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Self-reported diabetes mellitus and its association with overweight in older adults

Diabetes mellitus *auto-referido e sua associação com excesso de peso em idosos*

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Abstract – This study aimed to identify the prevalence of self-reported diabetes mellitus in the older adults in Florianópolis and its relationship with being overweight. 857 older adults took part in the study. Sociodemographic (sex, age group, schooling, monthly income), anthropometric (weight, height), usual physical activity, arterial hypertension and diabetes mellitus information was collected. The Body Mass Index (BMI) was adopted to diagnose the overweight. The adjustment variables were: sociodemographic, usual physical activity and arterial hypertension. The prevalence of diabetes mellitus was 13.5% (male = 12.1%; female = 14.8%; p<0.05) and the overweight was 59.4% (male = 58.0%; female = 60.7%; p=0.40). A higher prevalence of diabetes mellitus was observed in the older adults who were overweight. The overweight was positively associated with diabetes, regardless of sex, age, schooling, monthly income, usual physical activity and arterial hypertension. One can conclude that overweight in the older adults in Florianopolis was an independent factor and positively associated with diabetes mellitus.

Key words: Aged; Body Mass Index; Diabetes Mellitus; Nutritional Status; Overweight.

Resumo – *O objetivo do estudo foi identificar a prevalência de diabetes mellitus auto-referida em idosos de Florianópolis e sua relação com excesso de peso. Participaram do estudo 875 idosos. Foram coletadas informações sociodemográficas (sexo, grupo etário, escolaridade, renda mensal), antropométricas (massa corporal, estatura), atividade física habitual, hipertensão arterial e diabetes mellitus. Adotou-se o Índice de Massa Corporal para diagnosticar o excesso de peso. As variáveis de ajuste foram: sociodemográficas, atividade física habitual e hipertensão arterial. A prevalência de diabetes mellitus foi de 13,5% (masculino = 12,1%; feminino = 14,8%; p<0,05) e a de excesso de peso foi de 59,4% (masculino = 58,0%; feminino = 60,7%; p=0,40). Maior prevalência de diabetes mellitus foi observada nos idosos com excesso de peso. O excesso de peso foi positivamente associado à diabetes, independentemente do sexo, idade, escolaridade, renda mensal, atividade física habitual e hipertensão arterial. Conclui-se que o excesso de peso em idosos de Florianópolis foi fator independente e positivamente associado à diabetes mellitus.*

Palavras-chave: *Diabetes mellitus; Estado nutricional; Idoso; Índice de massa corporal; Sobrepeso.*

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INTRODUCTION

Adopting a lifestyle with inappropriate eating habits and low levels of physical activity together with an aging population are factors responsible for the chronic diseases considered to be the main cause of death in the world[1]. Among these chronic diseases, diabetes mellitus represents a serious problem of public health in both developed and developing countries, which entails high costs for the Brazilian Unique Health System (SUS), due to the number of hospitalizations, mainly owing to the global increase in its prevalence[2].

According to the data published, the number of diabetics in the world increased from 171 million in 2000 to 366 million in 2030. Regarding the Brazilian scenario, it can be noted that approximately 11.3 million people will be diabetic[3]. This increase will mainly occur in the most advanced age ranges[1]. The results of the National Research by Domicile Sample (PNAD) of 2003 indicated, in the Brazilian population, a prevalence of diabetes mellitus of 12% in men and 16% in women, in the age range from 70 to 79 years old[4]. According to the data of the Telephone-Based Surveillance of Risk and Protective Factors for Chronic Diseases (VIGITEL), in 2006 and 2007, the prevalence of self-reported diabetes mellitus in individuals aged 65 years or older attained 18.6%[5,6]. In 2010, more than 20% of the individuals aged 65 or over had diabetes mellitus[7]. Concerning regional studies, the prevalence was approximately 15% of diabetes mellitus in the elderly[8,9].

