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ORIGINAL ARTICLE / *ARTIGO ORIGINAL*

Inequities in intraurban areas in the distribution of risk factors for non communicable diseases, Belo Horizonte, 2010

Desigualdades intraurbanas na distribuição dos fatores de risco para doenças crônicas não transmissíveis, Belo Horizonte, 2010

Deborah Carvalho Malta[I,II], Regina Ivata Tomie Bernal[III], Maria Cristina de Mattos Almeida[IV], Lenice Harumi Ishitani[IV], Anne Marielle Girodo[IV], Lucia Maria Miana Mattos Paixão[IV], Maria Tereza da Costa Oliveira[IV], Fabiano Geraldo Pimenta Junior[IV], Jarbas Barbosa da Silva Júnior[I]

ABSTRACT: ***Objective*:** In order to identify intraurban differentials, the prevalence of major protection and risk factors for non communicable chronic diseases were analyzed in nine health districts of Belo Horizonte, Minas Gerais, Brazil. ***Methods*:** Analysis of data from a telephone survey conducted with 2,000 adults in Belo Horizonte, in 2010, using the average linkage method for cluster analysis among the health districts, using sociodemographic variables (education, race and marital status). The study compared the prevalence of risk factors for non communicable diseases among the health districts. ***Results*:** Four clusters were identified. The best socio-demographic indicators were found in cluster 4 (South Central health district), which also showed a higher prevalence of protective factors such as higher consumption of fruits and vegetables, higher frequency of physical activity practice in the free time, use of ultraviolet protection, higher proportion of ex-smokers, and lower prevalence of whole milk and high-fat meat consumption. As a risk factor, cluster 4 showed a higher proportion of alcohol abuse. Cluster 1, with the worst socio-demographic indicators, concentrated more risk factors such as consumption of whole milk, low regular consumption of fruit and vegetables, and lower practice of physical activity in the free time. The most frequent protective indicators in cluster 1 were the regular consumption of beans, having breakfast at home, and lower alcohol abuse. ***Conclusion*:** Intra-urban differences were found in the distribution of risk and protection factors or non transmissible diseases, these differences can support planning aimed at actions for greater equity in health.

Keywords: Risk factors. Health Surveillance. Interview. Health inequalities. Health promotion.

[I]Department of Non Communicable Disease of Surveillance and Health Promotion, Secretariat of Health Surveillance, Ministry of Health – Brasília (DF), Brazil.

[II]*Universidade Federal de Minas Gerais* – Belo Horizonte (MG), Brazil.

[III]School of Public health, *Universidade de São Paulo* – São Paulo (SP), Brazil.

[IV]Muncipal Secretariat of Health of Belo Horizonte – Belo Horizonte (MG), Brazil.

Corresponding author: Deborah Carvalho Malta. Departamento de Vigilância de Doenças e Agravos Não Transmissíveis e Promoção da Saúde, Secretaria de Vigilância em Saúde, Ministério da Saúde. SAF Sul, Trecho 2, Lote 5/6, Torre I, Edifício Premium, Sala 14, Térreo, CEP: 70070-600, Brasília, DF, Brasil. E-mail: deborah.malta@saude.gov.br

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RESUMO: ***Objetivo*:** Visando identificar diferenciais intraurbanos, foram analisadas prevalências dos principais fatores de risco e proteção para doenças crônicas não transmissíveis nos nove distritos sanitários de Belo Horizonte, Minas Gerais. ***Métodos*:** Análise dos dados de inquérito telefônico realizado com 2.000 adultos em Belo Horizonte em 2010, empregando-se *average linkage* para análise de clusters entre os distritos sanitários, com base em variáveis sociodemográficas (escolaridade, cor da pele e estado civil). O estudo comparou as prevalências dos fatores de risco para doenças crônicas não transmissíveis entre os distritos sanitários. ***Resultados*:** Foram identificados quatro clusters. O cluster 4 (distrito sanitário Centro Sul) apresentou as melhores condições sociodemográficas, além de maior prevalência de fatores de proteção, como maior consumo de frutas, legumes e verduras, maior frequência de atividade física no tempo livre, uso de proteção de raios ultravioleta, maior proporção de ex-fumantes e menor prevalência de consumo de leite com gordura integral e carne com gordura aparente. Como fator de risco, o cluster 4 apresentou maior proporção de consumo abusivo de álcool. O cluster 1, com piores indicadores sociodemográficos, concentrou mais fatores de risco, como maior consumo de leite com gordura, baixo consumo de frutas, legumes e verduras regular e menos atividade física no tempo livre. Os indicadores de proteção mais frequentes no cluster 1 foram: consumo regular de feijão, café da manhã em casa e menor consumo abusivo de álcool. ***Conclusão*:** Foram encontradas diferenças intraurbanas na distribuição dos fatores de risco e proteção para doenças crônicas não transmissíveis, que podem apoiar o planejamento visando ações na busca de maior equidade em saúde.

