Risk and protection factors for chronic non communicable diseases by telephone survey – VIGITEL Brazil – 2009

Fatores de risco e proteção para doenças crônicas não transmissíveis obtidos por inquérito telefônico – VIGITEL Brasil – 2009

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Abstract

Objective: To describe the risk and protection factors for non communicable diseases with data from Telephone-based Surveillance of Risk and Protective Factors for Chronic Diseases (VIGITEL) in 2009. **Methodology:** The prevalence of main risk and protective factors was estimated in adults (≥18 years old), by telephone surveys in a probabilistic sample of the population covered by landline telephones in Brazilian state capitals and the Federal District, stratified by gender, age and schooling. **Results:** Data from 54,367 adults were collected. Smokers and former smokers represented 15.5 and 22% of Brazilian adults, respectively. Excess weight affected 46.6% of adults; 33% reported the consumption of meat with visible fat and reported 18.9% alcohol abuse. These factors were more prevalent among men and, in general, young adults and people with low schooling. The prevalence of physical activity in leisure was 18.8% (95%CI 17.4–20.1) among men and 11.3% (95%CI 10.6–12.0) among women. Physical inactivity affected 15.6% of population and increased with age. Consumption of fruits and vegetables and physical activity in leisure time were more prevalent in men and women with 12 years of schooling or more. Hypertension diagnosis was reported by 21.1% (95%CI 19.6–22.5) of men, and 27.2% (95%CI 25.8–28.5) of women. Prevalence of diabetes was 5.8%. **Conclusion:** The results point to different health behavior according to gender, age and schooling of the population and reinforce the decreasing smoking trend and increasing overweight trend in Brazil.

Keywords: risk factors; chronic disease; health surveys; health surveillance; cross-sectional studies.

Resumo

Objetivo: Descrever os fatores de risco e proteção para doenças crônicas não transmissíveis resultantes do Sistema de Vigilância por Inquérito Telefônico (VIGITEL) em 2009. **Metodologia:** Prevalências dos principais fatores de risco e proteção foram estimadas na população ≥18 anos a partir de entrevistas telefônicas em amostras probabilísticas da população coberta por telefonia fixa nas capitais de estados do Brasil e no Distrito Federal, segundo sexo, faixa etária e escolaridade. **Resultados:** Foram realizadas 54.367 entrevistas. Fumantes e ex-fumantes corresponderam a 15,5e 22% da população adulta brasileira, respectivamente**.** O excesso de peso atinge 46,6% dos adultos; 33% relataram consumo de carne com gordura e 18,9% afirmaram consumir bebida alcoólica de forma abusiva. Tais fatores de risco são mais prevalentes em homens e em geral nos indivíduos jovens e de menor escolaridade. A prevalência de atividade física no lazer é de 18,8% (IC95% 17,4–20,1) em homens e de 11,3% (IC95% 10,6–12,0) nas mulheres. A inatividade física atinge 15,6% da população e aumenta com a idade. O consumo de frutas, legumes e verduras e a atividade física no lazer são mais frequentes em homens e mulheres com mais anos de estudo. Diagnóstico de hipertensão arterial foi referido por 21,1% (IC95% 19,6–22,5) dos homens e 27,2% (IC95% 25,8–28,5) das mulheres. A prevalência de diabetes foi de 5,8%. **Conclusão:** Os resultados apontaram comportamentos em saúde distintos de acordo com o sexo, idade e escolaridade da população e reforçam a tendência de queda do tabagismo e aumento no excesso de peso no Brasil.

Palavras-chave: fatores de risco; doença crônica; inquéritos epidemiológicos; vigilância; estudos transversais.

Introduction

Chronic non-communicable diseases (CNCDs) – cardiovascular diseases, cancer, chronic respiratory disease, diabetes and musculoskeletal diseases, among others – share their long natural history and some mutable and immutable behavioral risk factors. Epidemiological analyses indicate that this set of behavioral risk factors is responsible for most deaths caused by CNCD and by a substantial fraction of disease load due to such disorders[1]. Smoking, alcohol abuse, obesity, dyslipidemia, insufficient intake of fruits and vegetables and physical inactivity are prevalent, among others.

The prevention and control of CNCD and its behavioral risk factors are essential to avoid the epidemic increase of such diseases and their severe consequences to the quality of life of subjects, because, besides causing premature deaths, chronic diseases cause adverse economic effects to the families, communities, society in itself and the health system of the country[2].

In order to plan actions to promote health and establish programs that are directed to the reduction of morbidity and mortality caused by chronic diseases, it is essential to know about the health status of the population. Therefore, population surveys have been an important tool for health surveillance, since they provide information on reported morbidity and lifestyles, which is not captured by the mortality information system (SIM) and the hospital admission information system (SIH)[3].

There are different approaches to measure health behaviors in the population, and the method of choice depends not only on the objective of the study, but also on the cost, number of professionals and time required to collect and analyze data requested to collect and analyze data[4]. Due to the high cost of household surveys and research involving physical examinations and blood drawing, significant number of health surveys have been

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based on self-reported information[5,6]. Likewise, the application of telephone surveys has increased, with the advantage of using computers to speed the process of data collection and analysis[4,7]. The most famous experience came from the United States, with the creation of the Behavioral Risk Factors Surveillance System (BRFSS), in 1984, which encouraged specific studies in different fields of health[8].

