DIABETES MELLITUS IN MONTES CLAROS: SELF-REPORTED PREVALENCE SURVEY

Diabetes Mellitus em Montes Claros: inquérito de prevalência autorreferida

Diabetes Mellitus en Montes Claros: averiguación de prevalencia autorreferida

ABSTRACT

Objective: To estimate the prevalence of self-reported diabetes mellitus in the population of Montes Claros. **Methods:** Cross-sectional, analytical study with population and household basis. The data collection instrument was based on the questionnaire proposed by the Ministry of Health to assess behaviors and risk factors for noncommunicable chronic diseases. The prevalence of diabetes mellitus was surveyed through report made by the assessed individuals, in a northern city of Minas Gerais state, Brazil. The association of self-reported diabetes to sociodemographic profile, lifestyle, use of health services, and perception of general health was evaluated through Poisson regression, with analysis of prevalence ratios. The average number of medical appointments in the public sector and hospitalization events in the year were compared between diabetics and nondiabetics. Statistical analysis considered the significance level at $p<0.05$ and 95% confidence interval. **Results:** There were 2,149 participants. Of these, 4.5% (n=96) reported having diabetes. The highest prevalence rate was related to the elderly (PR=1.047), those who consume soft drinks (PR=1.054), and those with negative self-perceived health (OR=1.017), $p<0.05$. The average number of medical appointments in the public sector was higher among diabetics, (2.53±3.420), as well as the average number of hospitalizations, (1.44±0.703), $p<0.05$. **Conclusion:** The prevalence of self-reported diabetes mellitus in this population was similar to the national scenario and showed association to the elderly, soft drink consumers and to those who perceive not having a good general health. Diabetes seems to contribute to the increased use of public health services.

Descriptors: Diabetes Mellitus; Prevalence; Epidemiology.

RESUMO

Objetivo: *Estimar a prevalência de diabetes mellitus autorreferida na população de Montes Claros.* **Métodos:** *Estudo, transversal, analítico, de base populacional e domiciliar. O instrumento de coleta de dados embasou-se em questionário proposto pelo Ministério da Saúde para avaliar comportamentos e fatores de risco para as doenças crônicas não transmissíveis. O levantamento da prevalência de diabetes mellitus foi a partir de relato do pesquisado, em município do norte de Minas Gerais, Brasil. Avaliou-se a associação da diabetes autorreferida com perfil sociodemográfico, estilo de vida, uso dos serviços de saúde e percepção de saúde geral pela regressão de Poisson, com análise das razões de prevalência. As médias de consultas médicas no setor público e de internações no ano foram comparadas entre diabéticos e não diabéticos. A análise estatística considerou o nível de significância $p<0,05$ e intervalo de confiança 95%.* **Resultados:** *Participaram 2.149 indivíduos. Destes, 4,5% (n=96) relataram possuir diabetes. A maior razão de prevalência foi relacionada aos idosos (RP=1,047), aos que ingerem refrigerantes (RP=1,054) e aos com autopercepção negativa da saúde (RP=1,017), $p<0,05$. A média de consultas médicas no setor público foi maior entre os diabéticos (2,53 ±3,420) assim como a média de internações (1,44 ± 0,703), $p<0,05$.* **Conclusão:** *A prevalência de diabetes mellitus autorreferida nesta população foi semelhante ao cenário nacional e se associou aos idosos, aos consumidores de refrigerantes e aos que percebem não ter uma saúde geral boa. A diabetes parece contribuir para o maior uso dos serviços de saúde pública.*

