Revista Brasileira em Promoção da Saúde

e-ISSN:1806-1230

Original Article

DOI: 10.5020/18061230.2022.12456

Arterial hypertension and diabetes mellitus in a metropolitan region facing social inequality: a population-based survey

Hipertensão arterial e diabetes mellitus em uma região metropolitana de desigualdade social: inquérito populacional

Hipertensión arterial y diabetes mellitus en una región metropolitana desigualdad social: encuesta poblacional

Graziella Lage Oliveira
Federal University of Minas Gerais (*Faculdade de Medicina - Universidade Federal de Minas Gerais*) - Belo Horizonte (MG) - Brazil

César Coelho Xavier
Human Health and Ecology College (*Faculdade da Saúde e Ecologia Humana*) - Belo Horizonte (MG) - Brazil
Belo Horizonte Urban Health Watch (*Observatório de Saúde Urbana de Belo Horizonte*) - Belo Horizonte (MG) - Brazil

Fernando Augusto Proietti
René Rachou Research Center – Oswaldo Cruz Foundation (*Centro de Pesquisas René Rachou - Fundação Oswaldo Cruz*) - Belo Horizonte (MG) - Brazil
Human Health and Ecology College (*Faculdade da Saúde e Ecologia Humana*) - Belo Horizonte (MG) - Brazil

ABSTRACT

Objective: To estimate the prevalence of self-reported systemic arterial hypertension (SAH) and diabetes mellitus (DM) and check for associated factors. **Methods:** A cross-sectional study was carried out in 2015 using data from the Health in Vespasiano population-based survey. The sample consisted of 1,206 adults for whom the prevalence ratios of systemic arterial hypertension (SAH), diabetes mellitus (DM) and SAH+DM and their respective 95% confidence intervals were calculated and compared according to sex, age range, education and income using Poisson regression with robust variance. **Results:** The prevalence rates of SAH, DM and SAH+DM were, respectively, 21.8%; 7.8% and 5.3%. For the three groups of diseases, the prevalence was higher in women, those aged over 65 years, those with incomplete primary education and those with income below two minimum wages (p-value <0.05). **Conclusion:** The highest prevalence and distribution of SAH and DM was observed in older women, those with less study time and dependent on the Unified Health System (*Sistema Único de Saúde – SUS*).

Descriptors: Hypertension; Diabetes; Prevalence; Health Surveys; Chronic Disease.

RESUMO

Objetivo: *Estimar a prevalência de hipertensão arterial sistêmica (HAS) e diabetes mellitus (DM) autorreferidas e verificar os fatores associados.* ***Métodos:*** *Estudo transversal realizado em 2015 que utilizou dados do inquérito populacional Saúde em Vespasiano. A amostra compôs-se por 1.206 adultos para os quais se calcularam e compararam-se as razões de prevalências de hipertensão arterial sistêmica (HAS), diabetes mellitus (DM) e HAS+DM e seus respectivos intervalos de confiança de 95%, segundo sexo, faixa etária, escolaridade e renda, utilizando regressão de Poisson com variância robusta.* ***Resultados:*** *Encontraram-se as seguintes prevalências de HAS, DM e HAS+DM, respectivamente, de 21,8%; 7,8% e 5,3%. Para os três grupos de doenças, a prevalência mostrou-se maior em mulheres, com idade superior a 65 anos, ensino fundamental incompleto e renda inferior a dois salários mínimos (valor-p<0,05).* ***Conclusão:*** *A maior prevalência e distribuição de HAS e DM observou-se entre mulheres idosas, com menor tempo de escolaridade e dependentes do Sistema Único de Saúde (SUS).*

Descritores: *Hipertensão; Diabetes; Prevalência; Inquéritos Epidemiológicos; Doença Crônica.*

Received on: *04/08/2021*
Accepted on: *04/27/2022*

RESUMEN

Objetivo: *Estimar la prevalencia de hipertensión arterial sistémica (HAS) y diabetes mellitus (DM) autorreferidas y verificar los factores asociados.* ***Métodos:*** *Estudio transversal realizado en 2015 que utilizó datos de la encuesta poblacional Salud en Vespasiano. La muestra fue compuesta por 1.206 adultos para los cuales se calcularon y se compararon las razones de prevalencias de hipertensión arterial sistémica (HAS), diabetes mellitus (DM) y HAS+DM y sus respectivos intervalos de confianza de 95%, según sexo, franja etaria, escolaridad y renta, utilizando regresión de Poisson con varianza robusta.* ***Resultados:*** *Fueron encontradas las siguientes prevalencias de HAS, DM y HAS+DM, respectivamente, de 21,8%; 7,8% y 5,3%. Para los tres grupos de enfermedades, la prevalencia se mostró mayor en mujeres, con edad superior a 65 años, enseñanza primaria incompleta y renta inferior a dos salarios mínimos (valor-p<0,05).* ***Conclusión:*** *La mayor prevalencia y distribución de HAS y DM fue observada entre mujeres mayores, con menor tiempo de escolaridad y dependientes del Sistema Único de Salud (SUS).*

Descriptores: *Hipertensión; Diabetes; Prevalencia; Encuestas Epidemiológicas; Enfermedad Crónica.*

INTRODUCTION

Among Non-Communicable Diseases (NCDs), systemic arterial hypertension (SAH) and diabetes mellitus (DM) stand out. Both diseases account for high rates of morbidity, mortality and hospitalization in Brazil[1,2].