According to this worldwide trend, the Ministry of Health established the Telephone-based Surveillance of Risk and Protective Factors for Chronic Diseases (VIGITEL) in Brazil, in 2006, comprising state capitals and the Federal District. The system consists of computer-assisted telephone interviews (CATI). This system is annual and continuous in order to enable the monitoring and analysis regarding the trends of the main risk and protective factors of chronic diseases and reported morbidity in Brazil[9], as well as the monitoring of public policies addressed to the reduction of risk factors and chronic diseases.

The objective of this study was to describe the main risk and protective factors of CNCD found in the adult population (aged 18 years or older in 2009, living in the set of state capitals and the Federal District, according to socio-demographic characteristics.

Methods

VIGITEL is based on probabilistic samples of the adult population (aged 18 years or more) living in the state capitals or the Federal District as to the coverage of landline telephone lines in each location. Annually, 5,000 telephone lines are randomly drawn in each location, which are divided into replicates (or subsamples) of 200 lines each, in order to identify eligible lines, that is, active and landline telephone lines. For each eligible phone line, by which an adult living in the household was contacted and who agreed to participate in the study one of the adults is randomly selected for the interview[10].

In 2009, VIGITEL comprised 94 questions divided into the following topics: demographic and socioeconomic characteristics, eating patterns and physical activity, reported height and weight, smoking and alcohol consumption, self-evaluation on health status and reported morbidity. The questions appeared on the computer screen and the respective answers were immediately registered. It was possible to automatically advance in non-valid questions from previous responses.

This study assessed the frequency of the main indicators related to chronic diseases in adults in the Brazilian state capitals and Federal District in 2009.

Risk factors were: current smokers (subjects that smoke, regardless of intensity and length of time), former smokers (non-smokers that have already smoked at some point), passive smokers in the household (non-smokers who reported that one of the inhabitants smokes inside the house) and workplace (non-smokers who reported that at least one person smokes in the workplace); excess weight (Body Mass Index – BMI $\geq 25 \text{kg/m}^2$) and obesity (BMI $\geq 30 \text{kg/m}^2$); consumption of meat with visible excess fat (eating red meat with fat or chicken skin without removing the visible fat); and regular intake of soft drinks and artificial juices (five or more days a week); physical inactivity in general (subjects who have not practiced any kind of physical activity in their leisure for the past three months, those who do not make physical effort at work, people who do not go to school or work on foot or by bicycle and those who are not responsible for the housework); alcohol consumption of four or more doses for women and five or more doses for men in the same occasion in the past 30 days, considering one dose of distilled beverage, one can of beer and one glass of wine as one dose of alcohol; poor self-reported health status; reported morbidity (previous medical diagnosis of arterial hypertension, diabetes, dyslipidemia and heart diseases)[11].

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Protective factors were: regular (5 days a week or more) or recommended intake (5 daily servings, 5 days a week or more) of fruit, vegetables and legumes; regular consumption of beans (5 days a week or more); physical activity in the leisure time (light or moderate physical activity, such as hiking, treadmill walking, weight lifting, hydro-gymnastics, gymnastics, swimming, martial arts, bicycling, volleyball or others, for at least 30 minutes a day, 5 days a week or more; or intense activities, such as running, treadmill running, aerobic gymnastics, soccer, basketball or tennis, at least 20 minutes a day, 3 days a week or more)[11].

Prevalence estimates and respective 95% confidence intervals (95%CI) were calculated by gender, age and schooling. Data analysis was conducted with the Stata 9.2 program, based on weighting factors that considered the highest probability that individuals with more telephone lines or less inhabitants in the household had to participate in the sample, besides correcting the overestimation or under-estimation of VIGITEL, which would be a result from an unequal coverage of landline telephone lines in the studied locations, according to socio-demographic strata and the size of the sample in each city. A detailed description of methodological aspects regarding VIGITEL is found in Moura et al.[9].

Results

In 2009, a total of 54,367 adults participated in VIGITEL, accounting for 21,347 men and 33,020 women. The mean duration of the interview was 11 minutes. The average success rate was 76.5%, and refusal rate of 3%[11].

The frequency of risk and protective factors for the total population and genders, separately, are presented in Table 1. The prevalence of smokers, former smokers and passive smokers in the workplace was higher among males. Men also presented a higher frequency of excess weight,

consumption of soft drinks and artificial juices, consumption of meat and excess fat and alcohol abuse. Women, on the other hand, presented a higher frequency of self-reported poor health status, besides more medical diagnoses of arterial hypertension and dyslipidemia. Among protective factors, men reported consuming more beans (5 days a week or more) and performance of sufficient physical activity in their leisure, while women showed the more frequent intake of fruits, vegetables and legumes. The prevalence of passive smokers in the household, obesity, physical inactivity and diagnoses of diabetes and dyslipidemia did not present significant differences among genders (Table 1).

Other behavioral differences related to health were demonstrated by the stratified analysis of risk and protective factors as to age group and schooling (Tables 2-4).

In both genders, the prevalence of smokers is lower among the elderly (≥65 years old), when the prevalence of former smokers is maximum. The prevalence of passive smokers in the household is higher among youngsters, while the percentage of passive smokers in the workplace reaches higher rates among individuals at reproductive age (Table 2).

