

# Prevalence of Overweight and Obesity in Members of Two Large Fitness Clubs of the City of Rio de Janeiro, RJ, Brazil

## Prevalência de sobrepeso e obesidade dos inscritos em dois grandes centros de exercícios físicos do Rio de Janeiro

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### Abstract

The objectives of this study were: to assess the prevalence of overweight/obesity in two large fitness clubs of the city of Rio de Janeiro, Brazil; to compare its results with municipal and national demographic data; and to compare the prevalence and magnitude of overweight/obesity between genders and age groups. A cross-sectional, retrospective study was conducted with 12,415 subjects (4,932 men and 7,483 women), selected from the database of two fitness clubs of the city of Rio de Janeiro. After age categorization by decade (20-29, 30-39, 40-49, 50-59, 60-69 and  $\geq 70$  years) and body mass index (BMI) classification (underweight and normal weight:  $< 25 \text{ kg/m}^2$ , and overweight:  $\geq 25 \text{ kg/m}^2$ ), prevalences were compared to municipal and national data. In addition, a comparison of the prevalence and magnitude of overweight was made between genders and age groups. The prevalence of overweight was higher in men, regardless of age group. Comparing the results with municipal and national data, BMI values were significantly higher ( $p \leq 0.01$ ) in men (7.7%) and lower in women (21.6%). The two-way analysis of variance (age and gender) found lower values in women ( $21.4 \pm 1.8 \text{ kg/m}^2$ ), when compared to men ( $22.6 \pm 1.8 \text{ kg/m}^2$ ) in the underweight and normal weight categories, but not in the overweight category ( $28.1 \pm 3.1$  versus  $28.2 \pm 3.0 \text{ kg/m}^2$ , for women and men respectively). Women showed a 3-fold lower prevalence of overweight in the 20 to 49 year age group, which became similar to that of men after the age of 50 years. New studies are needed to confirm these findings or to identify regional and socioeconomic influences.

**Keywords:** Body mass index; Body image; Obesity.

### Resumo

Os objetivos deste estudo foram: estabelecer a prevalência de sobrepeso/obesidade em duas grandes academias no Rio de Janeiro; comparar os resultados com taxas demográficas nacionais e municipais de obesidade; e comparar a prevalência e magnitude de sobrepeso entre os sexos e grupos etários. O estudo analisou 12415 sujeitos (4932 homens e 7483 mulheres) selecionados a partir de um banco de dados de duas academias da cidade do Rio de Janeiro. Após categorização etária (20-29, 30-39, 40-49, 50-59, 60-69 e  $\geq 70$  anos), e por índice de massa corporal (IMC) (abaixo do peso e peso normal:  $< 25 \text{ kg/m}^2$ , e sobrepeso:  $\geq 25 \text{ kg/m}^2$ ) foram comparadas as prevalências com dados municipais e nacionais, e a prevalência e magnitude de sobrepeso entre gêneros e grupos etários. A prevalência de sobrepeso foi maior em homens do que em mulheres. Comparando estes resultados com dados municipais e nacionais, foram encontrados valores de IMC significativamente maiores ( $p \leq 0,01$ ) para homens (7,7%) e menores para mulheres (21,6%). Uma ANOVA a dois caminhos (idade e gênero) comparando o IMC demonstrou valores significativamente menores para mulheres ( $21,4 \pm 1,8 \text{ kg/m}^2$ ) do que para homens ( $22,6 \pm 1,8 \text{ kg/m}^2$ ) para as classificações abaixo do peso e peso normal, mas não para sobrepeso ( $28,1 \pm 3,1$  versus  $28,2 \pm 3,0 \text{ kg/m}^2$ , para mulheres e homens respectivamente). Mulheres demonstram prevalência de sobrepeso três vezes menor entre os grupos etários de 20 a 49 anos, assemelhando-se aos homens após 50 anos. Novos estudos são sugeridos com frequentadores de academia para ratificar esses achados, ou verificar possíveis influências regionais e/ou socioeconômicas.