Between 2006 and 2020, studies showed estimates of the prevalence of SAH in the Brazilian adult population ranging between 15 and 47%, reaching 65% in the older population[3-7]. The self-reported prevalence of DM between 2003 and 2020 practically doubled from 4.1% to 8.2%[1,4,7,8].

Despite their importance, both diseases are “silent”, that is, not all hypertensive and diabetic patients know their health condition. It is estimated that about 20 to 49.2% of patients with SAH are unaware of having the disease, while 46% of diabetic patients are unaware of the disease[8]. The problem gets worse when the two conditions occur together, which can be called a double burden of disease[9]. It is estimated that the prevalence of SAH in diabetic individuals is twice that in the non-diabetic population, which demands care for both health conditions simultaneously[10]. This proportion is valid for both types of diabetes (Types 1 and 2).

In both cases, coping and control strategies are actions targeted at health promotion and detection of risk groups for interventions aimed at changing habits (smoking, sedentary lifestyle, healthy eating) and constant monitoring of individuals by primary care services[11]. Such strategies require an estimate of the number of people with diabetes and/or hypertension, especially in places where the supply of and access to secondary and tertiary health services are scarce, as is the case of the municipality of Vespasiano located in the northern vector of the Metropolitan Region of Belo Horizonte, Minas Gerais, Brazil.

Although there are population-based studies on NCDs in the literature, such as the National Health Survey (*Pesquisa Nacional de Saúde – PNS*) and Vigitel (Surveillance of Risk and Protection Factors for Chronic Diseases by Telephone-based Survey), which are conducted in Brazil at some frequency, both are carried out mainly in Brazilian capitals. Therefore, the reality of municipalities such as Vespasiano, in Minas Gerais, can be quite different from the capital Belo Horizonte, both in terms of population, economics and coverage of health services[12,13].

For this reason, a population-based survey was carried out in 2015 to identify the prevalence of SAH and DM in that municipality. Thus, even after seven years, the data from this study constitute the only population-based survey carried out in Vespasiano until the year 2021 and it is believed that the information obtained is valuable not only for the knowledge of the population’s health situation, but also to assist municipal managers in health decision-making. Therefore, the aim of this study is to estimate the prevalence of self-reported systemic arterial hypertension (SAH) and diabetes mellitus (DM) and check for associated factors.

METHODS

This is a cross-sectional study that used data from the population-based survey *Health in Vespasiano and the user’s perception: evaluation of the public health care network in a municipality in the Northern Vector of the Metropolitan Region of Belo Horizonte* carried out in 2015. This survey was a response to call No. 14/2013 of the Minas Gerais State Research Support Foundation (*Fundação de Amparo à Pesquisa do Estado de Minas Gerais – FAPEMIG*), which aimed to fund research for the Unified Health System (*Sistema Único de Saúde – SUS*) through the SUS Research Program (*Programa de Pesquisa para o SUS – PPSUS* (MoH/CNPq/FAPEMIG/SES)). Although seven years have passed since its completion, the data from the aforementioned study constitute the only study on the prevalence of SAH and DM carried out in the municipality until 2021, being, therefore, an important source of information about the health status of this population.

The study was carried out in the municipality of Vespasiano, which is in the state of Minas Gerais and belongs to the Northern Vector of the Metropolitan Region of Belo Horizonte. It is located 29 km away from the capital of Minas Gerais. It has a municipal human development index (MHDI) of 0.688, which places it in the 2,224th position in the ranking of Brazilian municipalities[12]. According to the 2010 census of the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística – IBGE*)[13], the municipality has a population of 104,138 inhabitants distribute across 121 census sectors. It is a municipality that has presented a growth of 26.6% in the number of inhabitants since 1990 until today (76,422 inhabitants lived in the municipality in the 1990s). Of this total, 21,008 people (20.2%) live in areas called subnormal agglomerates (*favelas*). It has an average of 3.49 residents per household with the following age distribution: 18.2% between zero and 10 years old, 13.4% between 11 and 17 years old and 68.8% aged 18 years or older.