Palavras-chave: Fatores de risco. Vigilância sanitária. Entrevista. Desigualdades em saúde. Promoção da saúde.

INTRODUCTION

Chronic Non Communicable Diseases (CNCD) are the main causes of death in the world, and have generated a high number of premature deaths, loss of quality of life and high level of limitation in work and leisure activities[1]. In Brazil, CNCDs were responsible, in 2007, for 72% of the total of deaths, especially diseases of the circulatory system, neoplasms, chronic respiratory diseases and diabetes[2].

A small group of risk factors responds for most of the deaths caused by CNCDs and by a substantial fraction of disease loads due to these diseases. Among these factors, smoking, excessive consumption of alcohol, inadequate diets and physical inactivity stand out[1,2].

There is strong evidence correlating social determinants, such as education, occupation, income, gender and ethnicity, with the prevalence of CNCDs and risk factors[3,4].

The analysis of the distribution of CNCDs and their risk factors indicates inequities, which mostly affects mid and low-income countries[1], low schooling and income populations[2,5] and vulnerable populations[6]. The CNDC epidemic has mostly affected people with low income, since they are more exposed to risk factors and have less access to health services[1,4].

Family expenses with CNCDs reduce the availability of resources for needs such as food, housing, education, among others. This creates a vicious circle and increases the poverty status of families[3,7]. Therefore, they have an economic impact on families, communities and the society in general, thus worsening inequities and increasing poverty[7]. In Brazil, it is estimated that CNCDs can affect around 1% of the GDP[3].

The approaches of descriptive epidemiology try to analyze the distribution patterns of health events and risk factors that affect different segments of populations in various spaces. Therefore, it enables to identify "differences" that can be seen as incidence, prevalence of diseases, risk factors and other health indicators. The finding regarding these "differences" leads to the development of hypotheses, epidemiological analyses, decisions and interventions[8,9]. Studies have indicated heterogeneity among regions[10], cities and also inside the urban space, in the distribution of child mortality[9,10], in the diversity of the distribution of risk factors, in health indicators among the elderly[11], among others.

The analysis of health conditions that are territorially referenced makes it possible to show intraurban inequities. Therefore, the conception of space begins to be understood not only in an ecological, natural or administrative dimension, but as the social space that is historically constituted as an expression of social transformations and specific social forms of occupation[8,9,12]. These territorial analyses may support health promotion policies addressed to more vulnerable groups and regions.

The Telephone-based Surveillance of Risk and Protective Factors for Chronic Diseases (VIGITEL), conducted by the Ministry of Health, has monitored risk factors in the Brazilian population and, in 2010, it was prepared to represent the nine sanitary districts (SD) in the city of Belo Horizonte, Minas Gerais.

In order to identify intraurban differentials, prevalence rates of the main risk and protective factors for CNCDs in the nine SD, or health administrative regions, were analyzed in Belo Horizonte, Minas Gerais.

So, the intention is to contribute with the understanding of regional inequities and with the improvement of local planning to face these diseases.

METHODOLOGY

The study population was composed of adult inhabitants (18 years old or more) of households in the city of Belo Horizonte, Minas Gerais, with at least one landline in 2010. The sampling size was estimated in about 2,000 interviews, which would be sufficient to estimate the prevalence with error between 2 and 3%[13].

