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OBESITY AND OVERWEIGHT BETWEEN SEDENTARY AND ACTIVE PEOPLE WITHOUT PROFESSIONAL GUIDANCE JOINING A GYM

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ABSTRACT

This study aims to analyze the distribution between both the regular practice of unsupervised physical activity and physical inactivity among newcomers to a gym, their anthropometric profiles, and a possible correlation with obesity or overweight. The participants were 217 subjects with an average age of 29.89 ± 2.88 years. The sample was stratified by gender (66 men and 151 women) and subsequently sub-classified by history of regular but unsupervised physical activity or physical inactivity (72 active and 145 inactive). Anthropometric measurements of body mass index (BMI) and waist/hip ratio were performed. According to the results, men who joined the gym had a BMI close to women, although they were classified into different anthropometric categories, being men classified as overweight and women as eutrophic. However, the results do not indicate any advantage for practitioners of unsupervised physical activity when compared to sedentary practitioners.

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INTRODUCTION

The rise in obesity affects both the male and female population and may be induced to a greater or lesser extent due to genetic inheritance, but especially when such factors suffer from behavioral effects of potentiating lifestyle habits, such as poor diet and physical inactivity (Ministério Da Saúde, 2013; Ballor, 1991) Excessive body fat substantially increases the risk of morbidity due to chronic non-communicable diseases (CNCDs) with special attention to hypertension, type II diabetes, vesicular disease, osteoarthritis, dyslipidemia, coronary artery disease (CAD), sleep apnea, breathing problems, and some forms of cancer (Monteiro, 1999). However, body fat percentage is not the absolute or the most widely used indicator for estimating obesity and its health risk scores (Rezende, 2007).

In this spectrum, BMI is often used to determine an individual's degree of trophic normality or degree of obesity, while WHR is an index that provides information about body fat distribution in relation to upper or lower body fat concentration, a condition that is strongly associated with CNCDs and early mortality. Regarding the practice of good behavioural habits diet is more effective in reducing body weight, while exercise is more efficient in reducing fat (Tremblay, 1994). Intense physical activity usually leads to a temporary suppression in food intake, probably because of catecholamine secretion (adrenaline and noradrenaline), with a resulting increase in blood glucose and mobilization of fat deposits (Ballor, 1991), while other studies show that exercise leads to moderation and practice for short periods of time, recovery occurs within minutes without producing compensatory effects on metabolism, such as excess postexercise oxygen consumption (EPOC) and so is unable to mobilize body fat deposits or even produce the control of food intake: hunger suppression (Bahr, 1991).

Thus, we can understand that professional supervision in physical training programs in an appropriate environment seems to be of the utmost importance to achieve the benefits in weight control, while on the contrary, the unsupervised practice of physical exercises in non-specific environments may not be ineffective, besides making the practitioner vulnerable to various risks. The objective of the present study was to determine the prevalence of obesity and WHR indexes as well as their comparisons and possible associations and correlations between young adult individuals of both genders, who were previously active but without professional guidance, or sedentary.

METHODOLOGY

This is a descriptive cross-sectional study. The sample consisted of 217 volunteer subjects, male and female, joining a gym in the city of Patos de Minas (in the Brazilian state of Minas Gerais). The participants were between 26 to 35 years old, with an average age of 29.89 ± 2.88 years, of which 151 were female and 66 male. From this sample, 72 subjects were considered physically active (33.2 %) and 145 sedentary (66.8 %). For the composition of the subgroups, subjects who reported practicing systematic physical activity, even without professional guidance and supervision, at least twice a week, with an average time of 60 minutes each session in the six-month period before the beginning of the study, were considered physically active at the time they joined the gym. Those who did not meet this criterion were classified as sedentary. After being informed of the study objective, the individuals signed the Free and Informed Consent Form. This study was approved by the CEP-CONEP system and is in accordance with the norms of Resolution 466/12 of the National Health Council (*Conselho Nacional de Saúde*) on research involving human subjects, under the CAAE Protocol: 51921315.0.0000.5143 No. 1,767,715 and Opinion. Anthropometric measurements of waist circumferences were taken in duplicate, using the arithmetic mean of the values with an accuracy of 2 (two) millimeters.