Generally speaking, a higher frequency of protective factors was observed with increasing age, such as the regular and recommended intake of fruits, vegetables and legumes, the decreased frequency of risk factors, such as intake of soft drinks, meat with visible excess fat and alcohol abuse, for both genders (Table 2). However, physical inactivity mostly affects older women and men; the latter presented lower rates of physical activity in their leisure. In all age groups, the consumption of beans is higher among men.

Excess weight and obesity increase with age, up to the age of 64 years for both genders (Table 3). From the age of 25 to 54 years, excess weight is much more prevalent among men. The self-evaluation of poor health status is more prevalent among the elderly, as well as the diagnoses of arterial

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Table 1. Frequency* of risk and protective factors of non communicable chronic diseases in adults by sex, in the Brazilian State Capitals and Federal District (VIGITEL, Brazil – 2009)

Tabela 1. Frequência (%) de fatores de risco e proteção para doenças crônicas em adultos, por sexo, no conjunto das capitais do Brasil e no Distrito Federal (VIGITEL –2009)*

Variables	Sex					
	Total		Male		Female	
	n=54,367		n=21,347		n=33,020	
	%	95%CI	%	95%CI	%	95%CI
Smoking						
Current smokers	15.5	14.5–16.5	19.0	17.3–20.8	12.5	11.4–13.7
Former smokers	22.0	20.6–23.3	26.6	24.0–29.2	18.0	17.1–19.0
Passive smokers in the household	13.3	12.4–14.1	12.2	10.9–13.5	14.1	13.1–15.1
Passive smokers in the workplace	12.8	12.1–13.6	18.3	16.9–19.8	8.2	7.3–9.0
Nutritional status						
Excess weight	46.6	45.2–48.0	51.0	48.7–53.4	42.3	40.8–43.8
Obesity	13.9	13.1–14.7	13.7	12.4–15.0	14.0	13.1–15.0
Diet						
Regular intake of fruits, vegetables and legumes	30.4	29.3–31.4	24.3	22.8–25.8	35.5	34.3–36.8
Recommended fruits, vegetables and legume consumption	18.9	18.1–19.7	14.8	13.7–16.0	22.4	21.3–23.5
Consumption of beans	65.8	64.7–66.9	72.4	70.7–74.2	60.1	58.8–61.5
Intake of soft drinks or artificial juices	27.9	26.4–29.4	31.5	28.8–34.3	24.8	23.3–26.3
Consumption of meat with visible fat	33.0	31.8–34.2	43.2	41.1–45.4	24.3	22.9–25.7
Physical activity						
Sufficiently active during leisure time (leisurer)[c]	14.7	14.0–15.5	18.8	17.4–20.1	11.3	10.6–12.0
Inactive[d]	15.6	14.7–16.5	16.0	14.6–17.3	15.3	14.1–16.6
Alcohol abuse	18.9	17.9–19.9	28.8	26.9–30.7	10.4	9.6–11.3
Poor health self-evaluation	4.9	4.3 - 5.4	3.2	2.7–3.8	6.3	5.4–7.2
Reported morbidity						
Arterial hypertension	24.4	23.3–25.4	21.1	19.6–22.5	27.2	25.8–28.5
Diabetes	5.8	5.3–6.3	5.3	4.6–5.9	6.2	5.5–6.9
Heart diseases	2.5	2.2–2.8	2.4	1.9–2.8	2.6	2.2–3.0
Dyslipidemia	16.9	16.2–17.6	14.1	13.0–15.3	16.4	18.4–20.2

Source: Surveillance System of Risk and Protective factors for Chronic Diseases by Telephone Survey (VIGITEL), Ministry of Health, Brazil
*Weighted proportion according to the 2000 Census sociodemographic distribution of the adult population in each given State capital; 95%CI – 95% confidence interval; p-value=0.05, considering design effect of the study
Fonte: MS/SVS/CGDANT – VIGITEL – Vigilância de Fatores de Risco e Proteção para Doenças Crônicas por Inquérito Telefônico
Percentuais ponderados para ajustar a distribuição sócio-demográfica da amostra VIGITEL à distribuição da população adulta de cada cidade no Censo Demográfico de 2000 e para levar em conta o peso populacional de cada cidade; IC 95% – Intervalo de confiança (p=0,05), levando-se em consideração o efeito do desenho do estudo

hypertension, diabetes, heart diseases and dyslipidemia (Table 3).

Generally, higher frequencies of protective factors and lower rates of risk factors of CNCD were observed among individuals with a higher level of education, with some exceptions and differences among genders (Table 4). The prevalence of men and women who smoke is higher for individuals with up to eight years of schooling, which decreases with nine years of schooling or more, opposite to the frequency of former smokers. The reduction in the frequency of passive smokers in the household and workplace only occurs among individuals with 12 or more years of schooling in both genders.