The sample was obtained by raffling landlines from the electronic record made available by telecommunication companies to the Ministry of Health. The procedure adopted in the city of Belo Horizonte was the ordered systematic sampling per health regional. The 5,000 landline sample was subdivided in 25 replicas, with 200 each, by using the same initial raffling procedure. Each replica maintains the same distribution of landlines per health regional.

Replicas were used until the performance of 2,000 interviews. This procedure aims to facilitate operational tasks, including the substitution of commercial lines, those that were out of service, non-existing and refusals. For each eligible line, after their users agreed to participate in the study, individuals aged 18 years old or more living in the household were numbered, and, afterwards, they were raffled for interview. Then, the VIGITEL questionnaire was applied, which approaches themes such as diet, physical activities, use of tobacco, alcohol, reported morbidity, preventive examinations, among others[14].

The coverage rate of households with landlines was estimated in 76%, in Belo Horizonte[15], and so post-stratification weights were used for correction. Weights are the result of the multiplication of three weighting factors: (a) inverse of the number of landlines in the household of the interviewee; (b) number of adults in the household of the interviewee; (c) post-stratification weight, which aims at balancing the sociodemographic composition of the sample of adults analyzed by VIGITEL in each city, distributed in 36 categories resulting from stratification according to sex (male, female), age groups (18 – 24, 25 – 34, 35 – 44, 45 – 54, 55 – 64, 65 or older) and schooling (0 – 8, 9 – 11, 12 or more years). More details about the methodology used by VIGITEL can be consulted in other publications[14].

This study adopted the population of the National Household Sample Survey (PNAD) 2008[15], to correct for estimation bias caused by the exclusion of households without landlines.

Data were analyzed by the software Stata11[6]. The raffled sample was proportional to the number of landlines per SD, confirmed by the homogeneity test[17].

In order to identify homogeneous groups between regionals, the hierarchical cluster analysis was employed[18] by the method average linkage. Several demographic variables were used (schooling, skin color, marital status, number of inhabitants in the household), and SD clusters were identified.

The estimates of the variables coming from the 2010 survey in Belo Horizonte were presented in proportion (%), by SD, in order to compare the diferences between the SDs in the capitals.

The analyzed risk factors were: smokers, former smokers, passive smokers (report of inhaling cigarette smoke from another individual at home or at work); excessive weight (body mass index ≥ 25 kg/m^2); obesity (body mass index ≥ 30 kg/m^2); intake of meat with visible fat (red meat with visible fat or chicken with skin); regular intake of soft drinks or artificial juice (five or more days a week); physical inactivity (individuals who have not practiced any physical activity during their free time in the past three months, do not perform intensive physical efforts at work, do not commute to work or school by foot or by bicycle, and do not perform heavy cleaning duties at home); abusive alcohol consumptio (four or more doses for women and five or more doses for men in the same occasion in the last 30 days, considering as an alcohol dose one dose of distilled drinks, one can of beer or one glass of wine); driving after abusive alcohol consumption (driving after abusive alcohol consumption); poor health status self-evaluation (assessing health status as poor) and reported morbidities (previous medical diagnosis of arterial hypertension, diabetes, ashtma, bronchitis and emphysema. Protective factors were: regular intake of fruits, vegetables and greens (FVG) (five or more

portions of FVG for five days a week or more); recommended FGV intake (five or more daily portions of FVG a week); regular consumption of beans (five or more days a week); breakfast (having breakfast at home); suficiente physical activity during free time (mild or moderate physical activity for at least 150 minutes a week, or vigorous activities for at least 70 minutes a week); active commute to work, and/or school (walking or riding a bicycle, for 150 minutes or more a week); protection against ultraviolet radiation and owning a private health insurance plan.

The study presents no conflicts of interests, and the VIGITEL survey is registered with n. 13081. The study was approved by the National Committee on Ethics in Research (CONEP). In telephone interviews, the informed consente form is replaced by the verbal report obtained at the time of telephone contact.

RESULTS

In the comparison between the distribution of landline records and the sample raffled by SD, the result of the homogeneity test showed that both distributions are similar (p-value of 0.12). In 2010, 1,994 interviewes were conducted, ranging from 303 in the SD of Venda Nova and 145 in the SD of Pampulha.