To measure weight and height, a Filizola® scale was used, with precision of 100 g and 0.5 cm respectively. Measurements were made with men in only swimming shorts and women in shorts and tops or bikini tops, and being barefoot. From these measurements, BMI was determined by the ratio of body mass (kg)/square of height (m2). The WHR ratio was identified by the ratio of the waist circumference measurement obtained/hip measurement, both in centimeters (cm). The statistical design of the study was elaborated into two distinct stages. The first stage being purely descriptive of the numerical and categorical data of the study, was performed by applying the Kolmogorov-Smirnov test, to determine the normality of the sample distribution, complemented by the Shapiro-Wilk test. In the second phase, comparisons and correlation were established between the independent anthropometric variables evaluated and the subdivisions of the subgroups of active and sedentary people, using the two-way Anova test, complemented when necessary by the Bon-Ferroni test and Pearson's correlation coefficient test, respectively. For the study, a significance coefficient of $p < 0.05$ was adopted. The application of statistical tests was performed using the SPSS V. 17.1 statistical package for iOS-MAC.

RESULTS AND DISCUSSION

Regarding BMI, men and women presented different indexes for eutrofic, overweight and obese, like showed on Figure 1. The values for the BMI show a significantly lower percentage of men (50%) compared to women (70.2%) for eutrophic conditions, a profile which is reversed when the distributions for overweight and obesity are compared, thus showing better BMI values for women. From this observation we can infer that the low percentage of eutrophically classified men may be due to the difference in body composition between men and women (Schorr, Melanie, 2018). It is important to point out that the BMI does not take into account the body composition, which is a fat free mass, and therefore the BMI has little strength to estimate the individual's fat tissue (Goossens, 2017). Thus, we suspect that this percentage difference between men and women can be represented by the low accuracy of BMI in estimating fat mass. When the study participants were divided into physically active and sedentary respectively, there was almost absolute similarity between the different categories of classification of eutrophic and overweight, but not for obesity, which showed higher percentages of obese among active participants (5.56 %) and compared to sedentary ones (1.38 %), like showed on Figure 2. A higher percentage was observed among physically active individuals in the obese group compared to the sedentary group, we know that physical exercise has a positive impact on the increase of fat free mass (Liberman, 2017). Collaborating in such finding, we suspect that due to the low accuracy in estimating fat tissue by BMI, individuals with higher fat-free mass may be allocated in an obese classification (Goossens, 2017). Comparison between the male and female subgroups of the percentages in the different subclasses of risk factors related to WHR, are showed in Figure 3.

The frequency distribution of WHR for male gym newcomers, distributed in the different subclasses of risk factors, behaved as follows: 36.4 %, low risk (less than 0.84); 47 %, moderate risk (0.84-0.91); 12.1 %, high risk (0.92-0.96); and 4.6 %, very high risk (greater than 0.96). There was a predominance (83.4 %) of the male sample in the low and moderate classes. For females, the frequency distribution of WHR in the different subclasses for risk factors was as follows: 32.4 %, low risk (less than 0.72); 49.7 % moderate risk (0.72-0.78); 11.3 %, high risk (0.79-0.84); and 6.6 %, very high risk (greater than 0.84). There was a predominance (82.1 %) of female subjects for the low and moderate risk classes. Analyzing WHR that is associated with health risk factors, the study subjects showed similar characteristics in relation to gender. For a high and very high risk of both male and female groups, the frequency obtained was 16.7 % and 17.9 %, respectively. Corroborating with other studies, the use WHR is important in the analysis of overweight groups (Hollmann, 1997; Wuren, 2019) and WHR is more powerful in the metabolic health analysis of obese individuals([14]) and is therefore a more effective measure. When each group, male and female, was subdivided into physically active and sedentary categories, the results of comparisons between groups behaved differently in relation to BMI values. In this case, a small but significant difference was found only between sedentary men and women with higher values for males (Table 1), which does not allow us to infer any analysis on the possible effects of regular unsupervised exercise practice regarding this variable.

