

Risk factors for chronic noncommunicable diseases in users of two Basic Health Units in the city of São Paulo, Brazil

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76

Abstract

Introduction: The main risk factor for Chronic Noncommunicable Diseases (CNCDs) is lifestyle, which is open to prevention and health promotion interventions. **Objective:** to describe the risk factors associated with CNCD among individuals seen at two Basic Health Units (BHUs) in the city of São Paulo. **Method:** This was a cross-sectional study carried out in two BHUs in the northern and southeastern regions of São Paulo, involving 582 adult individuals. Data collection was done using the Vigitel instrument. In the inferential analyses, a logistic regression model was used. **Results:** Most participants were female, aged between 31 and 60 years; a quarter practiced physical activities, and most were overweight/obese. Less than a third were smokers or drinkers. The CNCDs observed were arterial hypertension, dyslipidemia and chronic obstructive pulmonary diseases (COPD). By the logistic regression analysis, the risk of presenting CNCDs was higher in patients over 60 years old (OR 11.3; 95% CI 5.6-15.5), male (OR 1.5; 95% CI 1.0-2.2), with an elementary education (OR 1.4; 95% CI 1.0-1.9), obese (OR 1.7; 95% CI 1.1-2.6) and smokers or with history of smoking. As for smoking, both consumption time (OR 2.1; 95% CI 1.4-3.0 if more than 10 years) and number of cigarettes consumed (OR 1.7; 95% CI 1.0-2.9 if more than 10 cigarettes/day) were significant. **Conclusion:** The most prevalent CNCDs were arterial hypertension, dyslipidemia and COPD. The main risk factors were male gender, age over 60 years, obesity and tobacco consumption.

Keywords: Chronic Non-Communicable Diseases. Risk factors. Prevention. Health promotion.

INTRODUCTION

The worldwide epidemiological transition is a precursor to the rise in Chronic Noncommunicable Diseases (CNCD), due to the fall in birth rates, the decrease in infant mortality and the consequent increase in the population and life expectancy. The new daily routine of individuals, the result of industrialization, urbanization, economic development and globalization of the food market, contributed to the nutritional transition of a diet rich in saturated fat and sugars¹.

CNCDs are one of the largest public health problems. The World Health Organization (WHO) states that CNCDs are responsible for

71% of a total of 57 million deaths worldwide in 2016 (WHO, 2018a, 2018b)^{2,3}. Statistical data pointed out that in 2016, in Brazil, CNCDs were responsible for 74% of the total deaths, with emphasis on cardiovascular diseases (28%), neoplasms (18%), respiratory diseases (6%) and diabetes (5%) (WHO, 2018c)⁴.

According to the WHO, smoking, inadequate food consumption, physical inactivity and excessive consumption of alcoholic beverages are risk factors that account for the vast majority of deaths from CNCDs (WHO, 2014)⁵. Due to the relevance of CNCDs in defining the epidemiological profile of the Brazilian

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population, and because these risk factors are preventable, in 2006, the Ministry of Health implemented the Surveillance of Risk and Protection Factors for Chronic Diseases by Telephone Survey (Vigitel)⁶.

CNCD Surveillance brings together a set of actions that make it possible to know the distribution, magnitude and trend of these diseases and their risk factors among the population, identifying their social, economic and environmental conditions, to support the planning, execution and evaluation of prevention and control of these diseases to reduce their harmful consequences for the quality of life of patients and for the health system in the country⁷.

The most important risk factors related to chronic conditions are linked to lifestyle and may be sensitive to preventive and health promotion interventions⁸. Strategies to reduce the onset and worsening of some of these conditions - such as diabetes, cardiovascular disease, obesity and various types of cancer - include early detection, increased physical activity, reduced consumption of tobacco and alcohol, as well as encouraging healthy nutrition. The preventive approach of the population and the individual proves to be effective in modifying unhealthy behaviors and promoting good habits⁸. However, it is necessary to emphasize the role and central responsibility of the patient and his family in health care, since the treatment of chronic conditions requires changes in behavior and lifestyle⁸.