Descritores: *Diabetes Mellitus; Prevalência; Epidemiologia.*

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RESUMEN

Objetivo: *Estimar la prevalencia de diabetes mellitus autorreferida en la población de Montes Claros.* **Métodos:** *Estudio transversal, analítico, de base poblacional y domiciliario. El instrumento para la recogida de datos estuvo basado en una encuesta propuesta por el Ministerio de la Salud para valorar los comportamientos y los factores de riesgo para las enfermedades crónicas no transmisibles. La búsqueda de la prevalencia de diabetes mellitus se dio a partir del relato del investigado en el municipio del norte de Minas Gerais, Brasil. Se evaluó la asociación de la diabetes autorreferida con el perfil sociodemografico, el estilo de vida, el uso de servicios de salud y la percepción de salud general a través de la regresión de Poisson con análisis de las razones de prevalencia. Las medias de consultas médicas en el sector público y de los ingresos al año fueron comparadas entre los diabéticos y no diabéticos. El análisis estadístico consideró el nivel de significancia de p<0,05 y el intervalo de confianza del 95%.* **Resultados:** *Participaron 2.149 individuos. De estos el 4,5% (n=96) relataron tener diabetes. La mayor razón de prevalencia estuvo relacionada con los mayores (RP=1,047), los que toman refrescos (RP=1,054) y los que tienen autopercepción negativa de la salud (RP=1,017), p<0,05. La media de consultas medicas en el sector público fue mayor entre los diabéticos (2,53 ±3,420) así como la media de ingresos (1,44±0,703), p<0,05.* **Conclusión:** *La prevalencia de diabetes mellitus autorreferida en esta población fue semejante al escenario nacional y se asoció con los mayores, los consumidores de refrescos y los que perciben que no tienen una buena salud general. La diabetes parece contribuir con más utilización de los servicios de salud pública.*

Descriptores: *Diabetes Mellitus; Prevalencia; Epidemiología.*

INTRODUCTION

Brazil is undergoing a process of demographic and epidemiological transition characterized by the aging of the population and an increase in chronic noncommunicable diseases (CNCD). Among the most evidenced chronic diseases in the public health scenario stands out diabetes mellitus[1]. The World Health Organization (WHO) defines diabetes mellitus (DM) as a syndrome of multiple etiologies, which may result from the lack of insulin and/or its inability to carry out its actions properly. This disease is characterized by chronic hyperglycemia and changes in the metabolism of carbohydrates, lipids and proteins. Polydipsia, polyuria, blurred vision and weight loss are characteristic symptoms[2]. Among the chronic manifestations of this condition, ocular, renal and vascular diseases are predominant, frequently causing disability, incapacity to work and hospitalization[3].

Among the diabetes risk factors are age, gender, ethnicity, and family history, which are not amenable to modification. However, there are modifiable factors that should be aimed for health interventions. As modifiable risk factors, one can emphasize obesity and dietary therapeutic factors, sedentary lifestyle and smoking. Additionally, psychosocial stress and major depressive episodes may also be associated with an increased risk for this pathologic condition. It is important to know the modifiable risks for the implementation of prevention programs[4].

Diabetes mellitus has been observed as a public health problem, since it generates great social and economic impact, both with regard to productivity and to costs, provoking relevant social reflexes[3]. For a reduction in such economic impact, it is necessary, in the first place, to reduce the incidence of the disease by means of preventive measures, and it is important to know the factors associated with this condition, in order to subsidize health promotion and prevention programs[4].

In this sense, the present study aimed to estimate the prevalence of self-reported diabetes mellitus in the population of Montes Claros.

METHODS

This is a quantitative, cross-sectional, population- and household-based study performed with use of secondary data, collected by the Health Surveillance of Montes Claros, Minas Gerais, Brazil, between the second half of 2010 and the first half of 2011. This city is a hub of the mining area of the Northeast Development Agency (*Agência de Desenvolvimento do Nordeste - ADENE*) and is located in the northern part of the state of Minas Gerais, with a population of 355,401 in habitants[5].