**Palavras-chave:** Índice de massa corporal; Imagem corporal; Obesidade.

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## INTRODUCTION

According to the *Instituto Brasileiro de Geografia e Estatística* (IBGE – Brazilian Institute of Geography and Statistics)<sup>1</sup>, overweight and obesity affect 41% of men and 40% of women in Brazil, of which approximately 9% and 13%, respectively, have a Body Mass Index (BMI)  $\geq 30$  kg/m<sup>2</sup>, which categorizes them as obese. Reduced energy expenditure and high energy intake are among the causes of this problem, resulting from a combination of social, economic, cultural and behavioral factors<sup>2</sup>. Apart from being considered a health problem whose prevalence has increased considerably, obesity is an important risk factor for other diseases, such as diabetes, hypertension and heart diseases<sup>3</sup>. Evidence has shown that an increase in physical activity can have several effects on overweight prevention and treatment, even in cases of morbid obesity<sup>4</sup>. When performed adequately, chronic physical activity can lead to significant weight loss, similar to food control strategies<sup>5</sup>.

Fitness clubs have been the main places for supervised physical activity, especially for individuals with clinical recommendations. In Brazil, the number of fitness clubs was estimated to be 20,000 in 2009, including 4 million users, nearly 2% of the Brazilian population<sup>6</sup>. In addition to the legal obligation of having physical education professionals to guide users, many clubs provide a comfortable and safe environment with infrastructure, making them an appealing and advantageous option for physical activity practice. Exploratory studies on the health profile of physically active individuals would enable a better understanding of their characteristics and help these services to be more suitable for this growing population.

However, perhaps because the service provided by fitness clubs is still restricted to body aesthetics for many individuals, little is known about the prevalence of cardiovascular disease risk factors such as overweight and obesity in these environments, although there are indications that improvement in health, weight loss and medical recommendations are among the main reasons to seek these services<sup>7</sup>.

Consequently, the present study aimed to: (a) establish the prevalence of overweight and obesity in individuals who sought two large fitness clubs of the city of Rio de Janeiro; (b) compare the results of overweight and obesity with national and municipal indices; and (c) compare the prevalence and magnitude of overweight between genders and different age groups.

## METHODS

### Study participants

The study population was comprised of individuals who were members of two large fitness clubs of the city of Rio de Janeiro and who underwent fitness assessment. One of these clubs, situated in the western part of Rio de Janeiro (Barra da Tijuca), was monitored during a period of ten years (1992 to 2001); the other, situated in the southern part of this city, was monitored during nine years (2001 to 2009). These two clubs and respective monitoring periods were selected due to their willingness to provide full access to their records for the purpose of this research. All participants signed an Informed Consent Form when they became members of the club, in accordance with the recommendations of the Declaration of Helsinki and Resolution 196/96 of the National Health Council for research involving human beings. All procedures adopted

were approved by the ProHealth Department of Ethics, the company responsible for data collection.

### Procedures

After the clinical assessments were performed, participants had their weight and height measured by the fitness clubs' assessment service. The same procedure was performed in both clubs: body weight was obtained using a platform-type digital scale with a 0.1 kg accuracy (Filizola Digital Scale, Filizola S.A., São Paulo, SP, Brazil) and height was measured with a wall stadiometer with an accuracy in millimeters, where individuals were in orthostatic position, arms alongside the body, elbows stretched out, feet together and head in the Frankfurt plane. Assessments were performed by a team of ten evaluators from a company that provides fitness assessment services for fitness clubs. All evaluators were submitted to training courses every six months, when the quality of measures was verified. These courses were conducted by an experienced evaluator with a level three certification from the International Society for the Advancement of Kynantropometry (ISAK). As accuracy criterion, errors (technical errors of measurement) of up to 1% were accepted for the measures used in the present study, as recommended by the ISAK<sup>8</sup>.