The χ^2 showed that the health regional is associated with the variables of schooling, skin color, marital status and household inhabitants. By using these variables in the cluster analysis of SDs, the result of the hierarchical clustering showed that the SD can be grouped (Figure 1). By adopting 8 as the cutoff point, in the distant scale of combined clusters, the nine clustered SDs were grouped in four homogeneous clusters based on the selected characteristics. By using the average linkage method, four groups were identified: (a) cluster 1: adults with up to eight schooling years, married and self-declared as being mulattos. This group consists of the SDs of North, Venda Nova, Barreiro, Northeast and Northwest; (b) cluster 2: SDs of West and East; (c) in clusters 3 (SD of Pampulha) and (d) 4 (SD of Center-South) mostly had higher schooling and higher proportion of people with white skin.

The population aged 12 schooling years or more was found in clusters 4 and 3, SD of Center-South (57%) and Pampulha (41.2%); while the population with lower schooling (0 to 8 schooling years) was found in cluster 1 ($p < 0.01$). With regard to white skin, higher proportions were identified in the SD of Center-South (63%), and black race/color (black and mulattos) was more frequent in cluster 1: SD of North (76.5%), Venda Nova (76.1%), Northeast (67.3%) and Northwest (66.8%) ($p < 0.01$). The number of 1 to 2 inhabitants was more common in the SD of Center-South (27.6%) and Pampulha (24.9%) ($p < 0.05$). The married marital status was more common in Venda Nova (58.3%), Barreiro (57.7%) and Northeast (55.9%) ($p = 0.04$) (Table 1).

Table 2 shows the frequencies of risk and protective factors of CNCDs according to SD. The following risk and protective factors: smokers, passive smokers, excessive weight,

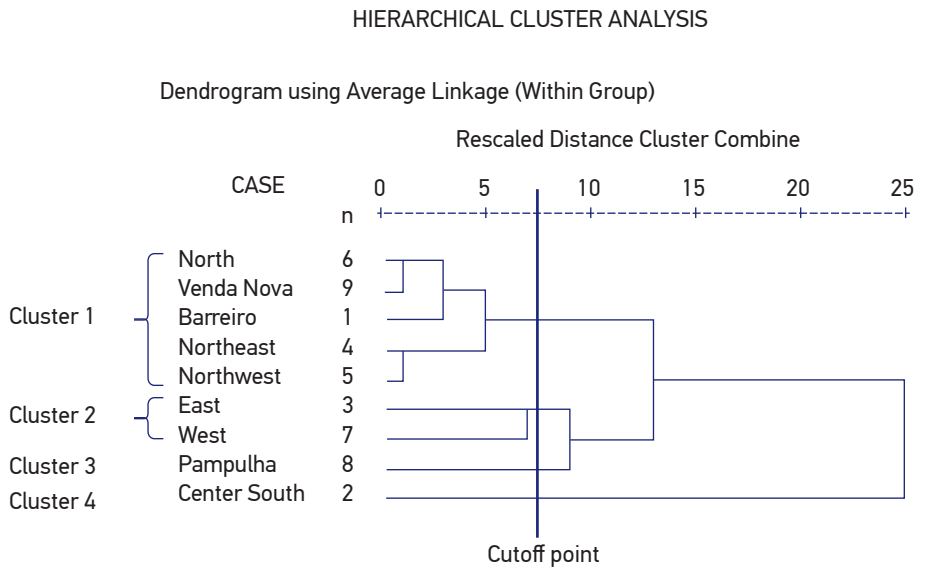

Figure 1. Sanitary district clusters according to sociodemographic characteristics, obtained by the hierarchical clustering technique. Belo Horizonte, 2010.

obesity, recommended FVG, five or more soft drinks a week, whole milk, active commute, inactive, dangerous driving, poor health status, arterial hypertension, diabetes and asthma, asthmatic bronchitis or emphysema did not presente differences between SDs. Table 2 shows, in bold, values with statistically significant difference.