Individuals who are overweight have the greatest prevalence of metabolic and cardiovascular diseases.[10,11] Thus, it becomes increasingly necessary to investigate the prevalence of non-transmissible chronic diseases associated with the nutritional status, mainly involving the older adults, who are more vulnerable to nutritional problems due to functional, physiological, psychological and social factors.[12] The prevalence of diabetes mellitus and its relationship with being overweight in the older adults population in developed countries is well documented[13-15], but there are few studies conducted with representative samples in developing countries, as Brazil. In this respect, the present study aims to identify the prevalence of self-reported diabetes mellitus in older adults living in a Brazilian capital and its relationship to being overweight.

METHODOLOGICAL PROCEDURES

The study was developed in the municipality of Florianópolis, Santa Catarina, Brazil. In 2000, there were 28,816 older adults in this municipality – 11,979 men and 16,837 women – distributed in 12 districts and 460 censoring sectors[16]. All the censoring sectors were surveyed, except for 20, of the following type: military bases and barracks (two); prisons (two); asylums (two); homeless sector (three) and sectors with fewer than 50 inhabitants (11). The sample selection was systematic random sampling, interviewing one older adults at the start of each censoring sector and another one in the middle.

19 refusals were recorded. Thus, the sample was composed of 875 older adults, 437 men and 438 women. The data were collected in the period from August to December of 2002.

The team of interviewers for collecting the data was formed by selecting 50 people, all university students or already graduated. The interviewers were trained by one of the authors and by technicians of the Brazilian Institute for Geography and Statistics (IBGE), in six weekly meetings lasting four hours. The training contents consisted of information about surveying, the importance of the interviewer's role, the concepts used, how to visit the censoring sector and locate the older adults, how to approach the older adults in his or her home and specific training in applying the interview: as starting, conducting and ending it. The interviewers were furnished with all the material for collecting data and identification. They performed in a determined number of censoring sectors and respected the territorial limits legally defined and established by the IBGE, as per the maps and descriptions of the sectors used in the census of 2000. The interviewers were remunerated by interview given, receiving a travel voucher and performing at most four interviews per day. The main difficulties found by the interviewers included fear of violence in the districts with less purchasing power, and the apprehension of the interviewee of receiving the interviewer in his or her home, besides the distance and difficult access to determined regions of the municipality.

The project was approved by the Research Ethics Committee for Human Beings of the Universidade Federal de Santa Catarina (Report 051/2001).

Diabetes mellitus (dependent variable) was self-reported by the elderly (yes or no), after being asked by the interviewers if they had the disease.

Nutritional status (independent variable)

The anthropometric data (weight and height) were measured according to standardized procedures[17].

The weight was measured using a digital balance (Plenna), with a capacity of 150 kg and sensitivity of 0.1 kg. A flexible steel metric tape measure attached to the wall was used to determine the height. The overweight was defined as the body mass index [BMI = weight (kg) / height (m)^2], greater than or equal to 25 kg/m^2, in accordance with the classification of the World Health Organization[18].

Adjustment variables

Sociodemographic: sex, age group (60-69, 70-79 and ≥ 80 years old), schooling (none, elementary school, high school and higher education) and monthly income (≤ 600; 601-1000; 1000-2000; > 2000 reals).

Usual physical activity (active and insufficiently active): the instrument used was the long version of the International Physical Activity Questionnaire (IPAQ)[19]. Those who spent less than 150 minutes per week doing moderate or vigorous physical activities were considered to be insufficiently active, whereas those spending 150 minutes or more per week were considered to be more active[20].

Arterial hypertension (yes and no): it was self-reported by the elderly people, after being asked by the interviewers if they had the disease.

Statistical procedure

The analyses included prevalence calculations with respective 95%CI. The association between self-reported diabetes mellitus and being overweight, as tested using the Poisson regression technique. Simple and adjusted models were calculated to estimate the prevalence ratios, with their respective confidence intervals. The statistical analysis was performed using the software SPSS version 15.0 and the significance level adopted was 5%.

RESULTS

The age of those taking part in the study varied from 60 to 101 years old, with a mean of 71.6 ± 7.9 years. The mean age was 71.4 ± 7.6 years (variance 60 - 94) in men and 71.7 ± 8.2 years in women (p = 0.578). The sample features according to the adjustment variables are presented in Table 1. There was a similar distribution according to the sex. Most of the individuals studied up to elementary school, were physically active and did not have arterial hypertension. There was a high percentage of older adults aged under 70 years old and with a low monthly income (up to R$ 600.00).