In this context, WHO proposes to redirect the current health systems, with actions that integrate health promotion and primary prevention of the main risk factors in the fight against CNCDs. Recommendations have been proposed for the development of projects with the active participation of the community, the involvement of local health services and the implementation of national policies that help direct healthy choices⁹.

Given the above, the objective of this study was to describe the risk factors associated with the most prevalent chronic diseases among individuals registered in two Basic Health Units in the city of São Paulo.

MATERIALS AND METHODS

This was a cross-sectional study, with descriptive and correlational analysis. The research was carried out in two Basic Health Units (UBS) that have a Family Health Strategy (FHS) program located in the north and southeast regions of the São Paulo metropolitan region. The study participants were 582 individuals, over 18 years old registered at the UBS and participating in the family health strategy.

After approval of the research project by the Ethics and Research Committee of the Centro Universitário São Camilo, under the opinion number 1.265.906 and signature of the Terms of Commitment of Basic Health Units of the Municipality of São Paulo and the Informed Consent Form (ICF) by the participant, data collection began between 2016 and 2017 once a week, between 8 a.m. and 5 p.m. The approach with each participant had an estimated time of approximately one hour. Data were collected using a semi-structured questionnaire, Vigitel7 (adapted) used by the Ministry of Health of Brazil³, with 104 open and closed questions⁷.

For this study, the dependent variable was used to have at least a diagnosis of CNCD, diabetes, hypertension, kidney failure, etc. self-reported by the patient. The independent variables used for inferential analyses were: a) age in years, categorized as up to 60 years and greater than 60 years; b) female or male; c) education, categorized as complete or incomplete high school or higher education and complete or incomplete elementary school or never studied; d) monthly income in reais, categorized as greater than R\$ 1,000 and up to R\$ 1,000; e) nutritional status, the body mass

index (BMI) indicator was used according to the criteria established by the World Health Organization (WHO) categorizing overweight as from 25.0 to 29.9 kg/m² and ≥ 30.0 kg/m² as obese; f) smoking and smoking history (yes and no), years of smoking: categorized into up to 10 years of smoking and more than 10 years of smoking, number of cigarettes/day categorized into 0 to 9 units and 10 or more units per day.

The analyses were performed using the Stata/IC 12 statistical package (StataCorp LP, College Station, TX, USA). In the descriptive analyses to characterize the sample, the prevalence of socioeconomic variables and risk factors for CNCDS were chosen to be in percentages and 95% confidence intervals (CI). In the inferential analyses, the logistic regression model was used. In simple regressions, variables with $p < 0.20$ of the interest category eligible for inclusion in the multiple regression model were considered. The “forward selection” strategy was adopted for the order of inclusion of variables in the model. Variables with $p < 0.05$ remained in the final model.

RESULTS

Of the 582 study participants, the majority were female (452 cases, 78.1%), aged between 31 and 60 years (323 cases, 55.5%). Regarding socioeconomic level, the most frequent level of education was high school or higher (502 cases, 86.2%), and the monthly income was up to R\$ 1,000.00 in 325 cases (55.8%). With respect to lifestyle, most did not practice physical activities (431 cases, 74.4%), 304 were overweight or obese (62.3%), 135 (23.2%) consumed soft drinks more than 5 times per week, 137 (24.4%) consumed alcoholic beverages regularly and 215 (38.3%) had a history of smoking, of which 121 were currently smokers (Table 1).

At least one CNCDS was spontaneously reported by 269 participants (46.2%). The most prevalent, in order of frequency were: arterial hypertension

(181 cases, 31.5%), dyslipidemia (106 cases, 18.8%), chronic obstructive pulmonary disease (COPD) (67 cases, 11.7%) and diabetes mellitus (67 cases, 11.7%). The other diseases reported were cancer, acute myocardial infarction, stroke and thrombosis (Table 2).