The study sample consisted of individuals over 18 years of age, living in urban and rural areas of that municipality. For sample calculation, it was considered an estimated population of 361,915 inhabitants and 50% prevalence of the event, as this is a conservative frequency that produces a larger "n", and considering that the main study has addressed different chronic noncommunicable conditions, besides diabetes. A 95% confidence coefficient and the sample error margin of 3% were estimated, multiplying the sample size by a correction factor of two, as this was a cluster sampling. A further 10% was added for possible losses, and thus was defined the sample of 2,150 people. However, one of the participants did not respond to the question that identified the presence or absence of diagnosis, and therefore, for the current study, 2,149 participants were considered.

The sampling model adopted two selection stages, having the census tracts of the municipality and districts (411) as the primary units, and the households as the

secondary units. The census tracts were numbered in ascending order and from downtown to the suburban area, according to the methodology used by the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística - IBGE*)[5]. The selection of the tracts was carried out in a systematic way, with probability proportional to the number of households registered at the time of the demographic census. Thus, 40 urban tracts and three rural tracts were picked out by lot. For calculating the number of rural tracts, the percentage of the rural population (approximately 4.8% of the total urban population) and the proportion of the rural tracts were considered. In each sector, 50 households were randomly picked out through a systematic selection. In each household, one only person was interviewed, aged 18 or over and regardless of gender.

The data collection instrument was based on a questionnaire proposed by the Ministry of Health to evaluate behaviors and risk factors for chronic noncommunicable diseases (CNCD)[6]. The diabetes mellitus prevalence survey was based on the respondent's report of the previous clinical diagnosis of the disease. The data collection took place in the households. The research participants signed the Informed Consent Term.

The study analyzed the association between the prevalence of self-reported diabetes mellitus and the independent variables, grouped as follows: sociodemographic profile (sex, schooling, marital status, and age); lifestyle (smoking and soft drink consumption); use of health services (health insurance plan, public service consultation in the year, and hospitalization in public hospital in the year); and general health perception (self-perception of health). All variables were dichotomized into two options. Poisson regression was performed with robust variance.

Poisson regression with robust variance was used to investigate how the prevalence of (self-reported) diabetes mellitus could be influenced by variables such as sociodemographic profile, lifestyle, use of health services, and self-perception of general health. Firstly, bivariate analysis was performed; variables with a significance of less than or equal to 20% were inserted in the multiple analysis model, with progressive exclusion of variables with a higher p value, until the variables with $p<0.05$ remained. Statistical significance was determined by the Wald test, estimating adjusted prevalence ratios and respective 95% confidence intervals. This statistical analysis involved the use of sampling weight to counterbalance the unequal probabilities of selection among sample elements. Student's

t-test was used to compare the means of the number of medical consultations in the public health sector, as well as the hospitalizations in public hospitals. Both tests considered the level of significance $p<0.05$.

Thus, considering cluster sampling, natural expansion factors were used, which represent different weights for the sample elements. This method is important because the cluster sampling could produce errors in the mean values and respective variations in the traditional statistical analysis, leading to incorrect results in the hypothesis tests and conclusions[7]. The weight of the sample was calculated for each census tract, whether urban or rural. The total urban or rural tracts selected, the total detected in the municipality, the number of households picked in each tract and the number of households identified in each tract, according to data by the IBGE, were considered[5].

For data processing and analysis, the IBM SPSS 22.0 statistics program was used.

This study is a cutting of a larger research approved by the Research Ethics Committee of Unimontes, opinion no. 153,234 for use of secondary data from the survey conducted in the period from 2010 to 2011, in compliance with Resolution 466/12 of the National Health Council.

RESULTS

A total of 2,149 individuals participated in the study, of whom 96 (4.5%) reported having diabetes mellitus. For the participants with diabetes, a majority 74 (n=77.2%) had been diagnosed up to 12 months prior to the study. Control of the condition is done through the use of medication, insulin or oral medication for 88 (n=92.0%). Diet and/or physical activity were reported as forms of diabetes control by 7 (n=8.0%) surveyed individuals.

It was verified that the prevalence of diabetes was higher among the elderly, in those who consume soft drinks, at least one day of the week, and among those with poor or very poor self-perception of health ($p<0.05$) (Table I).