The regular and recommended consumption of fruits, vegetables and legumes and alcohol abuse were higher with the increase in school years. However, there was an inverse relation between the regular

Table 2. Frequency* of risk and protective factors of non communicable chronic diseases in adults by sex and age group, in the Brazilian State Capitals and Federal District (VIGITEL, Brazil – 2009)

Tabela 2. Frequência (%) de fatores de risco e proteção para doenças crônicas em adultos, por sexo e faixa etária, no conjunto das capitais do Brasil e no Distrito Federal (VIGITEL – 2009)*

	18 to 24 years		25 to 34 years		35 to 44 years		45 to 54 years		55 to 64 years		≥65 years	
	%	95%CI	%	95%CI	%	95%CI	%	95%CI	%	95%CI	%	95%CI
Smokers												
Men	19.3	(13.2–25.4)	21.2	(18.0–24.3)	16.8	(14.4–19.2)	20.8	(18.1–23.5)	20.4	(16.8–23.9)	11.6	(8.8–14.4)
Women	11.0	(7.1–15.0)	12.0	(9.6–14.5)	13.5	(11.7–15.4)	17.5	(15.3–19.8)	14.1	(11.9–16.3)	5.9	(4.7–7.1)
Former smokers												
Men	17.5	(6.1–29.0)	17.0	(14.1–19.9)	24.5	(21.7–27.2)	37.8	(34.7–41.0)	44.7	(40.6–48.8)	52.3	(48.0–56.6)
Women	8.1	(6.4–9.8)	13.0	(10.8–15.1)	17.1	(15.2–19.0)	29.3	(26.8–31.7)	29.3	(26.5–32.0)	26.3	(23.9–28.7)
Passive smokers - household												
Men	17.9	(13.7–22.0)	13.3	(10.3–16.3)	8.7	(6.8–10.6)	10.5	(8.0–13.0)	8.3	(6.2–10.3)	9.6	(6.4–12.8)
Women	20.1	(17.1–23.1)	15.5	(13.0–18.0)	11.1	(9.4–12.7)	10.5	(8.8–12.1)	13.1	(11.0–15.1)	11.0	(9.2–12.9)
Passive smokers - workplace												
Men	17.4	(13.4–21.4)	20.6	(17.5–23.8)	23.6	(20.9–26.2)	18.4	(16.0–20.7)	11.7	(9.2–14.1)	5.0	(3.1–6.9)
Women	8.7	(6.8–10.6)	11.5	(9.2–13.8)	8.9	(7.5–10.3)	7.8	(6.3–9.3)	4.2	(2.9–5.5)	1.2	(0.6–1.7)
Regular consumption of fruits, vegetables and legumes												
Men	16.9	(13.5–20.2)	21.0	(18.0–23.9)	26.8	(24.0–29.5)	27.2	(24.5–30.0)	34.6	(30.7–38.6)	34.4	(30.5–38.4)
Women	25.3	(21.9–28.8)	29.7	(27.0–32.3)	37.2	(34.9–39.6)	42.6	(39.9–45.2)	44.7	(41.7–47.6)	49.1	(46.3–51.9)
Recommended consumption of fruits, vegetables and legumes												
Men	11.1	(8.6–13.6)	12.7	(10.4–14.9)	16.5	(14.1–18.9)	15.9	(13.7–18.0)	21.3	(17.7–24.8)	20.0	(16.4–23.6)
Women	16.8	(13.8–19.8)	18.4	(16.2–20.6)	25.0	(22.8–27.1)	26.4	(24.0–28.7)	27.0	(24.4–29.6)	28.5	(25.9–31.0)
Consumption of beans												
Men	71.8	(65.6–78.1)	75.7	(73.0–78.4)	73.9	(71.6 –76.2)	71.3	(68.6–74.0)	67.5	(63.6–71.4)	65.9	(61.9–69.8)
Women	59.0	(54.7–63.3)	59.9	(57.0–62.7)	61.6	(59.3–63.9)	62.5	(60.0–65.0)	60.8	(58.0–63.6)	55.7	(52.9–58.4)
Consumption of soft drinks												
Men	45.9	(37.1–54.6)	34.6	(31.0–38.1)	28.8	(26.2–31.5)	23.5	(20.6–26.4)	18.9	(15.4–22.5)	13.8	(11.5–16.0)
Women	38.5	(33.6–43.4)	29.3	(26.5–32.0)	22.1	(20.0–24.2)	17.2	(15.2–19.2)	13.8	(11.5–16.0)	11.6	(9.7–13.5)
Intake of meat with excess visible fat												
Men	48.0	(40.0–56.0)	48.7	(45.0–52.4)	43.5	(40.5–46.5)	39.6	(36.3–42.8)	31.6	(27.7–35.5)	28.7	(24.7–32.8)
Women	30.3	(25.5–35.2)	28.3	(25.6–31.1)	24.5	(22.4–26.7)	21.2	(18.9–23.5)	17.0	(14.6–19.3)	12.1	(10.2 –14.0)
Being sufficiently active at leisure-time												
Men	27.6	(22.5–32.8)	20.4	(17.5–23.3)	13.1	(11.3–14.9)	13.0	(11.1–14.9)	15.0	(12.6–17.4)	18.1	(14.9–21.3)
Women	9.9	(8.1–11.6)	11.4	(9.9–13.0)	12.1	(10.6–13.6)	11.8	(10.2–13.4)	12.0	(10.2–13.8)	10.8	(9.2–12.4)
Inactive												
Men	9.3	(5.9–12.7)	13.1	(10.4–15.9)	15.5	(13.2–17.8)	16.5	(14.1–18.9)	25.0	(21.1–28.9)	37.0	(32.8–41.1)
Women	19.2	(14.3–24.2)	10.6	(8.8–12.4)	9.5	(8.2–10.7)	10.0	(8.6–11.4)	17.8	(15.6–20.0)	37.2	(34.5–40.0)
Alcohol abuse												
Men	32.5	(25.7–39.3)	33.9	(30.5–37.3)	31.9	(29.1–34.7)	25.4	(22.7–28.1)	18.5	(15.5–21.4)	8.4	(6.0–10.7)
Women	14.2	(11.2–17.2)	13.0	(11.3–14.8)	10.8	(9.3–12.2)	9.8	(8.3–11.4)	4.3	(3.3–5.3)	1.5	(1.0–2.1)