The correlation between the presence or absence of CNCDS and the variables selected for the study identified a significantly higher risk for participants over 60 years of age, male, with an average level of education, obese and with a smoking history. With regard to smoking, there were significant associations with the time of use and the amount of tobacco consumed daily (Table 3).

The logistic regression model to identify risk factors associated with the occurrence of CNCDS in the studied population identified the independent variables of age over 60 years (OR 11.3; 95% CI 5.6-15.5), gender male (OR 1.5; 95% CI 1.0-2.2), education level up to elementary school (OR 1.4; 95% CI 1.0-1.9), obesity (OR 1.7; CI95 % 1.1-2.6) and smoking or smoking history as significant. Among the smokers, the variables time of consumption (OR 2.1; 95% CI 1.4-3.0 if over 10 years) and number of cigarettes consumed (OR 1.7; 95% CI 1.0-2.9 if greater than 10 cigarettes/day) were significant (Table 4).

Table 1– Characterization of the sample according to socioeconomic variables and risk factors for CNCDS of patients seen at two UBS in the city of São Paulo, 2016.

Variable	N ^a	% (%CI)
Age (in years (N=582))		
Up to 30	169	29.0 (25.3-32.7)
31-60	323	55.5 (51.5-59.5)
Greater than 60	90	15.5 (12.5-18.4)
Sex (N= 579)		
Female	452	78.1 (74.7-81.4)
Male	127	21.9 (18.6-25.3)
Education (N= 582)		
Never studied	30	5.2 (3.4-7.0)
Elementary (complete (92) and incomplete (184))	269	46.2 (42.2-50.3)

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...continuation - Table 1

Variable	N ^a	% (%CI)
High school (complete (191) and incomplete (57))	233	40.0 (36.0-44.0)
Higher education (complete (26) and incomplete (19))	50	8.6 (6.3-10.9)
Monthly income (reais) (N=582)		
Without income	70	12.0 (9.4-14.7)
Up to 1000	255	43.8 (39.8-47.9)
Between 1000 and 5000	252	43.3 (39.3-47.3)
Greater than 5000	5	0.9 (0.1-1.6)
Physical activity (N=579)		
Does not practice	431	74.4 (70.1-78.0)
Practice exercises	148	25.6 (22.0-29.1)
Smoker (N=577)		
Yes	121	21.0 (17.6-24.3)
No	456	79.1 (75.7-82.4)
History of smoking (N=562)		
Yes	215	38.3 (34.2-42.3)
No	347	61.7 (57.7-65.8)
Nutritional Status (BMI) (N = 488)		
Thinness and marked thinness	16	3.3 (1.7-4.9)
Eutrophy	168	34.4 (30.2-38.7)
Overweight	164	33.6 (29.4-37.8)
Obesity	140	28.7 (24.7-32.7)
Regular consumption of alcoholic beverages (N = 561)		
Yes	137	24.4 (20.9-28.0)
No	424	75.6 (72.0-79.1)
Regular consumption of soft drinks (N=582)		
5 or more days a week	135	23.2 (19.8-26.6)
Less than 5 days a week	447	76.8 (73.4-80.2)

^aIf less than 582, the difference is due to the lack of information in the database

Table 2- Prevalence of CNCDS in patients treated at two BHU in the city of São Paulo, 2016 (n=582).

Variable	N ^a	% (%CI)
Arterial hypertension		
Yes	181	31.5 (27.7-35.3)
No	393	68.5 (64.7-72.3)
Diabetes Mellitus		
Yes	67	11.7 (9.0-14.2)
No	511	88.3 (85.8-91.0)

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Cancer		
Yes	19	3.3 (1.8-4.8)
No	557	96.7 (95.2-98.2)
Acute Myocardial Infarction (AMI)		
Yes	11	1.9 (0.8-3.0)
No	563	98.1 (97.0-99.2)
Thrombosis		
Yes	10	1.7 (0.7-2.8)
No	568	98.3 (97.2-99.3)

Table 3- Correlation between the presence or absence of CNCDS and socioeconomic variables and risk factors, attended at two UBS in the city of São Paulo, 2016 (n=582)^b.