The prevalence of former smokers in the capital was of 24.1%, and, after being stratified by SDs, it presents with statistically significant differences ($p = 0.02$): Pampulha, with 32.2%, Center-South, with 31.6%, and Barreiro, with 18.2%.

The regular intake of FVG was of 41.5% in the capital and, after SD stratification, it was possible to observe significant differences ($p = 0.001$) between the SDs of Center-South (56%) and cluster 1: North (35.6%), Northeast (36.8%), Venda Nova (36.8%) and Northwest (36.9%). The consumption of beans was of 81% in the capital and, after SD stratification, significant differences were observed ($p < 0.001$) between the SD of Barreiro (86.1%) and Center South (67.2%). The habit of having breakfast at home was of 17.8% in the capital, with significant differences ($p = 0.023$) between the SD of Northeast (23.0%) and East (10.2%).

The prevalence of consuming whole milk in the capital was of 54.2%, and after SD stratification it is possible to observe significant differences ($p = 0.001$) between the SDs of Center South, with 39.6%, Venda Nova, with 61.9%, and Barreiro, with 61.6%.

The intake of meat with visible fat was of 39.7% in the capital and, after SD stratification, there wer differences ($p = 0.003$) between the SD of East (47.0%), Center South (30.6%) and West (31.4%).

Table 1. Distribution of frequency (%) of demographic variables per sanitary district in Belo Horizonte. VIGITEL, Brazil, 2010.

Variables	Barreiro (n = 221)	Center South (n = 303)	East (n = 218)	Northeast (n = 248)	Northwest (n = 296)	North (n = 170)	West (n = 226)	Pampulha (n = 145)	Venda Nova (n = 167)	p-value
Sex										
Male	47.2	40.2	43.2	44.9	46.4	44.5	44.0	55.5	50.6	0.43
Female	52.8	59.8	56.8	55.1	53.6	55.5	56.0	44.5	49.4	
Age group (years)										
18 to 24	15.1	15.5	12.9	12.8	17.2	17.2	18.8	13.2	14.5	0.08
25 to 34	25.2	21.9	26.2	18.8	25.5	26.0	19.6	18.6	30.4	
35 to 44	21.2	15.2	21.0	23.0	17.3	19.5	14.2	19.9	25.0	
45 to 54	16.1	19.0	12.8	15.2	18.7	13.2	20.3	23.7	12.7	
55 to 64	11.3	12.2	12.3	19.3	9.0	14.8	13.1	10.0	11.0	
65 to 94	11.1	16.3	14.8	10.9	12.3	9.3	14.0	14.6	6.4	
Schooling (years)*										
0 to 8	52.5	17.5	42.2	41.2	35.7	44.3	37.1	32.9	48.6	0.00
9 to 11	36.0	25.5	32.7	35.6	37.8	42.2	38.6	25.9	41.2	
12 to 20	11.6	57.0	25.0	23.2	26.6	13.5	24.3	41.2	10.2	
Skin color**										
White	33.2	63.0	34.7	32.3	32.7	23.5	47.3	43.9	22.6	0.00
Black	7.6	4.1	12.2	9.5	7.2	9.2	6.8	4.3	12.4	
Mulatto	58.5	32.2	52.4	57.8	59.6	67.3	45.9	51.8	63.7	
Marital status***										
Single	32.0	39.7	45.9	33.7	40.6	37.4	37.3	37.8	36.3	0.04
Married	57.7	47.2	37.6	55.9	47.3	49.1	47.5	48.5	58.3	
Widow	6.6	6.8	10.2	5.6	6.0	6.7	9.2	5.7	1.4	
Divorced	3.6	6.0	6.3	4.1	4.7	5.0	5.9	7.7	3.7	
Inhabitants per household										
1 to 2	15.4	27.6	18.7	16.8	18.1	15.6	22.9	24.9	15.2	0.05
3 to 4	53.1	48.5	49.6	54.0	48.4	54.2	42.4	54.0	56.7	
5 to 11	31.6	23.9	31.7	29.2	33.6	30.2	34.7	21.2	28.2	

*7 records with no information were excluded; **8 records of skin color and 4 with no information were excluded; ***15 records with no information were excluded.