The prevalences of self-reported diabetes mellitus and overweight are presented in Table 2. A high prevalence of overweight was observed; that of diabetes was within the range expected for older adults. In both the variables no significant differences were found between men and women.

Table 1. Features of the sample as per the adjustment variables. Florianópolis, SC, Brazil, 2002.

Variable	n	%
Sex	875	
Male	437	49.9
Female	438	50.1
Age (years)	875	
<70	403	46.1
70-79	323	36.9
≥80	149	17.0
Schooling	875	
None	175	20.0
Elementary school	476	54.4
High school	120	13.7
Higher education	104	11.9
Monthly income	841	
≤ R$ 600.00	292	34.7
R$ 601.00 to R$ 1000.00	148	17.6
R$ 1000.00 to R$ 2000.00	189	22.5
>R$ 2000.00	212	25.2
Usual physical activity	875	
Active	519	59.3
Insufficiently active	356	40.7
Arterial hypertension	639	
Yes	273	42.7
No	366	57.3

Table 2. Prevalences (%) and confidence intervals (95%) of self-reported diabetes mellitus and being overweight in men, women and the total sample. Florianópolis, SC, Brazil, 2002.

Sample	Diabetes	Overweight
Men	12.1 (9.3 – 15.5)	58.0 (53.3 – 62.6)
Women	14.8 (11.6 – 18.5)	60.7 (56.0 – 65.2)
Total	13.5 (11.4 – 15.9)	59.4 (56.1 – 62.6)

The prevalence of self-reported diabetes mellitus, according to the weight status, is presented in Figure 1. A greater prevalence of diabetes mellitus was observed in the older adults who were overweight.

Regarding the relationship between self-reported diabetes mellitus and being overweight, a positive association was found between the independent variable and the outcome (Figure 2). The adjusted model showed that being overweight was positively associated with diabetes mellitus in the older adults, regardless of the sex, age, schooling,

monthly income, usual physical activity and arterial hypertension.

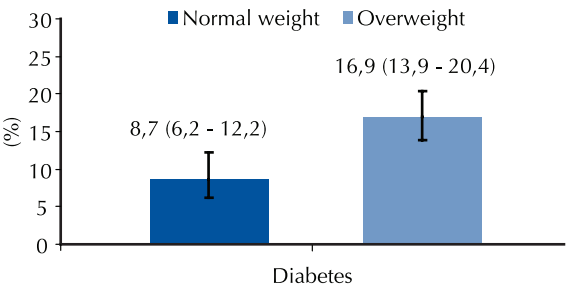

Figure 1. Prevalence (%) and 95%CI of self-reported diabetes mellitus, as per the nutritional status in older adults. Florianópolis, SC, Brazil, 2002.

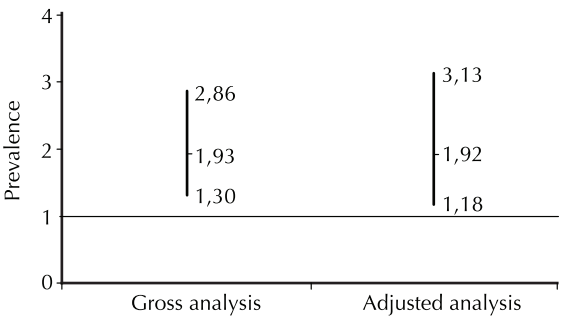

Figure 2. Association (gross and adjusted prevalence ratio and 95%CI) between self-reported diabetes mellitus and being overweight in the older adults. Florianópolis – SC, Brazil, 2002. * Adjusted by sex, age, schooling, monthly income, usual physical activity and arterial hypertension; p-value$_{model}$ = 0.033.

DISCUSSION

This is the first population and domiciliary-based study performed with older adults living in Santa Catarina State to investigate the prevalence of diabetes mellitus and is association with being overweight. The data were derived from a representative sample, which suggests that the results can be extrapolated to the general oldr adults population of the municipality of Florianópolis.