Interestingly, while the sedentary male group has a higher BMI than the values found for the same category as the female group, the female group has higher BMI values for the physically active category. In addition, it was observed that physical activity for males may be responsible for lower BMI, while females behave exactly the opposite. This confirms the finding that men respond better than women to the effects of exercise on weight reduction (Ballor, 1991) However, even with an apparent trend, BMI differences between categories in both genders as well as between men and women for the physically active category were not statistically significant. On the other hand it is necessary to add that the values found for both categories in both genders, respectively, belong to the same BMI score, being men classified as overweight and women as eutrophic. However, in obese children, BMI was not sensitive to discriminate between high level of physical activity versus sedentary behavior (Chaput *et al.,* 2018), thus corroborating the findings of the present study where BMI results did not differ significantly between physically active versus sedentary. The fact that the physically active group performs physical activity twice a week for 60 minutes may have been the reason for no significant difference, since the World Health Organization (WHO) suggests 150 to 300 minutes of moderate activity per week or 75 to 150 minutes of vigorous activity (Bull, 2020). When the WHR values are compared (Table 2), again a significant difference was found between men and women, but now for both categories, which can actually be understood as the expected results. However, a difference between the categories for males with higher values for the sedentary category is also demonstrated.

Table 1 - Comparison of BMI for physically active and sedentary male and female gym newcomers. Mean values and standard deviations.

	Physically Active	Sedentary
Male	25.19 ± 3.11	26.34 ± 4.42*
Female	24.78 ± 5.44	23.73 ± 3.60

*Significant difference only in relation to the sedentary female subgroup. Anova Two-Way - Bon Ferroni (P <0.05).

Table 2 - Comparison of WHR for physically active and sedentary male and female gym newcomers. Mean values and standard deviations.

	Physically Active	Sedentary
Male	0.84 ± 0.05*	0.87 ± 0.06*
Female	0.74 ± 0.05	0.75 ± 0.05

* Statistically significant difference in relation to the respective female subgroups. † Significant Difference from the Physically Active same gender category. Anova Two-Way - Bon Ferroni (P <0.05).

Figure 1 - Percentual of BMI frequency distribution graph (kg/m²) for male and female newcomers to a gym.

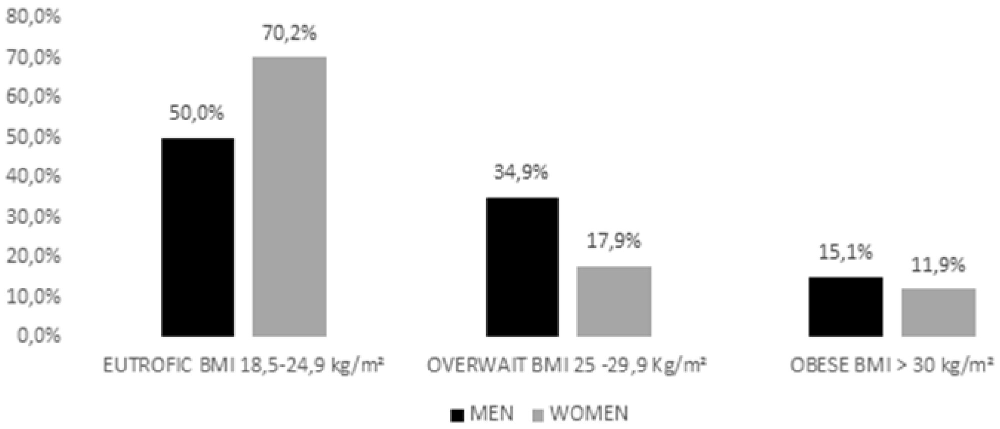


Figure 2 - Percentual of BMI frequency distribution graph (kg/m²), for physically active and sedentary gym newcomers aged 26 to 35 years old