Between the participants with or without diabetes mellitus, the average number of medical appointments in the public sector in the last 12 months, at the time of the survey, was higher among diabetics (2.53 ± 3.420) when compared to nondiabetic patients ($1.50 \pm 2,501$) ($p<0.001$) (Figure 1).

The mean number of admissions to public hospitals in the year prior to the interview was 1.44 ± 0.703 for diabetics, whereas in those who did not present the condition, it was 1.33 ± 0.888, with a significant difference ($p<0.001$).

Table I - Sociodemographic profile, lifestyle, use of health services and self-perception of general health of adult and elderly individuals. Montes Claros, MG, Brazil, 2010.

Variables	Diabetes		Prevalence Ratio (95% CI)*			
	Yes (%)* (n=96)	No (%)* (n=2,053)	Bivariate	p	Multiple	p
Sociodemographic profile						
Sex						
Male	3.9	96.1	1	0.310		-
Female	4.9	95.1	1.005(0.995-1.015)			
Schooling						
With formal education	3.8	96.2	1	0.025		-
Illiterate	10.8	89.2	1.037(1.004-1.070)			
Marital status						
Married/Stable union	4.9	95.1	1	0.073		-
Others	7.9	92.1	1.016(0.999-1.034)			
Age group						
18 to 59 years	2.8	97.2	1	<0.001	1	0.001
60 years and more	11.1	88.9	1.044(1.026-1.062)		1.047(1.024-1.071)	
Lifestyle						
Smoker						
Yes	4.1	95.9	1	0.720		-
No	4.6	95.4	1.003(0.989-1.016)			
Soft drink consumption						
Rarely or never	0.0	100.0	1	<0.001	1	<0.001
At least 1 day a week	8.2	91.8	1.043(1.034-1.051)		1.054(1.049-1.068)	
Use of health services						
Health insurance plan						
Yes	4.3	95.7	1	0.764		-
No	4.6	95.4	1.001(0.992-1.011)			
Consultation in public service in the year						
Yes	5.5	94.5	1.013(1.004-1.022)	0.007		-
No	3.0	97.0	1			
Admission to a public hospital in the year						
Yes	12.7	87.3	1.047(1.012-1.082)	0.007		-
No	3.9	96.1	1			
Self-perception of general health						
Self-perception of health						
Very good/good	3.0	97.0	1	<0.001	1	0.043
Fair/Poor	8.1	91.9	1.027(1.014-1.040)		1.017(1.001-1.033)	

*Poisson regression, percentage value and prevalence ratio (95% Confidence Interval) adjusted by the effect of the design.
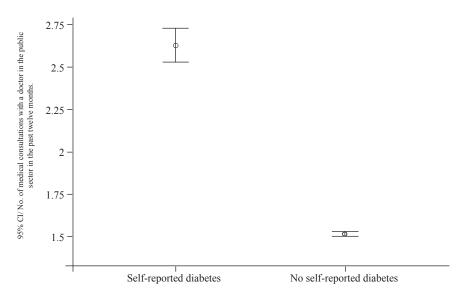
Figure 1- Average medical consultations of diabetic patients in the public sector. Montes Claros, MG, Brazil, 2010.

DISCUSSION

In this study, 4.5% of the respondents reported having diabetes; the majority of these were female. Comparatively, in a population-based cross-sectional study conducted in the urban area of the city of Pelotas, Rio de Janeiro, with an estimated sample of 1,968 people aged 20 to 69 years, 110 (5.6%) individuals reported having diabetes, with confirmation of the medical diagnosis, being the majority also female[8].

In another cross-sectional study, based on the Surveillance of Risk Factors and Protection against NCCD by Telephone Inquiry (VIGITEL), 54,369 individuals aged 18 years or above were interviewed and the amount of self-reported diabetes mellitus was 5.3% for the set of municipalities studied, so that the prevalence among men was 4.4%, reaching 6.0% among women[9].