Variável	CNCDS ^a		p-value
	No N (%)	Yes N (%)	
Age (year)			
Up to 30	116 (68.6)	53 (31.4)	
31 to 60	145 (44.9)	178 (55.1)	0.000
Greater than 60	8 (8.9)	82 (91.1)	
Sex			
Female	219 (48.5)	233 (51.6)	
Male	49 (38.6)	78 (61.4)	0.049
Income			
Up to R \$ 1,000.00	141 (43.4)	184 (56.6)	
Above R \$ 1,000.00	128 (49.8)	129 (50.2)	0.123
Education			
Never studied	14 (46.7)	16 (53.3)	
Elementary (incomplete / complete)	112 (41.6)	157 (58.4)	0.023
High school (incomplete / complete)	125 (53.7)	108 (46.4)	
Higher (incomplete / complete)	18 (36.0)	32 (64.0)	
Obesity			
Yes	52 (37.1)	88 (62.9)	0.008
No	175 (50.3)	173 (49.7)	
History of Smoking			
Yes	83 (38.6)	132 (61.4)	0.003
No	179 (51.6)	168 (48.4)	
Smoker			
Yes	50 (41.3)	71 (58.7)	0.219

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No	217 (47.6)	239 (52.4)	
Number of cigarettes/day			
0 to 9 units	243 (47.9)	264 (52.1)	0.045
10 or more units	23 (3,9)	43 (65.1)	
Years of smoking			
0 to 9 units	215 (51.1)	206 (48.9)	
10 or more units	54 (33.5)	107 (66.5)	0.000

^aChronic non-communicable diseases; blf less than 582, the difference is due to the lack of information in the database

Table 4– Model of multiple logistic regression analysis among patients with some CNCDs treated at two BHUs in the city of São Paulo for socioeconomic and health variables, Brazil, 2016 (n=582).

Variable	Reference	Bivariate Analysis			Multivariate analysis*			p
		% (n/t) ^a	OR ^b	IC - 95% ^c	p	OR	IC - 95%	
Age	Up to 60 years	47.0 (492/231)	1					
	Older than 60 years	91.9 (90/82)	11.3	5.6-15.5	0.000	10.5	4.6-23.8	0.000
Sex	Female	51.5 (452/233)	1					
	Male	61.4 (127/78)	1.5	1.0-2.2	0.050	-	-	-
Education **	High school or higher	49.5 (283/140)	1					
	Elementary school or never studied	57.9 (299/173)	1.4		1.0-1.9	0.043	-	-
Income	Greater than R\$ 1,000	50.2 (257/129)	1					
	Up to R\$ 1,000	56.6 (325/184)	1.3	0.9-1.8	0.123	-	-	-
Nutritional status	Up to 29.9 Kg/m ²	49.7 (348/173)	1					
BMI (Kg/m ²)	≥ 30.0 Kg/m ² (Obesity)	62.9 (140/88)	1.7	1.1-2.6	0.009	1.9	1.2-2.9	0.004
Smoking	No	52.4 (456/239)	1					
	Yes	58.7 (121/71)	1.3	0.9-1.9	0.220	-	-	-
History of smoking	No	48.4 (347/168)	1					
	Yes	61.4 (215/132)	1.7	1.2-2.4	0.003	-	-	-
Years of smoking	Up to 10 years	48.9 (421/206)	1					
	More than 10 years	66.5 (161/107)	2.1	1.4-3.0	0.000	-	-	-
Number of cigarettes/day Age	0 to 9 units	48.5 (507/246)	1					
	10 or more units	6.2 (66/43)	1.7	1.0-2.9	0.047			

^aPercentage (total number of reference individuals/total number of reference individuals with SAH); ^bOdds Ratio; ^cConfidence interval;

*Controlled by gender, education, income, smoking, smoking history, years of smoking and number of cigarettes per day; **Complete or incomplete

