Comparison of estimates for the self-reported chronic conditions among household survey and telephone survey – Campinas (SP), Brazil

Comparação de estimativas para o autorrelato de condições crônicas entre inquérito domiciliar e telefônico – Campinas (SP), Brasil

Priscila Maria Stolses Bergamo Francisco[I]
Marilisa Berti de Azevedo Barros[I]
Neuber José Segri[II]
Maria Cecília Goi Porto Alves[III]
Chester Luiz Galvão Cesar[II]
Deborah Carvalho Malta[IV,V]

[I]Department of Preventive and Social Medicine, Faculty of Medical Sciences, *Universidade Estadual de Campinas* (UNICAMP) – Campinas (SP), Brazil.

[II]Department of Epidemiology, Faculty of Public Health, *Universidade de São Paulo* (USP) – São Paulo (SP), Brazil.

[III]Health institute of Secretary of State for Health – São Paulo (SP), Brazil.

[IV]*Coordenação de Doenças e Agravos Não Transmissíveis,* Secretary of Health Surveillance, Health Ministry – Brasília (DF), Brazil.

[V]Department of Maternal Child Nursing and Public Health, Nursing School of *Universidade Federal de Minas Gerais* (UFMG) – Belo Horizonte (MG), Brazil.

Study carried out at the Collaborative Center in Health Situation Analysis of the Health Ministry, Department of Preventive and Social Medicine, Faculty of Medical Sciences of *Universidade Estadual de Campinas* (UNICAMP).
Financial Support: National Council for Scientific and Technological Development (CNPq – Process nº 409747/2006-8) and County Health Secretary of Campinas.
Correspondence to: Priscila Maria Stolses Bergamo Francisco – Departament of Preventive and Social Medicine, Faculty of Medical Sciences, *Universidade Estadual de Campinas* (UNICAMP) – Caixa Postal 6.111 – CEP: 13083-970 – Campinas (SP), Brazil - E-mail: primaria@fcm.unicamp.br.
Conflict of interest: nothing to declare.

Abstract

Objective: To compare the estimates obtained by different methods of population-based surveys for self-reported chronic conditions among adults living in Campinas in the year 2008. **Methods**: Data from ISACamp Survey, conducted by the Faculty of Medical Sciences from *Universidade Estadual de Campinas* (UNICAMP) with support from the County Health Department and VIGITEL (Campinas), a telephone survey conducted by the Brazilian Ministry of Health toward Surveillance of Risk and Protective Factors for Chronic non-communicable Diseases in the adult population (18 years and over) were analyzed. Estimates of self-reported hypertension, diabetes, osteoporosis, and asthma/bronchitis/emphysema were evaluated and compared by the independent (two-sample) Student's *t*-test. **Results:** For global estimates, a higher prevalence of hypertension and osteoporosis was ascertained by the telephone survey. Diabetes and asthma/bronchitis/emphysema results showed no statistically significant differences. According to sociodemographic variables, a higher prevalence of hypertension was obtained by VIGITEL for men, among people aged 18 to 59 years, and those who reported nine or more years of schooling. A higher prevalence of osteoporosis among adults (18 to 59 years) was verified by VIGITEL. Concerning asthma/bronchitis/emphysema in the elderly, ISACamp survey showed a higher prevalence. **Conclusion:** Except for the hypertension prevalence, the telephone survey has proven to be a rapid alternative to provide global prevalence estimates of health conditions in the adult population of Campinas.

Keywords: prevalence; comparison of estimates; chronic diseases; health surveys; Brazil; face-to-face interview; telephone interview.