The data showed that the prevalence of self-reported diabetes mellitus in Montes Claros, MG, was similar to that observed in other studies that addressed other populations in Brazil. Estimating the prevalence of diabetes provides a subsidy for health planning, favoring the programming for the disease, such as the calculation of visits, quantities of laboratory tests and supply of medications[8].

Another aspect investigated in this research was the low frequency (8%) of users who control DM through diet and/or physical activity. Similarly, another study carried out in the Family Health Strategy of Francisco Morato, developed by the Health Institute of the State Health Secretariat of São Paulo, and analyzed the diet of 64 patients with diabetes and/or hypertension. Of these, 32.8% showed an adequate diet and 75% of the individuals reported not having the

habit of practicing physical exercises, with a variety of justifications, such as lack of time, pain and tiredness[10].

It was also observed that most individuals with diabetes control the condition by using medication, insulin or oral medication. With similar results, a cross-sectional study conducted with household-based interviews with patients attending health centers in the urban area of Pelotas, Rio Grande do Sul, Brazil (11), found 77% of the diabetics using some medication to control the disease. Among them, 14% used insulin and 86% some type of hypoglycemic drug. Regarding insulin users, it was verified that more than 40% of the users did not self-apply the hormone, which may reflect a failure in the patients' educational plan. Likewise, 41% of the patients who used oral hypoglycemic drugs made use of the medication outside the recommended dosing parameters[11].

This fact demonstrates the importance of the orientation to sensitize on the treatment of patients with DM, since most of them use some pharmacological method, and the benefit of this therapy can be hindered by the lack of information and inadequate use of the therapeutic measures.

The prevalence of self-reported DM in this study was higher among those who reported consuming soft drinks at least once a week. In a study conducted in Blumenau, Santa Catarina, respondents reported the consumption of soft drinks, but claimed that they did not consume diet and light products, because they did not like the taste or considered the cost high[12].

The type of soft drink, with or without sugar, was not considered in this study carried out in Montes Claros. Non-evaluation of the soft drink category may be considered a limitation of the analysis of the results. This is because

this dietary product has a relevant meaning for the diet of the patient with diabetes mellitus, which can provide the pleasure of eating a sweet-tasting food and, in addition, favor the psychological and social aspect of these individuals.

Data analysis showed that the prevalence of self-reported diabetes mellitus was higher among people aged 60 years or older; 11.1% reported having this condition. This rate is expected because diabetes is a chronic disease. In a study carried out in three basic units of the municipality of Pelotas, RS, assessing the profile of 1,193 medical records of hypertensive and/or diabetic patients enrolled in the HiperDia system of the Ministry of Health, it was verified that the majority of diabetics were concentrated in the age range above 50 years [13]. A VIGITEL study interviewed 54,369 individuals aged ≥18 years in order to estimate the prevalence of self-reported diabetes and hypertension. A gradual increase of the two diseases was observed with increasing age; as for diabetes, this increase increase was more evidenced from 45-54 years on[9].

Health actions should promote quality of life, regardless of the cure of the pathological process. With that in mind, the interviewees were questioned about their health perception. The prevalence of diabetes was higher among people with regular/poor perception of their general health.

In a survey of 5,000 Brazilians aged 18 years and above, one of the questions was related to self-assessment of health, and the worst evaluations were from individuals with diabetes (79.3%) and angina (76.7%)[14].

In a cross-sectional, observational study, 30 individuals with arterial hypertension and diabetes, assisted by a Family Health Strategy of a municipality in the inner region of Minas Gerais, were interviewed. Regarding the individuals' satisfaction with their own health, 33.3% were dissatisfied, 30% neither satisfied nor dissatisfied, and 36.6% were satisfied or very satisfied[15]. This result demonstrates that the presence of a chronic disease does not always determine discontentment with the quality of life; other factors, indeed, interfere with this issue. But it is undeniable the fact that, once a person is affected by diabetes mellitus, it is necessary to take care of themselves and attend periodic medical appointments. In this way, they were questioned about the medical consultations in the public sector in the last 12 months to the date of the research, and it was noticed that the average number of consultations was greater for diabetics than for those who did not have diabetes.