Table 2. Frequency (%) of risk and protective factors for chronic non communicable diseases among adults per sanitary district in Belo Horizonte. VIGITEL, Brazil, 2010.

Indicators	Barreiro (n = 221)	Northeast (n = 248)	Northwest (n = 296)	North (n = 170)	Venda Nova (n = 167)	East (n = 218)	West (n = 226)	Pampulha (n = 145)	Center South (n = 303)	Belo Horizonte (n = 1994)	p- value**
Smoker	17.7	13.0	18.5	13.0	15.0	12.9	15.2	12.3	11.4	14.6	0.573
Former smoker	**18.2**	22.9	23.6	19.4	28.1	25.6	19.0	32.2	31.6	24.1	**0.021**
Passive smoker	21.9	16.6	24.3	20.7	21.2	22.9	26.2	15.6	14.8	20.7	0.159
Excessive weight	45.7	47.4	43.4	53.4	41.5	41.5	45.9	46.2	41.8	45.0	0.613
Obesity	10.7	15.4	13.9	17.9	14.1	10.0	12.0	8.6	9.3	12.5	0.267
Recommended fruits, vegetables and greens	24.0	22.9	22.7	25.7	27.7	27.4	30.1	23.4	36.0	26.6	0.074
Regular fruits, vegetables and greens	41.4	**36.8**	**36.9**	**35.6**	**36.0**	43.6	46.1	38.6	**56.0**	41.5	**0.002**
Consumption of beans on five weekdays or more	**86.1**	80.7	81.4	85.4	85.5	85.2	78.0	81.1	**67.2**	81.0	**0.001**
Intake of meat with visible fat	39.0	37.1	**48.8**	40.0	43.5	47.0	31.4	37.2	**30.6**	39.7	**0.003**
Soft drinks on five weekdays or more	22.9	27.8	29.0	26.7	23.7	32.3	29.4	25.0	28.4	27.5	0.672
Consumption of whole milk	**61.6**	54.4	56.6	57.4	**61.9**	51.7	49.5	57.8	**39.6**	54.2	**0.001**
Sufficient physical activities during leisure time	**18.3**	30.2	24.0	24.3	25.4	27.4	27.3	32.0	**38.7**	27.3	**0.003**
Active commuting	22.1	16.6	17.7	19.7	23.3	15.8	16.9	20.2	21.9	19.2	0.615
Inactive	13.6	17.2	16.2	13.4	11.4	12.4	15.4	11.1	14.9	14.3	0.742
Abusive alcohol consumption	**15.5**	**15.4**	17.9	16.0	20.5	26.2	19.7	25.1	**33.7**	20.8	**0.001**
Dangerous driving*	1.8	3.2	2.7	1.6	2.1	3.0	0.8	2.4	3.6	2.4	0.776
Poor self-reported health status*	4.2	3.5	4.0	3.4	5.8	3.9	4.1	4.4	1.5	3.8	0.777
Protection against ultravioleta radiation	54.2	49.1	47.0	43.3	**35.2**	44.4	46.2	58.9	**62.0**	48.9	**0.001**
Arterial hypertension	27.3	35.5	27.9	30.4	25.6	26.9	27.9	22.5	22.1	27.7	0.173
Diabetes*	4.4	6.3	8.5	6.8	5.6	8.2	6.4	9.3	4.8	6.6	0.520
Breakfast at home	20.7	**23.0**	22.8	15.9	19.9	**10.2**	12.8	14.4	16.2	17.8	**0.023**
Ashtma, ashtmatic bronchitis, chronic bronchitis or emphysema	8.6	8.8	8.7	7.4	9.7	4.9	10.0	10.0	7.5	8.4	0.992
Owning a health insurance plan	54.8	54.2	51.0	**38.4**	41.9	59.6	59.8	62.4	**78.5**	55.8	**0.001**

*Estimate with low level of reliability **test of proprotion between sanitary districts

Note: Indicators with $p < 0.05$; values in bold present statistically significant differences between sanitary districts.

The practice of sufficient physical activities during leisure time was of 27.3% in the capital, with significant differences ($p = 0.002$) between the SD of Center South (38.7%) and Barreiro (18.3%).