The sample size was estimated using a formula for calculating prevalence available in the Epi-Info software, version 3.5.2 (dated from 10/07/2014), based on the following data: Sample size: n = [DEFF*Np (1-p)]/ [(d2/Z21-α/2*(N-1)+p*(1-p)], where: n= minimum sample size required; N= reference population size, that is, the population of Vespasiano in 2010: 104,138; Z= confidence level (5%); p= prevalence of the health-related event to be investigated in the population: 50% (unknown data); d= predicted sampling error: 3 .0%, DEFF= design effect, by cluster, estimated at 1.5.

After applying the formula, the required sample size estimated was 1,600 adult individuals. A stratified cluster sampling methodology was used in three stages: 1 - census sector (CS); 2 - household, and; 3 – within the household, an adult resident aged 18 or over and all adolescents (between 11 and 17 years old). A total of 1,200 individuals were selected in the households, and a total of 499 users with SAH and/or diabetes were recruited in Primary Health Care (PHC) centers through systematic sampling according to the prevalence of SAH and DM present in each center. This was done because one of the study's objectives was to evaluate user satisfaction with the service provided in PHC centers (total study sample=1,705). However, these 499 users were not part of the results described in this study. Thus, only data from individuals selected from the households (n=1,206) were included in the estimate of the prevalence of SAH and DM (Figure 1).

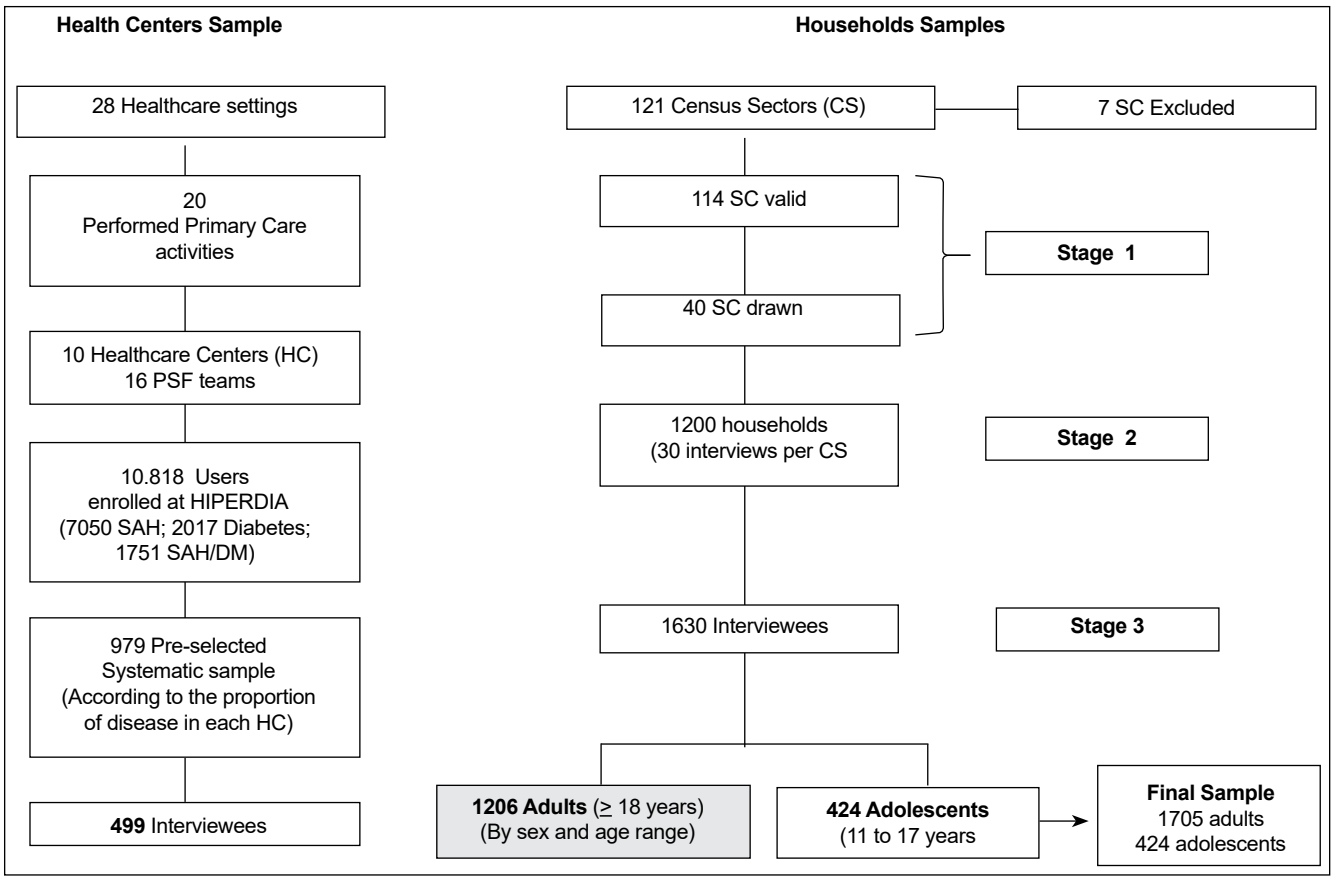

Figure 1 - Flowchart of the sample selection steps of the Health in Vespasiano Survey, Minas Gerais, 2015.

