 11 | 24.4 | |
| ≥ 10 | 146 | 12 | 26.7 | |
| Not stated | 39 | 1 | 2.2 | |
| Total | 664 | 45 | 100.0 | |
| Marital status | | | | |
| Married | 47 | 3 | 6.7 | 0.92 |
| Single | 589 | 39 | 86.7 | |
| Divorced | 16 | 2 | 4.4 | |
| Others | 12 | 1 | 2.2 | |
| Total | 664 | 45 | 100.0 | |
| Mother's education | | | | |
| College degree or more | 220 | 9 | 20.0 | 0.01 |
| Incomplete higher education or less | 427 | 32 | 71.1 | |
| Not stated | 17 | 4 | 8.9 | |
| Total | 664 | 45 | 100.0 | |

n, number of students; c, number of cases (users).

*It was considered user the student who reported to be using or have made use of anti-obesity drugs.

The students' mean age was 23.2 years and no difference was observed between the ages of individuals who reported use of anti-obesity drugs and those who have never used ($p = 0.07$). There was no association between waist-hip ratio (WHR) and systolic or diastolic blood pressure between these groups. Although the mean BMI (23.5 kg/m^2), waist circumference (79.5 cm), and hip cir-

cumference (98.9 cm) were significantly higher ($p < 0.05$) in college students who were using or have used anti-obesity drugs (Table 3), the proportion of students reporting use of anti-obesity drugs classified as normal by BMI was 47%, and the classification for both WC and WHR was 76.47%. Classification of overweight and obesity by BMI were 29.42% and 11.76%, respectively. The preva-

Table 3 – Age, blood pressure, and anthropometric characteristics of students in a public university, according to the use of anti-obesity drugs

| Variables | Students | | Users* | | p-value <i>t</i> test |
|--------------------------|----------|--------------------|--------|--------------------|--------------------------|
| | Mean | Standard deviation | Mean | Standard deviation | |
| Age (years) | 23.2 | 4.0 | 23.1 | 4.2 | 0.07 |
| SBP (mmHg) | 117.8 | 12.1 | 117.5 | 8.5 | 0.60 |
| DBP (mmHg) | 76.3 | 9.6 | 76.4 | 7.3 | 0.90 |
| BMI (kg/m^2) | 22.6 | 3.4 | 23.5 | 3.8 | 0.0008 |
| Waist circumference (cm) | 77.6 | 9.7 | 79.5 | 9.7 | 0.01 |
| Hip circumference (cm) | 97.6 | 7.8 | 98.9 | 7.7 | 0.03 |
| Waist-hip ratio | 0.78 | 0.08 | 0.79 | 0.06 | 0.29 |

SBP, systolic blood pressure; DBP, diastolic blood pressure; BMI, body mass index.

*It was considered user the student who reported to be using or have made use of anti-obesity drugs.

lence of abdominal obesity classified by waist circumference was 5.88%. Based on the anthropometric assessment, among those who reported medical indication, the use of anti-obesity medication was justified in 66.67%.

Restlessness, irritability or nervousness, insomnia, malaise or dizziness were the most common side effects among participants who reported using anti-obesity drugs (21.4%).

DISCUSSION

A report released by the International Narcotics Control Board (INCB), an organ reporting to the Organization of United Nations (ONU), showed that there was a 500% increase in consumption of anorexigens in Brazil since 1998²².

In this study, 6.8% of students were using or have used drugs for weight loss. These results are similar to those (6.5%) found in an institution for rehabilitation of children and juvenile delinquents in Porto Alegre, RS²³, and are superior to data from the 2005 Household Survey on the Use of Psychotropic Drugs in Brazil, involving the 108 largest Brazilian cities, which showed that 4.1% of respondents have already used appetite suppressants²⁴. On the other hand, larger proportions were found in a study by Sichieri et al.²⁵ of women aged 35 and older, living in permanent private households in the municipality of Rio de Janeiro in which the use of some formulas at least once was reported by 34% of women, with greater frequency among younger and obese women with higher socioeconomic level. The high consumption of these substances by the college students of Piauí supports the panorama of concern about the Brazilian position in the world ranking of these drugs consumption¹².