Source: Surveillance System of Risk and Protective factors for Chronic Diseases by Telephone Survey (VIGITEL), Ministry of Health, Brazil
*Weighted proportion according to the 2000 Census sociodemographic distribution of the adult population in each given State capital; 95%CI – 95% confidence interval; p-value=0.05, considering design effect of the study
Fonte: MS/SVS/CGDANT – VIGITEL – Vigilância de Fatores de Risco e Proteção para Doenças Crônicas por Inquérito Telefônico
Percentuais ponderados para ajustar a distribuição sócio-demográfica da amostra VIGITEL à distribuição da população adulta de cada cidade no Censo Demográfico de 2000 e para levar em conta o peso populacional de cada cidade; IC 95% – Intervalo de confiança (p=0,05), levando-se em consideração o efeito do desenho do estudo

Table 3. Frequency* of overweight, obesity, poor self-rated health and self reported morbidity in adults, by sex and age group, in the Brazilian State Capitals and Federal District (VIGITEL, Brazil – 2009)

Tabela 3. Frequência* (%) de excesso de peso e obesidade, auto-avaliação de saúde e morbidade referida em adultos, por sexo e faixa etária, no conjunto das capitais do Brasil e no Distrito Federal (VIGITEL 2009)

	18 to 24 years		25 to 34 years		35 to 44 years		45 to 54 years		55 to 64 years		≥65 years	
	%	95%CI	%	95%CI	%	95%CI	%	95%CI	%	95%CI	%	95%CI
Excess weight												
Men	37.3	(26.7–47.9)	48.9	(45.2–52.7)	56.9	(53.8–60.0)	59.2	(55.9–62.4)	59.6	(55.4–63.8)	55.7	(51.4–60.1)
Women	24.9	(19.6–30.3)	36.0	(32.7–39.2)	45.7	(43.1–48.3)	52.9	(50.0–55.8)	59.8	(56.6–63.0)	55.0	(51.8–58.1)
Obesity												
Men	7.7	(4.7–10.6)	13.6	(10.5–16.7)	16.0	(13.8–18.3)	16.6	(14.2–19.0)	19.9	(16.4–23.4)	12.4	(9.8–15.1)
Women	6.2	(4.0–8.4)	11.9	(9.7–14.0)	15.1	(13.2–17.1)	18.1	(16.0–20.3)	21.3	(18.8–23.9)	20.4	(17.6–23.1)
Poor health self-evaluation												
Men	2.0	(0.9–3.1)	2.1	(1.1–3.1)	3.0	(1.9–4.1)	4.3	(2.9–5.7)	5.3	(3.2–7.5)	7.2	(4.7–9.6)
Women	5.9	(2.4–9.4)	5.0	(3.7–6.2)	5.6	(4.3–6.8)	6.5	(5.2–7.8)	9.8	(8.0–11.7)	8.6	(7.1–10.2)
Arterial hypertension												
Men	5.1	(3.2–6.9)	11.8	(8.8–14.7)	20.7	(18.1–23.2)	30.5	(27.5–33.5)	45.9	(41.7–50.0)	58.4	(54.2–62.6)
Women	9.7	(4.7–14.7)	15.4	(12.5–18.3)	21.0	(19.0–23.1)	37.9	(35.2–40.6)	54.0	(51.0–57.0)	66.2	(63.6–68.7)
Diabetes												
Men	0.4	(0.1–0.6)	1.3	(0.5–2.1)	3.0	(1.8–4.2)	8.0	(6.2–9.7)	17.11	(13.6–20.6)	22.7	(18.8–26.6)
Women	1.0	(0.3–1.7)	3.1	(1.0–5.3)	3.7	(2.6–4.7)	7.2	(5.7–8.7)	14.0	(12.0–16.0)	21.7	(19.3–24.0)
Heart diseases												
Men	0.2	(0.0–0.4)	0.7	(0.0–1.4)	1.3	(0.6–1.9)	2.2	(1.6–2.9)	7.9	(5.3–10.5)	12.4	(9.4–15.5)
Women	0.2	(0.0–0.5)	1.7	(0.6–2.7)	1.4	(0.9–1.9)	3.9	(2.7–5.1)	5.9	(4.6–7.2)	7.7	(6.2–9.1)
Dyslipidemia												
Men	4.4	(1.9–6.9)	7.9	(5.9–9.8)	14.9	(13.1–16.7)	23.3	(20.6–26.0)	31.2	(27.3–35.2)	26.6	(23.0–30.2)
Women	5.7	(4.2–7.3)	9.3	(7.9–10.7)	17.7	(15.9–19.6)	28.2	(25.9–30.6)	41.1	(38.2–44.0)	43.1	(40.3–45.8)