DISCUSSION

CNCDs remain a major public health problem in the world, being responsible for the high rates of mortality and morbidity. In 2005, CNCDs caused approximately 35 million deaths, 80% in low- and middle-income countries and approximately 16 million deaths in people under 70 years of age. In 2010, the results released by the World Health Organization (WHO) revealed that CNCDs contributed to 36 million (63%) of worldwide mortality, considering the next 20 years from 2010, CNCDs will account for almost half of the global disease burden in developing countries. Risk factors, such as tobacco and alcohol use, inadequate nutrition and sedentary behavior contribute substantially to the development of CNCD¹⁰.

Among the 582 interviewed in this study, 323 (55.5%) were in the age group between 31 to 60 years old, regarding gender, the majority 452 (78.1%) were women; as for education, 15.8% had completed elementary school, and 31.6% had not completed elementary school; 32.8% had completed high school and only 4.46% had completed higher education; 255 (43.8%) earned up to R\$ 1000.00/month; 431 (74.4%) do not practice physical activity; 456 (79.1%) declared they were not smokers, however 215 (38.3%) had already used tobacco; 304 (62.3%) are overweight or obese; 424 (75.6%) do not consume alcohol.

According to data from IBGE¹¹ (2016), the most prevalent CNCDs were arterial hypertension, dyslipidemia and COPD. The main risk factors were male gender, age over 60 years, obesity and tobacco consumption. In addition, less than 20 million (15.3% of this population) had completed higher education, and the real average income usually earned in all jobs by employed persons was estimated at R\$ 2,270. In this study 8.6% of the participants declared to have a higher education (complete/incomplete)

Data from Vigitel (2017)¹², pointed out that 29.9% practiced moderate physical activity at least 150 minutes/week; in the present study 25.6% reported performing physical activity, but the degree of activity was not quantified.

The results of the present study corroborate the study carried out by Zarbato *et al.*, in 2007, in the city of Lages, SC¹³, who obtained in their analyses a considerable risk of developing CNCD among individuals who were overweight (33.46%), obesity

(23.46%), smokers and ex-smokers (45.9%) and sedentary (70.08%).

Still in the present study, it was found that 181 (31.5%) and 67 (11.6%) had hypertension and diabetes, respectively. These results are similar to those found in Vigitel 2017¹², in which the frequency of adults who reported medical diagnosis of arterial hypertension in the state of São Paulo was 48.6%, and 16.6% had diabetes. Arterial hypertension is considered a public health problem due to the difficulty in its control and one of the most important risk factors for the development of stroke, myocardial infarction and acute and chronic kidney injuries¹⁴.

The prevalence of diabetes has been growing worldwide, the causes are related to physical inactivity, inadequate diet, the increase in obesity and the aging population. Hospitalizations due to diabetes mellitus represent 9% of hospital expenditures in the Unified Health System¹⁵.

The diagnosis of diabetes requires blood tests, which makes it difficult to carry out population surveys, contributing to the prevalence being less frequent than hypertension. Studies conducted^{16,17} have found that the prevalence of diagnosed diabetes was 7.6% versus 4.1% for self-reported diabetes. These results started to be used to describe the prevalence of diabetes in Brazil, and based on them, the World Health Organization (WHO) estimated that the country would have 4.6 million diabetics in 2000 and 11.3 million in 2030. Diabetes and hypertension are clinical conditions that can be asymptomatic, and total cases may be underestimated in a population. The use of self-reported morbidity in health surveys can underestimate the prevalence of the diseases involved¹⁵.

There was a significant correlation between the variable presence of CNCD and age from 31 to 60 years ($p=0.000$), male ($p<0.049$), with an incomplete/complete primary education ($p<0.023$), obesity ($p<0.008$), among those who had a history of smoking ($p<0.003$), a number of 10 or more cigarettes/day ($p<0.045$) and who smoked for more than 10 years ($p=0.000$), which were observed in the analyzed correlations (table 3). When performing multiple logistic regression analysis (table 4), the adjusted odds ratios demonstrated the prevalence of CNCDs among males and increased progressively and sharply with advancing age. Positive associations were also

maintained with the level of basic education or never studied, among those with a BMI (kg/m²) ≥ 30.0 Kg/m² (Obese), who reported having a history of smoking for more than ten years and with a habit of smoking ten more cigarettes/day.