The data collection instrument used as a reference several national studies such as the National Household Sample Survey (*Pesquisa Nacional por Amostra de Domicílios – PNAD*)[14], the São Paulo Health Survey (*Inquérito de*

Saúde de São Paulo – ISA Capital)[15] and the questionnaire used in the Health in Belo Horizonte study[16]. It consists of a questionnaire with closed-ended questions. The present study analyzed variables related to sociodemographic aspects such as age, income and education. Additionally, we used data obtained from the following questions about arterial hypertension and diabetes: "Has a doctor ever told you that you have arterial hypertension (high blood pressure)?" and "Has a doctor ever told you that you have diabetes (high blood sugar)?". The instrument was applied in a pre-test before the study at the interviewee's home at a time set by them.

Before data collection, the population was sensitized with the distribution of explanatory leaflets in the community, meetings with local community leaders, meetings with PHC center managers to request support and employment of community health workers (CHW) and workers of the Center for Zoonosis Control (CZC) for the distribution of printed material to publicize the research at previously selected addresses. To conduct the household interviews, a specialized research company was hired. The company had previous training and proven experience in conducting health surveys in complex urban areas.

Prevalence ratios for arterial hypertension, diabetes mellitus and hypertension and diabetes were calculated and stratified by 1) sex; 2) age range (in years: 18 to 29; 30 to 59; 60 to 64; 65 to 74; 75 and over – according to PNS – 2013); 3) level of education (incomplete primary education, complete primary education, incomplete secondary education, complete secondary education, incomplete higher education, complete higher education and more) and; 4) household income (no income; less than one minimum wage; between one and less than two MW; between two and less than three MW; between three and less than five MW; above five MW) using Poisson regression with robust variance. The respective 95% confidence intervals were calculated. The analyses were carried out using the Statistical Package for the Social Sciences (SPSS), version 20.0.

The present study was approved by the Research Ethics Committee of the Human Health and Ecology College of Vespasiano under Approval No. 4312012. All participants who agreed to participate in the study signed the informed consent form.

RESULTS

The analyzed data come from 1,206 adults (aged 18+ years) living in Vespasiano. Participants were mostly women (52.4%; n=632), aged between 30 and 59 years (57.0%; n=687), and had an income of one and less than two minimum wages (38.2%; n =454). As for education, 40.1% (n=477) of the respondents had complete secondary education, 38.7% (n=461) had incomplete primary education, and 4.9% (n=58) had complete higher education (Table I).

Table I - Sample characteristics (n=1,206): Health in Vespasiano Survey, Minas Gerais, Brazil, 2015.

Variables	n (%)
Sex	
Women	632 (52.4)
Men	574 (47.6)
Age range (in years)	
18-29	385 (31.9)
30-59	687 (57.0)
60-64	46 (3.8)
65-74	69 (5.7)
75+	19 (1.6)
Level of education	
Incomplete primary education	461 (38.7)
Complete primary and incomplete secondary education	194 (16.3)
Complete secondary and incomplete higher education	477 (40.1)
Complete higher education and more	58 (4.9)
Household income	
None	15 (1.3)
Less than 1 minimum wage*	159 (13.4)
Between 1 and less than 2 MW	454 (38.2)
Between 2 and less than 3 MW	291 (24.5)
Between 3 and less than 5 MW	195 (16.4)
Above 5 MW	73 (6.1)

* Minimum wage (MW) = BRL 788.00. Values expressed as n (%)

Data on the prevalence and prevalence ratios (PR) of SAH, DM and SAH+DM are described in Table II. The self-reported prevalence rate of arterial hypertension was 21.8% (n=263), with rates being higher in women (27.2%), those aged over 75 years (73.7%), those with a low level of education (incomplete primary education – 36.0%) and those with a household income of one and less than two minimum wages (23.8%). The prevalence of SAH in women was 1.71 times higher when compared to the prevalence in men (PR=1.71; 95%CI= 1.37-2.15). With regard to age, this prevalence can be up to 25 times higher in people over 75 years of age when compared to the prevalence in young people (18-29 years). As for education, although there is a decrease in prevalence with increasing study time, this difference is only really significant for individuals with incomplete primary education, that is, those with less than eight years of study (PR=3.50; 95%CI=1.61-7.49). Income, on the other hand, was not statistically associated with an increase in the prevalence of SAH in the studied sample (Table II).