Concerning abusive alcohol consumption, 20.8% of the interviewees in the capital were identified, with significant differences ($p < 0.001$) between the SD of Center South (33.7%), Barreiro (15.5%) and Northeast (15.4%). The frequency of adults who reported being protected against ultraviolet radiation was of 48.9%, and there were significant differences ($p < 0.001$) between the SDs, ranging from 62.0% in the SD of Center South to 35.2% in the SD of Venda Nova.

The proportion of adults who own an insurance health plan was of 55.8%, with significant differences ($p < 0.001$) between the SDs of Center South (78.5%) and North (38.4%) (Table 2). The prevalence of driving after the abusive alcohol consumption and poor health self-evaluation are little accurate.

DISCUSSION

The analysis that shows the distribution of risk and protective factors for CNCDs per spatial areas inside the urban space, sub-regions, is new in VIGITEL. Studies indicate that ecological analyses may support the definition of specific actios for social and territorially defined populations[8].

An ecological study conducted in Belo Horizonte showed the importance of spatial analysis in the conduction of public policies that prioritize risk areas, and can contribute with the reduction of inequalities in child mortality in risk areas of the SDs[9].

The tradition of dealing with intraurban differentials in Belo Horizonte oriented the Municipal Secretariat of Health to create the Health Vulnerability Index (IVS). This composite index was created based on socioeconomic and health indicators, by classifying the census sectors in low, medium and high risk strata, and then it started to guide the planning of health actions[19]. By using the IVS methodology, a study conducted in Belo Horizonte, by Braga et al.[11], analyzed health indicators, including risk factors for CNCDs, according to the distribution of the population in three geographic areas of the city. The authors found significant associations between high risk stratum and health conditions, thus reinforcing the importance of spatial analysis in the identification of intraurban differentials[20].

The current study is based on the fact that risk factors for CNCDs may be associated with inequality, and areas of higher risk may concentrate worse health indicators and risk factors. The fast and unplanned urbanization has been attributed to the promotion of unhealthy behaviors, since it limits options of healthy and low cost foods, in accessible places, and also because it does not provide places that promote physical activities; besides, it increases the exposure to air pollutants (including the smoke from tobacco), among others[21].

Indicators that are already known as determinants of health conditions in the definition of clusters, like schooling, were used in this study. People with high schooling have more access to information, tend to value health care, as well as to adopt healthier behaviors and to look for health preventive services[22]. Besides, schooling tends to be the income proxy and, consequently, of better health conditiosn[23]. The white color tends to be associated with income and schooling and, in general, to better health conditions[24].

The current study aggregated the SDs in 4 clusters, according to sociodemographic indicators. Cluster 4 (Center South SD) had better sociodemographic indicators and higher frequencies of protective factors, as well as lower frequencies of risk factors for CNCDs, unlike cluster 1, with worse indicators.

With regard to smoking, a study from the Brazilian Institute of Geography and Statitics (IBGE), in 2008 (PETab)[25], showed there is an inverse relationship between the level of income and schooling and the prevalence of tobacco use and former smokers[25]. The same situation was described in studies from other countries, like Italy and South Africa, which showed lower prevalence of smokers in a population with higher schooling and, consequently, income[26,27]. In Belo Horizonte, Braga et al.[11] found higher prevalence of smoking among elderly people in high risk areas, with lower socioeconomic status/schooling. This is compatible with the findings regarding the Center South SD (cluster 4), which presents the lowest prevalence of smoking and the highest prevalence of former smokers, even though these values are not statistically significant for smoking.

The healthy dietary pattern was also more common in the Center South SD (cluster 4), since it was possible to observe higher prevalence of the regular intake of FVG, lower frequency of whole milk consumption, meat with visible fat and milk with fat. The intake of beans is more common in the SDs of Barreiro and Venda Nova (cluster 1). Braga et al.[11] showed unsatisfactory consumption of FVG in areas with higher risk in Belo Horizonte. Diets that are rich in FVG are associated with reduced mortality, decreased risk of cardiovascular diseases and reduced incidence of several types of cancer[28]. Studies associate higher schooling to a better dietary pattern[29]. The higher intake of FVG in populations with higher schooling has been attributed to the fact that these people have more access to information, which contributes with the adoption of healthy habits, besides the access to healthy foods, which tend to be more expensive[29].