Risk factors for the development of CNCDs are classified as modifiable or non-modifiable. Ingestion of alcohol in large quantities, smoking, physical inactivity, obesity and eating habits that provoke the greater consumption of fats, sugars and white flour, are considered modifiable. Among the not modifiable factors age, heredity, sex and race, age stands out as having a clear relationship with the risk of developing CNCDs¹⁸.

The rapid demographic transition in Brazil has produced an age pyramid with a greater relative number for adults and the elderly. In Brazil, CNCDs influence about 72% of deaths, mainly affecting individuals with lower purchasing power, low education and the elderly¹⁹. The physiological changes resulting from aging, associated with inappropriate habits and lifestyles such as tobacco consumption, obesity and physical inactivity considerably increase the risk of being affected by CNCDs. In this study, it was found that individuals over the age of 60 years were 11.3 times more likely to be affected by a chronic non-communicable disease.

Male individuals have a higher risk of morbidity and mortality and lower life expectancy when compared to women, perhaps because they do not accept the fact that they become ill and do not recognize their real health needs. Moreover, this could also be because of the lower investment in operationalizing health policies and training of professionals prepared to meet specific male-related needs²⁰. Corroborating the findings of this study, men are 1.5 times more likely to have CNCDs when compared to women.

National Household Sample Survey (PNAD) carried out in 2003, which analyzed Social Inequalities in the prevalence of chronic diseases in Brazil, obtained results regarding schooling, an inverse

relationship between the lower level of education and the increase in CNCDs; that is, individuals with less education had 1.62 times greater prevalence of developing CNCDs than the others, and also frequent health services centers less²¹.

Obesity is a chronic problem and difficult to treat, several studies show a direct relationship between obesity and cardio and cerebrovascular problems, metabolic disorders, different types of cancer, diseases of the digestive system and others. In a survey carried out by Brasil, data from VIGITEL 2017¹², carried out in 27 cities, found that the frequency of overweight was 54.0%, while in this study about 28.75% were obese. Individuals with a higher BMI have a direct association with overweight and hypertension²².

In a study by Monteiro *et al.*²³ obtained a sharp and statistically significant decline in the prevalence of smoking (approximately 35%); the estimated frequency of smokers among the adult Brazilian population decreased from 34.8% in 1989 to 22.4% in 2003, and also a reduction in the number of cigarettes consumed/day. Recent data from Vigitel 2017¹², obtained a percentage of 28.9% of smokers in the State of São Paulo and among these 7% consumed more than 20 cigarettes/day. In this study, 21.0% declared themselves to be smokers and 38.3% already had the habit of smoking.

Smoking and passive exposure to tobacco are important risk factors for the development of chronic diseases, such as cancer, lung diseases and cardiovascular diseases, thus, tobacco use remains a global leader among the causes of preventable deaths.

Despite the important achievements related to smoking control in the last 20 years, it is estimated that still 13.6% of deaths are attributed to smoking, which may be related to the effect of high smoking prevalence in the past, which was evidenced in this study, individuals who smoked for more than ten years were more likely (2.1) to be affected by CNCDs, as well as consuming more than ten units of cigarette per day (Table 4).

CONCLUSION

The most prevalent CNCD in users of two BHU in São Paulo were arterial hypertension, dyslipidemia and COPD. The main risk factors identified by logistic regression analysis were male gender, age over 60 years, obesity and tobacco consumption. The notes described here can serve

as a basis for the development to contribute to the development of prevention, promotion, treatment and rehabilitation actions, in order to guide the organization, planning and improvement of the quality of health care services, seeking to reduce the incidence and the impact of CNCDs.

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