The prevalence of diabetes mellitus was 7.8% (n=94), with rates being higher in women (9.8%), those aged between 65 and 74 years (29.0%), those with incomplete primary education (13 .0%) and those with no income (13.3%). The prevalence of DM in women is 1.75 times higher when compared to the prevalence in men (PR=1.75; 95%CI= 1.17-2.65). With regard to age, this prevalence can be up to 37 times higher in people aged between 65 and 74 years when compared to the prevalence in young people (18-29 years). Although the prevalence of DM decreases as the study time increases, no (statistically) significant differences were observed between these variables. The same was observed for income: although the prevalence ratios indicate a decrease in the prevalence of DM as income increases, they were not statistically significant for any income category (Table II).

Table II - Prevalence of self-reported systemic arterial hypertension (SAH) and diabetes mellitus (DM) in adults (over 18 years old) in a city in the metropolitan region of Belo Horizonte and their respective prevalence ratios according to sex, age, education and income: Health in Vespasiano Survey, Minas Gerais, Brazil, 2015.

Variables	SAH		DM		SAH + DM	
	P(%)	PR [95%CI]	P(%)	PR [95%CI]	P(%)	PR [95%CI]
Sex						
Men	15.9	Reference	5.6	Reference	3.8	Reference
Women	27.2	1.71 [1.37-2.15]	9.8	1.75 [1.17-2.65]	6.6	1.74 [1.05-2.87]
Age range (in years)						
18-29	2.9	Reference	0.8	Reference	0	---
30-59	24.6	8.83 [4.74-15.64]	7.7	9.87 [3.11-31.47]	4.7	Reference
60-64	65.2	22.48 [12.28-42.41]	28.3	36.28 [10.73-122-55]	26.1	5.55 [3.09-10.13]
65-74	56.5	19.48 [10.66-36.71]	29.0	37.18 [11.36-121.80]	23.2	4.94 [2.88-8.6]
75+	73.7	25.41 [13.58-48.98]	26.3	33.72 [8.71-130.95]	21.0	4.47 [1.77-11.5]
Level of education						
Incomplete primary education	36.0	3.50 [1.61-7.49]	13.0	2.5 [0.81-7.76]	9.9	2.83 [0.72-11.61]
Complete primary and incomplete secondary education	12.9	1.25 [0.53-2.89]	4.6	0.88 [0.25-3.20]	2.0	0.57 [0.11-3.18]
Complete secondary and incomplete higher education	12.2	1.18 [0.53-2.60]	3.8	0.73 [0.22-2.40]	2.1	0.60 [0.13-2.70]
Complete higher education and more	10.3	Reference	5.2	Reference	3.5	Reference
Household income						
Up to 1 minimum wage	22.0	Reference	10.1	Reference	5.7	Reference
Between 1 and 2 MW	23.8	1.11 [0.72-1.72]	8.8	0.86 [0.47-1.63]	6.2	1.09 [0.51-2.50]
Between 2 and 3 MW	21.0	0.94 [0.59-1.51]	5.8	0.55 [0.27-1.15]	4.5	0.78 [0.32-1.94]
Between 3 and 5 MW	20.0	0.88 [0.53-1.49]	7.2	0.69 [0.32-1.48]	5.6	0.99 [0.40-2.56]
Above 5 MW	20.6	0.92 [0.45-1.80]	2.7	0.25 [0.05-1.12]	1.4	0.23 [0.01-1.45]
None	13.3	0.55 [0.08-2.26]	13.3	1.37 [0.28-6.65]	0	---
General survey sample	21.8	---	7.8	---	5.3	---

SAH (systemic arterial hyperension); DM (diabetes mellitus); P (prevalence); PR (prevalence rario); MW (minimum wage=BRL788.00)

The prevalence of hypertension and diabetes mellitus was 5.3% (n= 64) in the studied sample. It was also higher in women (6.6%), those aged between 60 and 64 years (26.1%), those with a low level of education (incomplete primary education – 9.9%) and those with an income of one and less than two minimum wages (6.2%). The prevalence of SAH + DM in women is 1.74 times higher when compared to the prevalence in men (PR=1.74; 95%CI= 1.05-2.87). With regard to age, unlike the diseases separately, as age increases the prevalence decreases a little and can be up to five times higher when compared to individuals aged between 30 and 59 years. People aged between 18 and 29 years did not present with these combined diseases.

As with SAH and DM alone, the prevalence of SAH + DM decreases with increasing education, with more than eight years of study being a protective factor. However, these differences were not statistically significant for any education level category. Income was also not associated with either a higher or lower prevalence of SAH + DM (Table II).

DISCUSSION

The prevalence of SAH observed in the present study (21.8%) was lower than that found in the national survey carried out by the System for Surveillance of Risk and Protective Factors for Chronic Diseases via telephone survey (*Sistema de Vigilância de Fatores de Risco e Proteção para Doenças Crônicas por inquérito telefônico – Vigitel*) in 2008[17] and 2020[7], when the self-reported prevalence rates of SAH were, respectively, 24.1% and 25.2%. However, it was slightly higher than that observed in the National Health Survey (*Pesquisa Nacional de Saúde – PNS*) carried out in 2013[14], when the prevalence rate was 21.4%.