Source: Surveillance System of Risk and Protective Factors for Chronic Diseases by Telephone Survey (VIGITEL), Ministry of Health, Brazil
*Weighted proportion according to the 2000 Census sociodemographic distribution of the adult population in each given State capital; 95%CI – 95% confidence interval; p-value=0.05, considering design effect of the study
Fonte: MS/SVS/CGDANT – VIGITEL – Vigilância de Fatores de Risco e Proteção para Doenças Crônicas por Inquérito Telefônico
*Percentuais ponderados para ajustar a distribuição sócio-demográfica da amostra VIGITEL à distribuição da população adulta de cada cidade no Censo Demográfico de 2000 e para levar em conta o peso populacional de cada cidade; IC 95% – Intervalo de confiança (p=0,05), levando-se em consideração o efeito do desenho do estudo

consumption of bean and meat with visible excess fat and years of schooling. Physical activity during the leisure significantly increases among groups with 0 to 8 and 9 to 11 years of schooling, both for men and women (Table 1).

Excess weight and obesity presented different behaviors. Among men, excess weight was lower among those with an intermediate level of schooling (9 to 11 years), and among women, excess weight and obesity had higher rates in the group with a higher level of schooling.

The frequency of arterial hypertension, diabetes and heart diseases was higher among individuals with a lower level of schooling, while the frequency of dyslipidemia was higher among men with more years of schooling (Table 4).

Discussion

The results from VIGITEL 2009 point to important differences as to the prevalence of risk and protective factors of CNCD between genders and also according to age groups and schooling. Healthy behavior was observed among women, older individuals and those with a higher school level, which had been also analyzed in a previous evaluation[9,12]. Among the risk factors, men present more frequent rates of smoking, excess weight , intake of soft drinks and meat with visible excess fat and alcohol abuse. Among protective factors, men perform more leisure physical activities and regularly consume beans, while women consume more fruits, vegetables and legumes. Likewise, women also

Table 4. Frequency* of risk and protective factors of non communicable chronic diseases in adults by sex and education, in the Brazilian State Capitals and Federal District (VIGITEL, Brazil –2009)

Tabela 4. Frequência (%) de fatores de risco e proteção para doenças crônicas em adultos, por sexo e escolaridade, no conjunto das capitais do Brasil e no Distrito Federal (VIGITEL – 2009)*

	Men						Women					
	0 to 8 years		9 to 11 years		≥12 years		0 to 8 years		9 to 11 years		≥12 years	
	%	95%CI	%	95%CI	%	95%CI	%	95%CI	%	95%CI	%	95%CI
Smokers	23.4	(20.3–26.5)	14.8	(13.3–16.3)	12.5	(10.8–14.1)	15.7	(13.6–17.7)	8.5	(7.5–9.6)	9.9	(8.5–11.2)
Former smokers	31.8	(27.3–36.3)	19.1	(17.6–20.7)	23.0	(20.9–25.1)	22.1	(20.4–23.7)	12.9	(11.9–14.0)	14.4	(13.1–15.8)
Passive smokers - household	12.9	(10.7–15.2)	13.2	(11.7–14.6)	8.6	(7.0–10.1)	14.4	(12.7–16.0)	15.1	(13.7–16.5)	11.4	(9.8–12.9)
Passive smokers - workplace	21.8	(19.3–24.4)	17.8	(16.2–19.5)	8.2	(6.8–9.5)	7.5	(6.2–8.8)	9.8	(8.6–11.0)	7.2	(6.1–8.3)
Regular consumption of fruits, vegetables and legumes	19.2	(16.9–21.5)	23.9	(22.2–25.5)	41.1	(38.7–43.5)	32.6	(30.5–34.7)	33.3	(31.7–34.9)	49.5	(47.4–51.6)
Recommended consumption of fruits, vegetables and legumes	11.6	(9.8–13.3)	14.7	(13.3–16.2)	25.2	(23.1–27.4)	19.1	(17.4–20.9)	21.8	(20.3–23.2)	34.3	(32.3–36.3)
Consumption of beans	77.6	(74.7–80.5)	71.9	(70.1–73.7)	57.0	(54.6–59.4)	64.8	(62.6–67.0)	59.3	(57.6–60.9)	46.4	(44.3–48.5)
Intake of soft drinks	32.6	(27.8–37.4)	32.3	(30.3–34.3)	26.9	(24.7–29.1)	23.5	(20.9–26.1)	27.0	(25.4–28.7)	24.7	(22.7–26.7)
Consumption of meat with excess visible fat	45.0	(41.1–48.8)	44.9	(42.8–47.0)	35.0	(32.6–37.3)	25.3	(22.9–27.7)	25.3	(23.8–26.8)	19.1	(17.3–20.8)
Sufficiently active at leisure time	14.5	(12.4–16.6)	23.2	(21.4–24.9)	24.8	(22.8–26.8)	8.7	(7.6–9.7)	13.5	(12.3–14.7)	15.7	(14.4–17.1)
Inactive	18.3	(15.9–20.7)	12.2	(10.8–13.5)	15.1	(13.4–16.9)	16.0	(13.8–18.2)	12.9	(11.7–14.1)	17.7	(16.1–19.4)
Alcohol abuse	26.4	(23.2–29.6)	30.7	(28.8–32.6)	33.0	(30.7–35.3)	9.0	(7.6–10.4)	10.9	(9.9–12.0)	14.1	(12.6–15.6)
Poor health self-evaluation	4.3	(3.4–5.3)	2.1	(1.5–2.7)	1.6	(1.1–2.2)	9.2	(7.6–10.8)	3.5	(2.9–4.1)	2.0	(1.5–2.5)
Excess weight	51.7	(47.5–55.8)	46.5	(44.4–48.6)	56.7	(54.2–59.1)	50.0	(47.4–52.7)	37.2	(35.5–38.9)	31.1	(29.1–33.0)
Obesity	14.1	(11.9–16.4)	12.2	(10.9–13.5)	15.1	(13.3–16.9)	18.2	(16.4–20.0)	11.0	(10.0–12.1)	8.4	(7.3–9.4)
Arterial hypertension	24.9	(22.2–27.5)	15.4	(14.0–16.7)	18.9	(17.1–20.7)	37.3	(34.9–39.6)	16.2	(15.1–17.3)	14.9	(13.5–16.4)
Diabetes	6.7	(5.5–7.8)	3.1	(2.6–3.7)	4.7	(3.8–5.6)	9.0	(7.7–10.3)	3.1	(2.6–3.6)	3.0	(2.4–3.6)
Heart diseases	3.2	(2.5–4.0)	1.3	(0.9–1.6)	1.5	(1.1–1.9)	3.9	(3.2–4.6)	1.2	(1.0–1.4)	1.2	(0.8–1.6)
Dyslipidemia	13.1	(11.3–15.0)	13.2	(11.9–14.5)	18.9	(17.1–20.7)	22.6	(21.0–24.1)	14.6	(13.5–15.7)	17.5	(16.0–19.0)