The following inclusion criteria were established to select individuals and minimize possible bias: age ( $\geq 20$  years), height ( $\geq 120$  cm and  $\leq 215$  cm) and weight ( $\geq 35$  kg and  $\leq 150$  kg). Of all 17,254 individuals, 12,415 remained in the sample, which represented a reduction of 19.1%. The individuals selected were categorized according to their age group (20-29, 30-39, 40-49, 50-59, 60-69 and  $\geq 70$  years) and BMI category (underweight, normal weight, overweight and obesity class I, II and III), according to what was proposed by the World Health Organization (WHO)<sup>9</sup>. The prevalence of overweight and obesity ( $\geq 25$  kg/m<sup>2</sup>) for each age group was established and compared to national and municipal prevalences for all ages (Rio de Janeiro).

### Statistical Analysis

The descriptive analysis was performed with the calculation of the relative frequency for the prevalence of different BMI categories and for the combined prevalence of overweight and obesity by gender and different age groups. The Chi-square test for heterogeneity was used to compare the combined prevalence of national and municipal data. Two-way analysis of variance (ANOVA) (age and gender) and Scheffé post hoc test (when necessary, in case of a significant difference identified by ANOVA) were used to compare BMI values between genders and age groups. In addition, one-way ANOVA was performed to identify a possible effect of time (year by year) on the prevalence of fitness club members found in the subcategories of weight studied. A type I error (alpha) of 1% was determined using the SPSS software, version 17 (SPSS Inc., Chicago, USA).

## RESULTS

The prevalence and distribution of different categories according to BMI levels by age and gender are shown in Table 1. The combined prevalence of overweight and obesity in both genders, regardless of age, was significantly higher in men than women, when compared to national and municipal data<sup>1</sup> (Figure 1). When the comparison is specifically made with the city of Rio de Janeiro, the differences found were

Table 1

Prevalence (n) of body mass index (BMI) by category, age group and gender.

Age (years)	BMI categories (kg/m <sup>2</sup> )						Total
	Underweight < 18.5	Normal weight 18.5 - 24.9	Overweight 25.0 - 29.9	Class I 30.0 - 34.9	Obesity Class II 35.0 - 39.9	Class III ≥ 40.0	
<i>Men</i>							
20 - 29	17 (0.9%)	1012 (56.2%)	638 (35.4%)	106 (5.9%)	23 (1.3%)	4 (0.2%)	1800
30 - 39	7 (0.4%)	706 (41.9%)	778 (46.2%)	161 (9.6%)	26 (1.5%)	6 (0.4%)	1684
40 - 49	3 (0.3%)	332 (35.4%)	471 (50.2%)	108 (11.5%)	17 (1.8%)	7 (0.7%)	938
50 - 59	0 (0%)	106 (28.6%)	199 (53.8%)	57 (15.4%)	7 (1.9%)	1 (0.3%)	370
60 - 69	1 (1%)	27 (26%)	51 (49%)	20 (19.2%)	5 (4.8%)	0 (0%)	104
≥ 70	0 (0%)	12 (33.3%)	20 (55.6%)	3 (8.3%)	1 (2.8%)	0 (0%)	36
Total	28 (0.6%)	2195 (44.5%)	2157 (43.7%)	455 (9.2%)	79 (1.6%)	18 (0.4%)	4932
<i>Women</i>							
20 - 29	177 (6.4%)	2283 (82.6%)	258 (9.3%)	33 (1.2%)	11 (0.4%)	1 (0%)	2763
30 - 39	73 (3%)	1958 (80.7%)	317 (13.1%)	64 (2.6%)	9 (0.4%)	5 (0.2%)	2426
40 - 49	20 (1.4%)	1072 (75.3%)	260 (18.3%)	56 (3.9%)	14 (1%)	2 (0.1%)	1424
50 - 59	7 (1.1%)	377 (60.7%)	175 (28.2%)	51 (8.2%)	9 (1.4%)	2 (0.3%)	621
60 - 69	1 (0.5%)	76 (41.8%)	78 (42.9%)	20 (11%)	6 (3.3%)	1 (0.5%)	182
≥ 70	1 (1.5%)	28 (41.8%)	27 (40.3%)	10 (14.9%)	1 (1.5%)	0 (0%)	67
Total	279 (3.7%)	5794 (77.4%)	1115 (14.9%)	234 (3.1%)	50 (0.7%)	11 (0.1%)	7483
Total	307 (2,5%)	7989 (64.3%)	3272 (26.4%)	689 (5.5%)	129 (1%)	29 (0.2%)	12415

7.7% higher in men and 21.6% lower in women.