For diabetes, the self-reported prevalence found in the present study was higher than those observed by the 2006 Vigitel (5.3%)[4], the 2013 PNS (6.2%)[14] and a systematic review study with a meta-analysis dated from 2016 (5.6%)[18]. However, it was lower than the rates found in a national study carried out in 2008[1] and the last Vigitel dated from 2020 (8.2%)[7]. Such differences observed may be related to the data collection method used. According to a literature review study carried out in 2016[18], DM prevalence rates were 5.6% for self-reported diabetes, 6.6% for studies using fasting glucose and 11.9% for studies using more complex diagnostic methods.

The prevalence of SAH and DM together (5.3%) was lower than that observed in a study carried out in Ribeirão Preto, São Paulo, between 2004 and 2005, which found an estimated prevalence of diabetes of 5.6% in the general population, 14.5% in hypertensive individuals and 2.5% in normotensive individuals[19]. A national study carried out in 2008 showed an even higher prevalence of the two NCDs, reaching 17%[2]. A possible explanation for this difference between the prevalence rates of diseases in the municipality studied in this study and in the general population observed in national studies is rooted in the economic aspect of that municipality. In addition to showing poor indicators in terms of HDI[13], Vespasiano has shown, in recent decades, a disorderly growth of subnormal agglomerates (*favelas*), which could be hampering individuals' access to information and health promotion activities.

Another important finding of the present study was the fact that women had higher prevalence rates of hypertension (27.2%), diabetes (9.8%) and SAH+DM (6.6%) when compared to men, which is in line with other studies carried out in Brazil[1,4,6,7,9,14,17,18,20]. A possible explanation for this higher prevalence among women could be related to hormonal changes typical of menopause and also to the fact that women are known to seek more health services, which would allow them to "know" about their health condition in a greater proportion than men[20].

In addition to sex, age was shown to be important for the increase in the prevalence of the diseases studied. The highest prevalence rate of SAH in this study (73.7%) was found in people aged 75 years or older, whereas the highest rate of DM (29.0%) was found in individuals aged 65 to 74 years. In both cases, the prevalence of diseases increased with increasing age, showing prevalence ratios that ranged from 8.0% to 37.0% when compared to the age of 18 to 29 years. These findings are consistent with those found by more recent studies carried out in Brazil[4,7,14,17,18]. However, for individuals who reported having SAH+DM, age had an opposite behavior: there was a decrease in prevalence rates after 60 years of age, and no individual aged between 18 and 29 years presented the combined conditions. A possible explanation could be the fact that, when combined, these two NCDs can lead the individual to have a worse health condition, which, in turn, could be associated with higher mortality after 60 years of age[21].

The level of education in the present study suggests an inverse relationship with the prevalence of NCDs studied, that is, the higher the level of education, the lower the prevalence of diseases. Thus, although most studies also point to this direction[1,4,9,14,17,18,20,21], in the present study the prevalence ratios did not show statistically significant differences, except for SAH, with individuals with incomplete primary education exhibiting a prevalence 3.5 times higher when compared to individuals with complete higher education. For DM and SAH+DM, the prevalence ratios suggest that the increase in education level is a protective factor for the onset of diseases, but these differences were not statistically significant.

With regard to household income, the present study did not find statistically significant differences between the increase in income and the lower prevalence of the NCDs studied, even when signaling this trend. Despite contradicting most findings in the literature, this result is similar to that found in a study carried out in the countryside of São Paulo[19]. Furthermore, it is known that socioeconomic differences play an important role in the health conditions of individuals, influencing access to the health system, the level of information, understanding of the medical condition and adherence to treatment[22].

Different studies have shown higher rates of NCDs in groups with lower socioeconomic status[1,5,20,22] in addition to higher mortality rates in poorer groups[23]. Thus, it is understood that the socioeconomic aspect is particularly relevant in the city of Vespasiano, since the municipality has 20.2% of its population living in "*favelas*", thereby indicating important socioeconomic disparities[13]. Despite that, differences observed may be explained by the proximity between the income ranges, since more than half (62.7%) of the interviewees reported household incomes between one and less than three minimum wages.

Although the present study was a population-based survey with strong control over data collection and representativeness of the population of the analyzed municipality, some limitations exist and deserve to be observed. One of them concerns the use of self-reported morbidity to measure the prevalence of SAH and DM at the expense of biomedical criteria. This is because some studies that validated this information by comparing it with data from medical records revealed that the degree of accuracy differs according to the pathology researched, the presence of comorbidities and the social and demographic characteristics of the respondent[24,25]. Therefore, the data presented here refer only to cases already diagnosed. Also, the literature shows that, for hypertension, self-report is a satisfactory indicator for prevalence estimates, with the advantage of speed in obtaining information and low cost, fundamental characteristics for carrying out epidemiological surveys[3,4]. As for diabetes, the differences are greater, and it is necessary to infer these results only for already diagnosed cases.