The estimate of self-reported diabetes mellitus in older adults was 13.5%. This value is below that observed in countries as the United States (19.7%)[15] and Israel (18.9%)[21] and above that found in Canada (9.9%)[22]. Multicentric studies which compiled surveys of several countries reported prevalences varying from 6.7% to 24.7% in Asia[13] and from 8.5% to 22.4% in Europe[14], dependant upon the sex and age group. Another multicentric study involving samples representing seven large municipalities of Latin America and the Caribbean found a prevalence of 15.7%[10]. Compared with domestic data, it was found that the prevalence of self-reported diabetes mellitus in Florianópolis was below that observed in the older adults in São Paulo (15.4%)[23] and 16 Brazilian capitals (17.8%)[24].

In spite of the prevalence of diabetes mellitus being on a smaller scale when compared with other morbidities, it is considered to be an extremely limiting disease, as it can cause blindness, amputations, nephropathies, cardiovascular and encephalic complications which impair the functional capacity, autonomy and quality of life[23]. In a study conducted in a municipality inside in São Paulo State, the older dults revealed that not having diabetes mellitus was associated with being satisfied with life[25].

It was found that six out of each ten older adults in Florianópolis are overweight. These findings corroborate the last study made by VIGITEL in the 26 Brazilian states and in the Federal District, which indicated that 58.4% of the elderly aged 65 years old or above are overweight[7]. When observing the nutritional status in some municipalities separately[26,27], the findings indicate a high prevalence of obesity among the older adults.

Surveys have shown that obesity significantly increases morbidity and mortality by other diseases, such as arterial hypertension, dyslipidemias, ischemic coronary heart disease (IHD), gallbladder disease, osteoarticular diseases, non-insulin-dependent or type 2 diabetes mellitus and certain types of cancer, noting that there is a higher prevalence of obesity in women than men, including among the older adults[28]. This epidemiological context indicates the urgent need for more efficacious preventive strategies, concerned with changes in the lifestyle of the older adults, by adopting healthy eating habits and regularly practicing a physical activity.

The results of the present study indicate that being overweight was an independent factor and positively associated with diabetes mellitus. The data indicate that the prevalence of diabetes mellitus is 92% (PR = 1.92) higher in older adults who are overweight. Similar results were found in oldr adults in several countries of Latin America and the Caribbean[10], suggesting that overweight is an important risk factor for diabetes mellitus and cardiovascular diseases in the older adults, which was confirmed in analytical studies with a cohort design[11]. The relevant literature acknowledges that obesity is a risk factor in the occurrence of the disease and recommends weight reduction and control as being one of the main non-pharmacological strategies for treating diabetes[29]. Within this context, the Brazilian Society of Diabetes (Sociedade

Brasileira de Diabetes)[29] states that reducing body weight by 5 to 10% could reduce the levels of glycemia, postpone the advance of the disease, decrease requirements for insulin, and even allow the pharmacological treatment to be withdrawn.

Evidence indicates that diabetes mellitus remains asymptomatic for a long period of time before being diagnosed. In this respect, early diagnosis and preventive intervention should be made a priority, as this would allow the number of cases of the disease to be reduced. Furthermore, an accessible health system, ensured quality in the treatment, education and the health care adhesion of people with diabetes mellitus would reduce the burden of the disease[30].

There are certain limitations regarding the interpretation of the data presented in this study: (i) the prevalence of self-reported diabetes mellitus doesn't indicate the proportion of individuals having the disease in a determined population, but only the estimate of known cases. Several studies[13,21,22] show that the proportion of diabetes mellitus not diagnosed in older adults populations is fairly significant and can vary with age and sex, besides being affected by the availability of health services; (ii) The cross-sectional design does not allow one to state that the association found indicates causation.

CONCLUSIONS

The present study showed that the older adults who are overweight report more diabetes, regardless of sociodemographic factors, practicing a physical activity and having hypertension. In accordance with these results social campaigns and programs are advisable in order to encourage behavioral changes which favor the reduction of the prevalence or occurrence of diabetes mellitus and its complications in the older adults population.

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