The magnitude of BMI levels according to gender, the classification of underweight and normal weight and that of overweight and obesity (A), and the prevalence of overweight and obesity in men and women and according to age group (B) are shown in Figure 2. Women categorized as low and

normal weight showed a significantly lower BMI than men in the same category in all age groups, especially up to 60 years. There were no differences between genders among individuals with a BMI  $\geq 25$  kg/m<sup>2</sup>.

Except for the group of individuals aged  $\geq 70$  years, all age groups showed differences in the prevalence of overweight

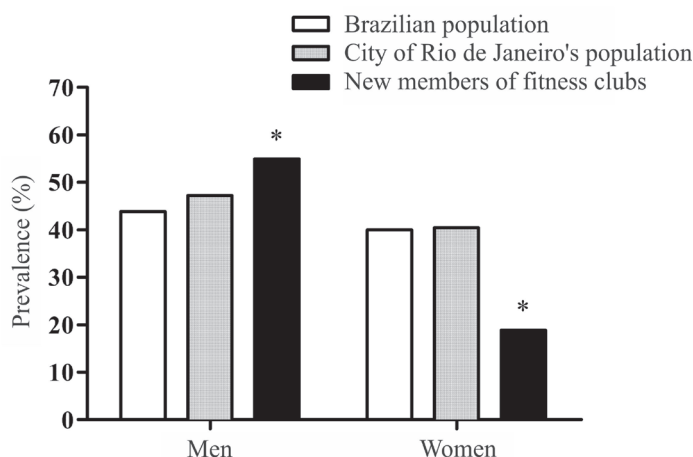
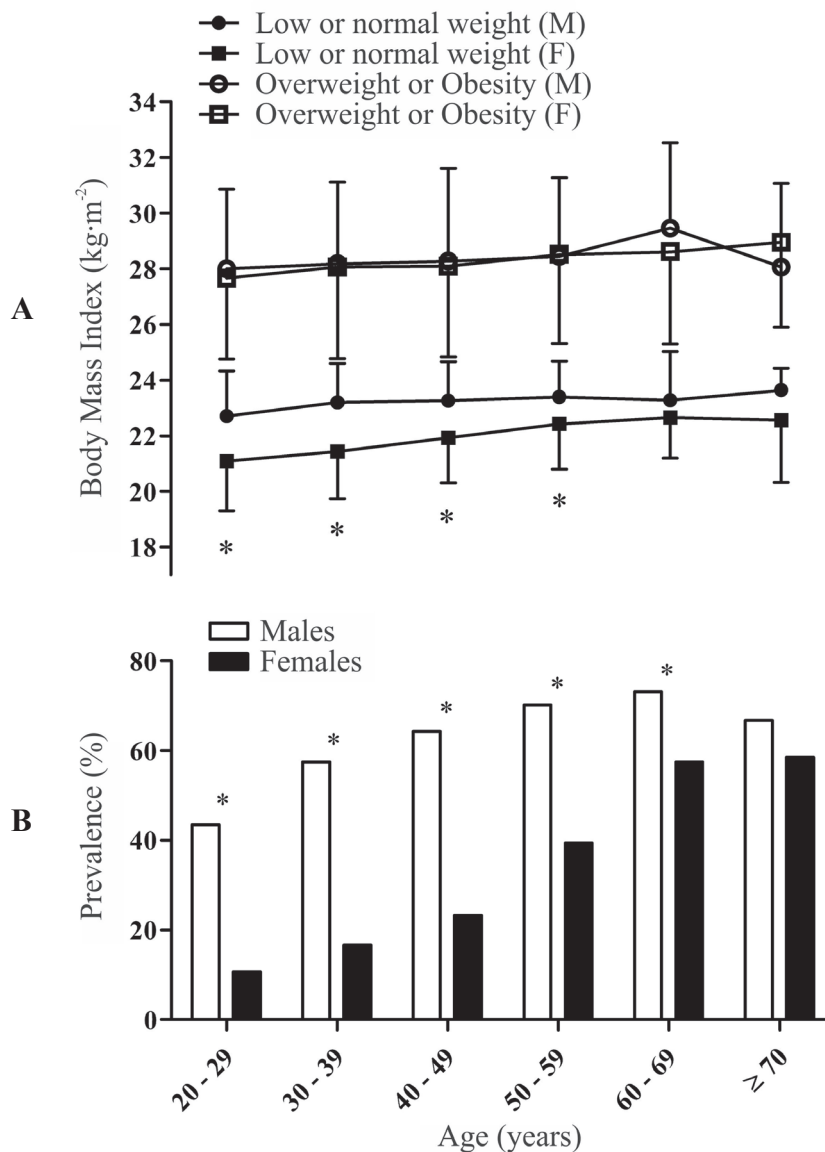