Another limitation concerns the type of study used (cross-sectional) which does not allow establishing a causal relationship between the exposure and the analyzed effect. However, this type of study provides the possibility of exploring the entire population of the municipality since a representative sample was used for the factors associated with the prevalence of SAH, DM and SAH+DM in the population studied. Thus, despite being a study carried out in 2015, it is believed that the results may be useful for directing resources to this population, since no other population-based study has been conducted in the municipality to date.

The results presented here may help the Vespasiano Municipal Health Department to direct health promotion and disease prevention actions to the most vulnerable groups aiming to reduce the burden of diseases due to hypertension and diabetes as well as their respective complications. These findings may be particularly important for primary health care professionals, since most sick individuals are exclusively SUS users, people with some dependence and older adults. Thus, with the increase in longevity in Brazil and the socioeconomic disparities observed in recent times, this population group will become even more vulnerable.

CONCLUSION

The present study made it possible to know the prevalence and distribution of two of the main NCDs in a population (hypertension and diabetes mellitus) and to evaluate the associated factors.

The highest prevalence and distribution rates of SAH and DM were observed in older women, those with less study time and those dependent on the Unified Health System (*Sistema Único de Saúde – SUS*) in the analyzed municipality.

ACKNOWLEDGMENTS AND CONFLICTS OF INTEREST

The authors thank the Vespasiano Municipal Health Department for their help in data collection and research support and to FAPEMIG.

The authors have no conflicts of interest.

CONTRIBUTIONS

All authors contributed equally in the conception and design of the study, acquisition, analysis and interpretation of results and in the writing or revision of the manuscript, and are responsible for its content and integrity.

FUNDING SOURCES

The population-based survey from which this paper originated, titled Health in Vespasiano and the user's perception: *Evaluation of the public health care network in a municipality in the Northern Vector of the Metropolitan Region of Belo Horizonte* was funded by FAPEMIG - public call No. 14/2013 of the SUS Research Program (*Programa de Pesquisa para o SUS – PPSUS (MoH/CNPq/FAPEMIG/SES*)).

The first author was granted a FAPEMIG postdoctoral fellowship from the René Rachou Research Center (*Centro de Pesquisa René Rachou – CPqRR - Fiocruz*).

REFERENCES

1. Flor LS, Campos MR. Prevalência de Diabetes Mellitus e fatores associados na população adulta brasileira: evidências de um inquérito de base populacional. Rev Bras Epidemiol. 2017;20(1):16-29.
2. Stopa SR, Cesar CLG, Segri NJ, Alves MCGP, Barros MBA, Goldbaum M. Prevalência da Hipertensão Arterial, do Diabetes Mellitus e da adesão às medidas comportamentais no Município de São Paulo, Brasil, 2003-2015. Cad. Saúde Pública. 2018;34(10):1-11.
3. Passos VMA, Assis TD, Barreto SM. Hipertensão arterial no Brasil: estimativa de prevalência a partir de estudos de base populacional. Epidemiol Serv Saude. 2006;15(1):35-45.
4. Schmidt MI; Duncan BB; Hoffmann JF; Moura L; Malta DC; Carvalho RMSV. Prevalência de Diabetes e Hipertensão no Brasil baseada em inquérito de morbidade auto-referida, Brasil, 2006. Rev Saúde Pública. 2009;43(Supl 2):74-82.
5. Ministério da Saúde (BR), Secretaria de Vigilância em Saúde. Vigitel Brasil 2016: vigilância de fatores de risco e proteção para doenças crônicas por inquérito telefônico. Brasília: Ministério da Saúde; 2017.
6. Malta DC, Bernal RTI, Andrade SSCA, Silva MMA, Melendez GV. Prevalência e fatores associados com Hipertensão Arterial autorreferida em adultos brasileiros. Rev Saúde Pública. 2017;51(Supl 1):1-11.
7. Ministério da Saúde (BR), Secretaria de Vigilância em Saúde. Departamento de Análise em Saúde e Vigilância de Doenças Não Transmissíveis. Vigitel Brasil 2020: vigilância de fatores de risco e proteção para doenças crônicas por inquérito telefônico: estimativas sobre frequência e distribuição sociodemográfica de fatores de risco e proteção para doenças crônicas nas capitais dos 26 estados brasileiros e no Distrito Federal em 2020. Brasília: Ministério da Saúde; 2021.
8. Gus I, Harzheim E, Zaslavsky C, Medina C, Gus M. Prevalência, reconhecimento e controle da Hipertensão Arterial Sistêmica no estado do Rio Grande do Sul. Arq Bras Cardiol. 2004;83(5):424-28.
9. Zattar MML, Kretzer MR, Freitas PF, Herdy AH, Vietta GG. Dupla carga de doença (Hipertensão Arterial e Diabetes Mellitus) no sul do Brasil. Estácio Saúde, 2019;8(2):16-22.
10. Lobo LAC, Canuto R, Costa JSD, Patussi MP. Tendência temporal de hipertensão arterial sistêmica no Brasil. Cad. Saúde Publica. 2017;33(6):1-13.
11. Cruz MF, Ramires VV, Wendt A, Mielke GI, Martínez-Mesa J, Wehrmeister FC. Simultaneidade de fatores de risco para doenças crônicas não transmissíveis entre idosos da zona urbana de Pelotas, Rio Grande do Sul, Brasil. Cad. Saúde Pública. 2017;33(2):1-11.
12. Programa das Nações Unidas para o Desenvolvimento. Relatório de Desenvolvimento Humano 2010. Nova York: PNUD; 2010.
13. Instituto Brasileiro de Geografia e Estatística. Sinopse do censo demográfico: 2010, Rio de Janeiro: IBGE; 2011.
14. Andrade SSA, Stopa SR, Brito AS, Chueri PS, Szwarcwald CL, Malta DC. Prevalência de Hipertensão Arterial autorreferida na população brasileira: análise da Pesquisa Nacional de Saúde, 2013. Epidemiol. Serv. Saúde. 2015;24(2):297-304.
15. Secretaria Municipal da Saúde (SP). Coordenação de Epidemiologia e Informação - CEInfo. Boletim ISA Capital 2015, nº 0, 2017: aspectos metodológicos e produção de análises. São Paulo: CEInfo; 2017.
16. Felicíssimo MF, Friche AAL, Xavier CC, Proietti FA, Neves JAB, Caiaffa WT. Posição socioeconômica e deficiência: “Estudo Saúde em Belo Horizonte, Brasil”. Ciênc. saúde colet. 2017;22(11):3547-56.
17. Muraro AP, Santos DF, Rodrigues PRM, Braga JU. Fatores associados à Hipertensão Arterial Sistêmica autorreferida segundo VIGITEL nas 26 capitais brasileiras e no Distrito Federal em 2008. Ciênc. saúde colet. 2013;18(5):1387-98.