In a cross-sectional study with analysis of 462 medical records of diabetic and hypertensive patients enrolled in the health unit of the Planalto health district in Santa Rosa, RS, it was observed that 60% of diabetics had three or more appointments per year. Thus, the authors stated that most patients have been concerned with having adequate medical follow-up[16]. In another study, which interviewed 2,022 adults living in the city of Lages, SC, it was noted that 76% had a medical appointment in the 12 months prior to the interview. Most of the interviewees (52.5%) reported using the public health system[17]. Medical consultations, as well as multidisciplinary follow-up, are essential, since regular follow-up for a long time narrows the relationship between health professionals and patients, favoring adherence to treatment[18].

If treatment and follow-up are not performed correctly, complications may occur that will require hospitalization. In this study, among those interviewed who reported having diabetes, the average length of hospital stay in public hospitals in the year prior to the interview was higher than among those who reported not having the disease.

In a cross-sectional study that interviewed 50 patients residing in Joinville, SC - aged between 30 and 59 years at the time of hospital admission - and who had at least one hospitalization - in the years 2008 to 2010 - in public or contracted hospitals of the Unified Health System in the municipality, due to diabetes or associated complications. It was observed that the mean in hospitalization was 1.77 per 10,000 inhabitants[19]. In the study by Duarte and Junqueira, admissions for diabetes mellitus, in 2008, in Brasília, DF, accounted for 8.7% of a total of 157,003 hospitalizations. A greater increase was found over 60 years[20].

An investigation of the profile of hospitalizations for NCCD in three municipalities of Rio Grande do Sul showed that the major causes of in-hospital mortality are cerebrovascular diseases, heart failure and diabetes mellitus[21]. The greater number of medical consultations and hospitalizations in the public system emphasize the importance of the health services, especially at the primary level, in the prevention of diseases and their aggravations. Therefore, it is necessary that programs and strategies involving active search and screening of diabetics be performed in different locations in the country, so that the population can be guided and referred to the appropriate health care and thus ensure a better quality of life.

The prevalence of DM can be obtained through health surveys, which are cross-sectional types of designs, basically using a questionnaire as data collection instrument. Based on health surveys of different formats, Brazil has been consolidating databases that will facilitate the continuing monitoring of risk and protection factors for NCCDs[22].

Although different aspects related to diabetes, such as sociodemographic profile, lifestyle, use of health services and self-perception of general health have been included, it is known that the present study was not intended to exhaust the investigation of the factors associated with the disease, such as working conditions, income, presence of obesity, the social interaction of the interviewees, and the type of diabetes, since each modality of the disease presents

differentiated evolution and treatments. Furthermore, this study is relevant, mainly because it estimates the prevalence of diabetes mellitus in a medium-sized municipality, identifies the factors associated with the disease and the use of public health services; even though the medical diagnosis of diabetes mellitus has not been made, due to technical and financial difficulties.

In Brazil, the preventive focus remains on the infectious diseases and on maternal and child health problems. It is necessary to control the increase of diabetes. Since diabetes occurs most frequently among the poorest in the society, such actions can contribute to the alleviation of health inequalities[23]. The results may support strategies for health promotion and prevention of this disease, considered a public health problem.

CONCLUSION

The prevalence of self-reported diabetes mellitus in the population of Montes Claros, MG was 4.5%, similar to the national scenario. The use of self-reporting was important because it contributed to the identification of factors associated with the disease, such as the age range of the elderly, the intake of soft drinks and negative self-perception of health. Diabetes seems to contribute to the greater use of public health services, both with regard to medical consultations and hospital admissions.

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