Figure 1

Prevalence of overweight of the populations studied by gender.



**Figura 2**

**(A) Mean BMI ± standard deviation by age group and category; and (B) comparison between the prevalence of overweight and obesity by age group.**

and obesity between genders. In the age groups between 20 and 49 years, the prevalence in men was nearly three times higher than that of women. In addition, time did not have a significant effect on the prevalence of fitness club members found in the subcategories of weight studied ( $p = 0.999$ ).

## DISCUSSION

Health Sciences descriptors define fitness clubs as establishments that have programs aimed at the promotion and maintenance of well-being for optimal performance and health<sup>9</sup>, being currently considered in Brazil as one of the new forms of health services<sup>10</sup>. When the benefits to health resulting from increased physical activity levels, marketing strategies and fitness industry advertising are taken into consideration, one can understand why fitness clubs become an option for those who need to lose weight to improve their health.

However, fitness clubs are viewed by the public in general as a place for the “cult to the body”, where individuals could meet the aesthetic standards dictated by the media<sup>11</sup>. In this way, the aesthetic and health goals become mixed up<sup>12</sup>, creating an imbalance between individuals who go to these clubs to meet such aesthetic standards and those who go there because they need to lose weight and consequently improve their health. The relationship between overweight and emotional disorders has been previously shown<sup>13</sup>. The search for physical and emotional self-protection may create a certain level of resistance to body exposure when performing physical exercises in fitness clubs, especially when considering that the female population is mainly comprised of young women with a low BMI, as 60% of the total number of females was aged between 20 and 39 years and had a BMI lower than 25 kg/m<sup>2</sup> (Table 1). The city of Rio de Janeiro has a tropical climate, which promotes body exposure, emphasizing aesthetic standards that can hardly be met by the majority of



the population. In addition, self-image disorders seem to be associated with an individual's intention to lose weight<sup>14</sup>.

According to the results of this study, women with overweight or obesity avoid fitness clubs, whereas men in this situation apparently seek these clubs, regardless of their aesthetic condition. Motivation associated with body image could help one to understand this situation. It has been shown that women's greater dissatisfaction with their body image when compared to men's could justify the results found in this study. These results are very relevant when considering the fact that one of the fastest growing sectors in recent years has not fulfilled its role in helping to control and reduce body weight in women. Associated with the public health impacts, this finding has economic repercussions for this segment, indicating that part of the population is underserved and perhaps at the mercy of fate to benefit from exercising to help them lose weight.

Differences between genders become more relevant when making observations for each age group. As expected when considering population data on weight gain<sup>1</sup>, there was a direct relationship between the increase in age and the prevalence of overweight and obesity among individuals who seek fitness clubs. However, the pattern observed in men was statistically different from that of women. Whereas the prevalence in men is similar to the population data on those aged 20 years or more and reaching a peak between 50 and 59 years, women showed values that remained practically unaltered until the age of 40 years (Figure 2B). The results indicate that younger women with normal weight or underweight are the ones seeking fitness clubs.