Source: Surveillance System of Risk and Protective Factors for Chronic Diseases by Telephone Survey (VIGITEL), Ministry of Health, Brazil
*Weighted proportion according to the 2000 Census sociodemographic distribution of the adult population in each given State capital; 95%CI – 95% confidence interval; p-value=0.05, considering design effect of the study
Fonte: MS/SVS/CGDANT – VIGITEL – Vigilância de Fatores de Risco e Proteção para Doenças Crônicas por Inquérito Telefônico
Percentuais ponderados para ajustar a distribuição sócio-demográfica da amostra VIGITEL à distribuição da população adulta de cada cidade no Censo Demográfico de 2000 e para levar em conta o peso populacional de cada cidade; IC 95% – Intervalo de confiança (p=0,05), levando-se em consideração o efeito do desenho do estudo

reported arterial hypertension and dyslipidemia diagnoses more frequently, as well as poor health status.

Surveys regarding risk factors of CNCD are still recent in the country, which makes it difficult to analyze trends. However, previous studies conducted in Brazil may serve as a parameter for themes such as smoking, although the methodologies were not identical to the ones used in this study. In 1989, according to the National Health and Nutrition Survey, the prevalence of smokers was 33.1%, which came down to 17.2% in 2008 among individuals aged 15 years or older, living in different regions of the country, including the

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rural area[13,14]. This result is similar to that found by VIGITEL 2009, of 15,5% (95%CI, 14.5–16.5), considering only adults (aged ≥18 years), living in Brazilian state capitals and the Federal District. In that same year, the smoking prevalence among North-American adults was 20.6% (95%CI, 19.9–21.3)[15]. Thus, although the reduction of smoking rates has also been observed in other countries in the past few years, the intensity of the annual decrease in Brazil is considered as one of the highest in the world[16].

Also, the number of former smokers is higher after the age of 45 years, which reinforces the decreasing smoking trend in the past two decades. The decrease in smoking in Brazil and the higher smoking cessation rates are partly a result of specific policies of the National Smoking Control Program, which restricted advertising and publicity, and created educational campaigns, warnings on cigarette packets, besides the prohibition to smoke in public places, among other initiatives[16-18]. The impact of this decrease may be analyzed by the lower rates of mortality caused by trachea, bronchi and lung cancer in younger individuals and also in mortality caused by respiratory disease in the past years[19,20].

Even if based on self-reported information on height and weight, data from VIGITEL are similar to those of the Family Budget Survey of 2008-2009[21], in which excess weight was diagnosed in about half of the men and women aged 20 years or older. In the trend analysis as to gender, the prevalence rates of excess weight in the male population almost tripled; in 1974, it was 18.5%[22], and in 2009 it was 50.1%[21]; among women, the rates doubled, going from 28.7% to 48% in the same period. Obesity increased four times among men (2.8% to 12.4%) and doubled among women (from 8% to 16.9%)[21]. Likewise, the inverse relation between the prevalence of obesity and schooling observed in VIGITEL for women, and the direct relation for men, had been previously described in national studies[23,24], once again ensuring the validity of our findings. This real obesity epidemic occurring in our country is related to the increased prevalence of other risk factors, such as inadequate eating habits (high intake of saturated fat, low intake of fruit, vegetables and legumes) and the low rates of physical activity in the population[25,26].