18. Telo GH, Cureau FV, Souza MS, Andrade TS, Copês F, Schaan BD. Prevalence of Diabetes in Brazil over time: a systematic review with meta analysis. Diabetol Metab Syndr. 2016;8(1):1-13.

19. Cipullo JP, Martin JFV, Ciorlia LAS, Godoy MRP, Cação JC, Loureiro AAC, et al. Prevalência e fatores de risco para Hipertensão em uma população urbana brasileira. Arq Bras Cardiol. 2010;94(4):1-8.

20. Tormas DP, Santos DAS, Souza GNP, Freitas AFSC, Faria FR, Goulart LS. Hipertensão e/ou Diabetes Mellitus em uma estratégia saúde da família: perfil e associação aos fatores de risco. RIES. 2020;9(1):59-75.

21. Iser BPM, Stopa SR, Chueiri PS, Szwarcwald CL, Malta DC, Monteiro HOC, et al. Prevalência de Diabetes autorreferido no Brasil: resultados da Pesquisa Nacional de Saúde 2013. Epidemiol. Serv. Saúde. 2015;24(2):305-14.

22. Kanjilal S, Gregg EW, Cheng YJ, Zhang P, Nelson DE, Mensah G, et al. Socioeconomic status and trends in disparities in 4 major risk factors for cardiovascular disease among US Adults, 1971-2002. Arch Intern Med. 2006;166(21):2348-55.

23. Saydah S, Lochner K. Socioeconomic status and risk of Diabetes-related mortality in the U.S. Public Health Rep. 2010;125(3):377-88.

24. Skinner KM, Miller DR, Lincoln E, Lee A, Kazis LE. Concordance between respondent self-reports and medical records for chronic conditions: experience from the Veterans Health Study. J Ambul Care Man-age. 2005;28(2):102-10.

25. Chrestani MAD, Santos IS, Matijasevich AM. Self-reported hypertension: validation in a representative cross-sectional survey. Cad Saúde Pública. 2009;25(11):2395-406.

Mailing address:
Graziella Lage Oliveira
Universidade Federal de Minas Gerais - Faculdade de Medicina
Av. Professor Alfredo Balena, 190/ Sl 823
CEP: 30130-100 - Belo Horizonte - MG - Brasil
E-mail: grazilage.oliveira@gmail.com

How to cite: Oliveira GL, Xavier CC, Proietti FA. Arterial hypertension and diabetes mellitus in a metropolitan region facing social inequality: a population-based survey. Rev Bras Promoç Saúde. 2022;35:12456.