Among the anti-obesity agents commonly used by respondents were amfepramone, fenproporex hydrochloride, and sibutramine. A sobering fact concerning the use of these drugs is that only one third of students reported the use of prescription drugs and medical guidance, which refers to the great problem of self-medication and the risks associated with it. Among the causes of the indiscriminate use of drugs by the population, especially in self-medication, are the multitude of pharmaceutical products in the market and its massive advertising, the shy awareness campaigns about the possible health problems resulting from this practice, as well as drug information transmitted by "word of mouth", the internet or other media²⁶, and the psychosocial problems caused by the "dictatorship of thinness"¹⁰.

In addition to the problem of self-medication, the irrational use of appetite suppressants and a series of improper practices regarding its prescription in Brazil¹⁴ – and possible medical malpractice in prescribing psychotropic medication²⁷ – point out the need for a comprehensive review of the government's control system of these substances¹⁴. In this sense, Carneiro et al.²², analyzing 168,237 prescriptions and notifications of prescriptions

dispensed, evidenced the poor quality of notifications and highlighted the indiscriminate and irrational use of anorexigens, revealing how crucial it is the improvement of market regulation.

This whole scenario should alert the regulatory agencies regarding the high frequency of side effects caused by appetite suppressants usage, as this was one of the reasons (for a long time) why the pharmacological treatment of obesity was seen as a controversial treatment option, subject to considerable criticism⁹.

Feelings of restlessness, irritability, nervousness, insomnia, malaise, dizziness, and anxiety have been described as the side effects most reported by the students interviewed in this study. Massuia et al.¹⁰, investigating the use of weight-loss schemes associated with the use of drugs with or without prescription among 230 college students of São João da Boa Vista, SP, found that the side effect of such medications was the main reason leading to discontinuation of its use.

The socioeconomic profile of study participants was similar to that found in other studies with regard to family income and marital status^{28,29}, and the anorexigen drugs used were also similar^{14,22,30}. Furthermore, there was a higher proportion of non-users among those who had mothers with higher education degree.

Another fact worth mentioning is the difference in consumption pattern of anorexigen drugs between men and women³¹. In absolute numbers, the highest proportion of female users (62.2%) found in this study agrees with the national trend¹⁴ and also with other studies conducted with students^{10,22,29}.

The difference in consumption of anorexigens between the sexes is probably based on female and male differences regarding body dissatisfaction³², quantitatively greater in female³³, and the difference in usage purpose between the sexes, as demonstrated by Barcellos et al.³⁴ In this sense, Nappo et al.³⁵ concluded that the use of drugs such as amphetamines in Brazil is particularly prevalent among women, and its use is strongly related to the culture of thinness as a symbol of beauty. In addition, the knowledge that 90% of the individuals who develop serious eating disorders are adolescents and young women may have relevance to the explanation of this fact³⁶.

It is also important to note that the mean BMI, WC, and HC were significantly higher in students who were using or have used drugs for weight loss. This finding is probably justified by the fact that many people start consumption because they are overweight. In addition, this observation corroborates the fact that body image³³ has relevance in the use of such medications, but may also reveal the ineffectiveness of such drugs when used recklessly and irrationally.

Drugs such as sibutramine, for example, reduce body weight by only 4-6%³⁷, a mean similar to that obtained by interventions involving only low-energy diets³⁸. In addi-

tion, the pharmacological treatment of obesity when discontinued or interrupted results in body weight regain^{9,39,40}. Note also that prolonged therapy with sibutramine for more than two years is associated with a mean weight recovery of approximately half of the initial weight loss⁴¹.

The results presented here showed high prevalence of appetite suppressant users or former users, and the most commonly used drugs were amphetamines and sympathomimetic amines. We also found a considerable proportion of these non-prescription drugs been used by college students of Piauí, particularly among the female group of this population and those with overweight.

CONCLUSIONS

The proportion of anti-obesity drugs used among college students is worrisome, particularly considering the high proportion used without indication or prescription. Thus, it is clear the need for reassessment of control policies and regulations so far adopted for these products in the country, a fact now being discussed by the Brazilian National Agency of Sanitary Vigilance, along with the medical professionals and various governmental and non-governmental organizations regarding the use of psychoactive drugs

This study demonstrates the importance of implementing health education programs targeted at college students, aiming to clarify the risks and complications caused by the indiscriminate use of anorexigens and other drugs.

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