Resumo

Objetivo: O objetivo do presente estudo foi comparar as estimativas obtidas por diferentes modalidades de inquérito para condições crônicas auto-referidas em adultos residentes em Campinas (SP) no ano de 2008. **Métodos:** Foram utilizados os dados do ISACamp, inquérito domiciliar realizado pela Faculdade de Ciências Médicas da Universidade Estadual de Campinas com apoio da Secretaria Municipal de Saúde, e do VIGITEL – Campinas (SP), inquérito telefônico realizado pelo Ministério da Saúde para Vigilância de Fatores de Risco e Proteção para Doenças Crônicas na população adulta (18 anos ou mais). Estimativas do auto-relato de hipertensão arterial, diabetes, osteoporose, asma/bronquite/enfisema, foram avaliadas e comparadas por meio do teste *t* de Student para duas amostras independentes. **Resultados:** Para as estimativas globais, maior prevalência de hipertensão arterial e osteoporose foram verificadas pelo inquérito telefônico. Diabetes e asma/bronquite/enfisema não apresentaram diferenças estatísticas significantes. Na análise segundo variáveis sócio-demográficas, maior prevalência de hipertensão foi obtida pelo VIGITEL para os homens, entre as pessoas de 18 a 59 anos e nos que referiram 9 ou mais anos de estudo. Maior prevalência de osteoporose entre adultos (18 a 59 anos) foi verificada pelo VIGITEL. Em relação à asma/bronquite/enfisema nos idosos, maior prevalência foi observada pelo ISACamp. **Conclusão:** Exceto para hipertensão arterial, os dados obtidos do inquérito telefônico constituíram uma alternativa rápida para disponibilizar estimativas globais da prevalência das condições estudadas na população adulta residente em Campinas (SP).

Palavras-chave: prevalência; comparações de estimativas; doença crônica; inquéritos epidemiológicos; Brasil; entrevista domiciliar; entrevista por telefone.

Introduction

Population surveys are widely used for epidemiological studies in order to produce the necessary information to articulate and assess social policies and interventions in the health field[1]. To perform such studies, data collection methods have improved with time[2], and telephone interviews have proved to be an effective and low-cost process[3,4].

Thus, the validation of estimates obtained by telephone surveys demands specific methodologies to answer questions regarding the representativeness of the sample collected by means of telephone records, the impact that varied coverage of residential telephone lines may have on such estimates, and in order to measure the differences between the population excluded from the sample (those who do not possess a telephone) and the ones who were included in the sample in relation to the investigated events, although it is possible to use weighting factors and to adjust the estimates to represent the sociodemographic composition of the studied population[5,6].

Comparison between indicators obtained in household and telephone surveys has started in the United States ever since the latter began to be frequently used. The Behavioral Risk Factor Surveillance System (BRFSS), which has been conducted by the Centers for Disease Control and Prevention (CDC) since the early 1980s aiming at the collection of data on risk factors for the adult population, has been using this methodology and presenting valid results[5].

Chronic Non-Communicable Diseases (CNCD) have been considered as the main cause of morbidity and mortality in the last decades throughout the world[7]. Periodic population surveys allow the monitoring of the prevalence and the main risk factors of these conditions, as well as the assessment of the impact of large-scale interventions, aiming at the primary prevention of these diseases[8].

The use of questionnaires to obtain self-reported information is a low-cost, accessible and fast strategy to estimate prevalence, in spite of being subjected to classification errors sources. However, the accuracy of self-reported information depends on the characteristics of the questionnaire, the form of application, the ability of the interviewers, and on the population to which it is applied[9].

Population surveys must be part of the national health information system, being essential to monitor the conditions and health situation using the indicators that are not available in secondary databases of the information systems[10]. However, the assessment of information originated from different types of survey becomes necessary to improve the system.

The objective of this study was to compare the prevalence estimates obtained from different types of survey for hypertension, diabetes, osteoporosis and asthma/bronchitis/emphysema in adults living in Campinas (SP), Brazil.

Methods

Data used in this study were obtained from the Health Survey in the city of Campinas (ISACamp), conducted by the Collaborative Center in Health Situation Analysis of the Health Ministry, Department of Preventive and Social Medicine of the Faculty of Medical Sciences of *Universidade Estadual de Campinas* (UNICAMP), and by VIGITEL-Campinas (Telephone-based Surveillance of Risk and Protective Factors for Chronic Diseases), conducted by the Secretary of Health Surveillance, Health Ministry, both in 2008.