The high frequency of excess weight and obesity in the elderly may be a result of a sedentary lifestyle and a caloric intake, besides genetic and metabolic factors. The consequence is the increased morbidity and mortality rates due do chronic diseases, such as diabetes and arterial hypertension[11,12,20], which justifies the investment in actions related to healthy eating promotion and encouragement to physical activity[27]. Estimates are that, if the current trend continues, in ten years Brazil will reach the numbers of United States, where almost one third of the population is obese, and the prevalence increases in at a slower pace[28].

VIGITEL results also point to the low levels of physical activity in the country. It is emphasized that leisure physical activity decreases with age, but men with high levels of schooling are more active, which has been observed in other studies[25,29,30]. The the increased rates of obesity and the development of different types of chronic diseases, such as heart disease, diabetes and cancer[31]is related to the lack of physical activity. Despite the efforts to promote leisure physical activity, prevalence rates of physical activity and sedentary lifestyle have not had significant changes throughout the years.[11]

Evidence as to the benefits of healthy diets to prevent CNCD has been established. According to WHO, the insufficient intake of fruits, vegetables and salad (daily intake lower than 400 g or approximately 5 servings a person) causes 2.7 million deaths a year, 31% of ischemic heart diseases, 11% of cerebrovascular diseases, and 19% of gastrointestinal cancers in the world[2,27]. VIGITEL showed that only 30.4% of the adult population regularly consumes fruits, vegetables and salads, and only

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18.9% of the adult population reached the levels recommended by WHO[27]. Besides, almost one third of the population regularly consumes meat with fat and soft drinks. The intake of beans is highly prevalent, especially among men, although it has presented a decreasing trend in the past few years for both genders[11,32]. Usually, women have better diets than men, but such habits also improve with higher levels of education and aging, in accordance with previous studies[33,34]. The healthy intake of food in populations with higher levels of schooling may be explained by the access to information in order to adopt healthier habits[35], as well as the higher income to choose for food items[36].

Alcohol abuse is a concern in the Brazilian adult population, especially among young men. Besides being a risk factor of hypertension, cirrhosis, stroke and cancer, alcohol consumption is associated with high rates of violence and accidents.

The poor health status self-evaluation was more prevalent among women and older age groups, which is similar to the findings of the recent National Household Sample Survey. This feature was expected because it measures the health status of populations, access to medical care, and the impact of diseases on the quality of life of individuals; besides, this indicator has been considered as an important mortality predictor, especially for the elderly population.

In relation to morbidity conditions, the prevalence of medical diagnoses of arterial hypertension, diabetes, heart disease and dyslipidemias is higher among women, which can be explained because more women seek medical care. The National Household Sample Survey also showed a high percentage of chronic disease in women, and even higher in older age groups. Considering that men present more risk factors such as smoking, alcohol consumption, excess weight and inadequate diets, the lowest self-reported chronic disease in men could be explained by the fact that men worry less about health and do not seek medical care as much, which results in higher morbidity and mortality rates and a lower life expectancy. This scenario contributed to the establishment of the Brazilian national policy for the health of men, in 2009. The goal was to broaden the access for the male population to medical care and preventive exams[40].

Hypertension is the most frequent chronic disease in the results of health surveys. However, the identified values presented variations according to the methodology used and the studied period[30,41]. Because it is limited to a reported diagnosis of the adult population living in Brazilian state capitals and the Federal District, where the access to diagnostic tests is easier, VIGITEL tends to present higher frequencies when compared to broader surveys, like the National Household Sample Survey. However, it is still underestimated when compared to surveys conducted with biomedical measurements for diagnosis[26,42,43].

At VIGITEL, diabetes was mostly reported by individuals aged 45 years or older, which is similar to the age group that presents the highest disease load in terms of Disability Adjusted Life Years (DALYs)[44]. In relation to the prevalence of arterial hypertension, most population studies did not find a difference among genders[45], unlike the results in this study and in the Bambuí survey (MG)[46], in which it was more prevalent among women. Other studies[34,45,47] also show that the higher prevalence in older age groups and in the population with a lower education level is a condition.

Limiting factors of this study are: the sample was restricted to individuals living in Brazilian state capitals and the Federal District who own a telephone landline, because there are differences in Brazil regarding telephone coverage; the use of self-reported information to estimate the frequency of diseases such as arterial hypertension and diabetes, whose diagnoses depend on the access to medical care, and this also presents regional differences;

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the cross-sectional study does not allow the cause-effect evaluation. VIGITEL is based on weighting factors to adjust estimates from the telephone survey in order to correct the differences among the population who own and those who do not own a telephone line. The objective is to extrapolate the results for the total population of the assessed locations[9,11]. In relation to the use of reported morbidity, previous studies conducted in the United States and in Brazil showed that despite the possible underestimation or false reports, this kind of measuring is valid[26,39,48].

Telephone surveys are useful to bring fast and low cost information[4], thus becoming an important tool to monitor risk and protective factors of chronic non-communicable diseases and actions of health promotion, as well as the impacts on health policies addressed to face risk and control factors of chronic diseases.

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