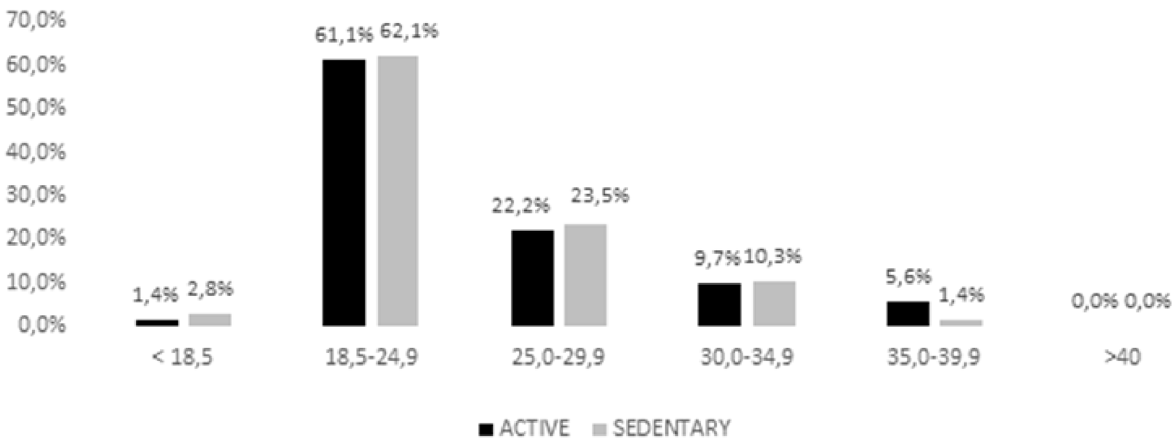
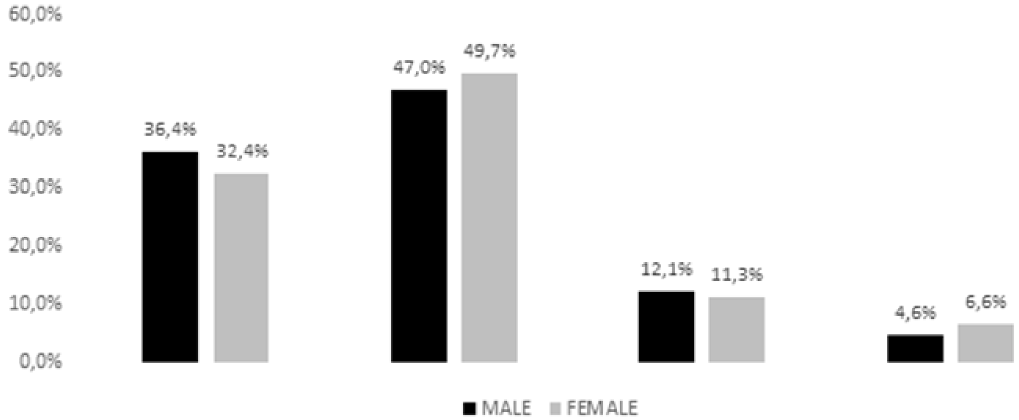


Figure 3 - Percentual of risk frequency distribution graph for WHR for male and female joining a gym.



The difference in WHR indexes found between males when comparing physically active and sedentary individuals suggests the hypothesis that even when not oriented and supervised, regular physical exercise has a reducing effect on WHR indexes. However, it should be noted that in both categories (physically active and sedentary), the values found fall within the same moderate risk score range and thus, although presenting different numerical values, both categories are in the same risk condition for CNCDs. For female participants, when divided into physically active and sedentary categories, although numerical differences were observed between the means, there was no significant difference, thus showing the absence of any differentiating effect promoted by the regular practice of supervised exercises for this parameter. Thus considering that abdominal fat, especially visceral fat, is metabolically more responsive than in the rest of the body,(Bouchard, 1993) it can be considered that men tend to have lower WHR values when regularly active, even if not oriented and supervised, as seems to be demonstrated by the results of the present study. When practicing moderate exercise, women tend not to have very significant reductions in fat and when they do, this occurs proportionally in all areas of the body (Rezende, 2007). In the present study, physically active women not under professional guidance and/or supervision were evaluated. In conditions such as these, the practitioners develop low intensity and/or volume exercises, which end up not having metabolic and conditioning effects, a fact that helps to explain the results found in the study (Tsai, 2003). Finally, no correlation results were found between any of the variables tested.

Final considerations

It is concluded with the present study that men who join a gym had a BMI very close to that found for women, although they are classified into different anthropometric categories, with men having an overweight condition whereas women fit as eutrophic. This difference is especially marked between people who maintained sedentary behavior until they joined the gym. However, the results do not point to any advantage for practitioners of unsupervised physical activity when compared to sedentary subjects. Regarding WHR, it was observed that men who were practitioners of unsupervised physical activity had lower ratios than their sedentary colleagues. However in this case, both categories of the male group were in the same (moderate) risk rating for CNCDs. Among women, no differences were found for the values of this variable between the evaluated categories (being also classified as moderate risk for CNCDs), which also demonstrate that the practice of unsupervised physical activity does not seem to influence this measure. All this added to the absence of correlations between the variables, allows us to infer that unsupervised exercise practice for a period of six months is not able to promote better anthropometric indexes than those found in sedentary adults, or promote greater protection against developmental risks for CNCDs.

Some conditions may have interfered with the result. Among them the classification criterion for physically active, which took into account only the time but disregarded the intensity of this training. Neither were the weekly caloric intake, nor the body composition considered. The authors suggest that further studies be conducted in this field.

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