The reasons for this finding were not an object of investigation in the present study. Although results of this study do not enable more in-depth conclusions to be made, certain hypotheses can be formulated with the purpose of better understanding them. These results may suggest that women aged more than 50 years seek fitness clubs aiming to lose weight, whereas individuals in younger age groups may be primarily concerned about aesthetics, as they are not overweight. This fact could lead to the self-exclusion of women who do not meet the current aesthetic standards, causing them to avoid this type of service. There are indications that self-image disorders tend not to be so frequent in older women, even when they are overweight or obese<sup>14</sup>. Especially in the case of younger women with overweight or obesity, the appeal of a slim body apparently opposes the search for fitness clubs as a space for a physically active life.

It is plausible to admit that there is a certain resistance to exposing one's body while exercising in fitness clubs, especially when considering the female population primarily comprised of younger women with normal weight or underweight (Table 1). In addition, the city of Rio de Janeiro, where the climate is tropical and body exposure is frequent, could induce the population to seek aesthetic standards that are more rigorous than those followed by the majority of the population.

While investigating individuals who attempted to lose or maintain their body weight, Serdula et al.<sup>16</sup> showed that there was a reduction in the use of physical activities as a strategy to lose weight with age in both genders. This result can be partly explained by the reduced number of older members in fitness clubs. Millstein et al.<sup>17</sup> showed an association between the intention of using physical activities to lose weight and the level of satisfaction with one's self-image, although there is a different standard between genders and women dissatisfied

with their body image have a lower intention of exercising.

Certain limitations in the present study should be noted. First of all, only two fitness clubs were studied and, although the sample size was large, researchers could not affirm that it was representative of the population who go to fitness clubs in the city of Rio de Janeiro. In addition, this sample is limited to individuals with an average to high socioeconomic level. It has been reported that lower socioeconomic status individuals committed to weight loss strategies are more likely to perform physical activities than those with a higher socioeconomic level<sup>18</sup>. However, considering the fact that fitness clubs charge for their services, those with a lower socioeconomic level probably do not seek this type of environment to perform physical activities. Based on this information, the inclusion of individuals belonging to lower socioeconomic groups could generate different results from those obtained in the present study. In this way, the results of this study cannot be extrapolated to groups with socioeconomic characteristics differing from those investigated here. Moreover, researchers understand that the BMI must be used with caution as a strategy to determine overweight and obesity in physically active individuals. According to Ode et al.<sup>19</sup>, this variable can overestimate the prevalence of such indicators in athletes or even those who practice bodybuilding<sup>20</sup>. The sample of this study probably included individuals with such characteristics and it was not possible to assess the proportion of lean and fat mass.

However, it should be noted that the present study shows indications that provide an overview of the characteristics of this population. Consequently, more studies on this topic are required.

## CONCLUSION

The results of the present study suggest that, unlike men, few women with overweight and obesity sought the fitness clubs studied as places for exercising.

Curiously, the prevalence of overweight and obesity in the men studied was similar to that found in national and municipal demographic data, suggesting that club members' characteristics were not so different from those of the general population, despite the study limitations. Consequently, researchers understood that being overweight did not appear to be a limiting factor for the male population of different ages to seek the fitness clubs studied. Better understanding of the aspects associated with these findings could have important implications for the understanding of more suitable interventions for the female population. The reason for the differences found among women needs to be investigated. New studies with members of fitness clubs should be conducted, aiming to confirm these findings or even to observe the influence of regional and/or socioeconomic differences.

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### Authors' contributions

Tony Meireles dos Santos was responsible for the research project conception, literature review, article writing and reviewing and statistical analysis; Bruno Ribeiro Ramalho Oliveira was responsible for the literature review, article writing and reviewing and statistical analysis; Geraldo Albuquerque Maranhão, Marcos Santos Ferreira and Walter Rolph Thompson were responsible for text writing and reviewing.

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