VIGITEL has shown that the population with more schooling years has consumed fewer beans, probably by replacing the calories of traditional foods with other types of food. The Family Budget Survey (POF) also identified the less frequent consumption of beans for the population with higher income and schooling[30].

Breakfast consumed at home had differences between SDs, and the low frequency of this factor in the city called our attention. Breakfast has been considered as a protective dietary practice for obesity, since it tends to increase satiety, reducing the intake of caloric foods and obesity[31].

Sufficient physical activity during leisure time was more prevalent in the Center South SD and less common in the Barreiro SD. Insufficient physical activity is an essential risk factor for mortality, comparable to smoking[32]. People who are not physically active have more risk of mortality due to any cause in comparison to those who perform at least 30 minutes of moderate physical activity on most weekdays[21,32]. High levels of physical activity are associated with schooling and income[32,33]. Braga et al.[11] found lower prevalence of physical activity in areas with higher socioeconomic risk.

Excessive weight and obesity were high in the whole city, with no differences between SDs. This is a warning for the definition of preventive policies[5,7].

Abusive alcohol consumption is a multiple risk factor for health, including conditions such as hypertension, cirrhosis, stroke, neoplasms, besides traffic accidents and violence[34]. The Center South SD (cluster 4) presented the highest prevalence of abusive alcohol consumption, besides a higher frequency with regard to the association between alcohol and driving. The association between abusive alcohol consumption and individuals with high purchasing power and schooling was also described[34,35].

Arterial hypertension constitutes an important marker, being a risk factor for coronary heart disease and cerebrovascular disease, heart failure, kidney failure, peripheral vascular disease and other damages to blood vessels[2]. There were no differences between SDs with regard to arterial hypertension. Concerning diabetes, it is an important risk factor for heart diseases and, in general, the higher frequency of diagnoses of diabetes reflects more access to the service network and the age group structure, being more common among older populations[1,2].

Among VIGITEL limitations, we identified the landline coverage in some regions, even though the average of the capital presents high coverage, superior to 73%, which makes the population estimates of the city stable. Besides, weighting factors are used to correct the estimates. Other limitations were: this is a cross-sectional study, so it is not possible to establish temporal relationships, and the sample size in the SDs of Pampulha and Northwest, thus resulting in less accurate estimates, especially for low prevalence indicators.

The explanations based on the ecological model also have limitations concerning the interpretation of complex phenomena; therefore, they do not capture all of the territorial differences. SDs can be internally heterogeneous in the socioeconomic and urban infrastructure aspects. So, the findings for the SDs of Center South and Pampulha, which presented better indicators, still have major internal territorial inequalities and, in order to plan for actions, these internal differences should be considered.

Besides, ecological studies deal with the approximation of the reality, therefore, the ecological dimension cannot always be explained or directly attributed to the found results. Many of the findings in this study should be confirmed, because besides social inequities, the differences we found here may be a result of age structure, gender, access to services, among others.

CONCLUSION

The study design was adequate to estimate intraurban differentials concerning risk and protective factors for CNCDs that are representative of the adult population, with access to landlines, in one of the largest urban centers in the country.

Studies conducted to identify inequities in the urban space may generate evidence and overcome possibilities, so they can increase discussions that lead to the development of intersectoral actions.

The results described here, with differences between SDs, may reflect socioeconomic situations, as well as schooling, income, age distribution and access to the service, thus resulting in a concentration of risk factors for CNCDs in specific regions. Social inequities and life conditions constitute the main obstructions to the progress and improvement of the health situation, and this study can be useful to define health priorities.

Data from VIGITEL may contribute with the approximation of the surveillance of risk factors for CNCDs, getting closer to the analysis of differentials of the health situation and life conditions in the different sectors of the population. These studies should be connected to levels of decision-making, thus contributing with the efforts to prioritize more unequal sectors and territories[20].

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