ISACamp

In the period between April 2001 and March 2002, the Health Survey was conducted in the state of São Paulo (ISA-SP), which was a cross-sectional study that aimed at analyzing life conditions, health status and access to health care in different areas of the State of São Paulo by means of household surveys[11]. The project was approved by the Program of Public Policies of São Paulo Research Foundation (FAPESP) and covered four areas of the state: two in the countryside – cities of Botucatu and Campinas – two in the region of São Paulo – sub-prefecture of Butantã (city of São Paulo), and in one area that includes three cities of the southwest São Paulo metropolitan area – Taboão da Serra, Embu and Itapecerica da Serra. Based on this study. A new health survey was conducted in the city of Campinas (ISACamp) in 2008 with content review and the applied questionnaire.

ISACamp was designed to analyze health status profiles, lifestyle (risk factors for chronic diseases), and access to health care services by different social segments of the population, and to evaluate social equality/inequality in the city, that is, to monitor indicators of health and social inequalities.

Data were obtained by a population-based household survey, as to the non-institutionalized resident population aged 18 years or more, and 90.4% of the interviews were performed in 2008. The objective of the study is to analyze aspects regarding three sub-groups of this population: adolescents, adults and the elderly. Thus, the population was divided into three groups that comprised study domains, for which independent samples were selected.

The survey sample was obtained by stratified probability sampling in clusters and in two stages: census-tract and household. In the first stage, 50 census-tract were drawn with the probability of being proportional to the number of households. The draw was systematic, and the sectors were organized according to the percentage of heads of family who had a college degree, thus generating an implicit educational stratification among them.

The size of the sample was determined considering the situation that

corresponded to the maximum variability for the frequency of the studied events (p=0.50), 95% confidence interval (z=1.96), sampling error between 4 and 5 percentage points and design effect of 2, which resulted in 1,000 individuals in each age domain: adolescents (10 to 19 years), adults (20 to 59 years) and elderly (60 years or more). At the expectation of an 80% rate of coverage and response, the sample size was changed to 1,250. In order to reach this size in each domain, after the updating field maps of the selected sectors and the creation of a list of addresses, the number of 2,150, 700 and 3,900 households for adolescents, adults and elderly were independently selected. In each household, trained and supervised interviewers collected information from all the participants at the selected age group for that specific household.

The questionnaire, which had been previously tested at a pilot study, had mostly closed and predefined questions. It was organized in blocks, according to some thematic fields: health status, access to health care, health-related behavior and socioeconomic conditions. Data were then entered on EpiData 3.1 software, which was also used to assess the database consistency. Afterwards, the Stata 11 software was used to calculate sampling weights considering complex design, non-response and post-stratification adjustment.

VIGITEL

In 2006, the VIGITEL system (Surveillance System of Risk and Protective Factors for Chronic Non-Communicable Diseases through Telephone Interviews) was established in Brazil aiming at the continuous monitoring of frequency and distribution of risk and protective factors for chronic diseases in the capitals of all Brazilian states and Federal District of Brazil. It consisted of telephone interviews assisted by computers in probability samples of the adult population (18 years or more) resident in households of each city and owning a telephone line[12].

The Health Ministry chose the city of Campinas to conduct the telephone survey (VIGITEL – Campinas) since ISACamp would be performed in the same year.

For data collection, a probability sample of the adult population was conducted in two phases: telephone line draw and the draw of the household resident to be interviewed. These procedures aimed at getting samples of adults living in the households with at least one telephone line in that year[12]. Minimum sample size of 2,000 individuals aged 18 years or more enables estimates with a confidence coefficient of 95% and maximum error of 2%, which is the frequency of any risk factor in the adult population[13].

At first, the systematic draw of 5,000 telephone lines starting from the electronic record of the residential lines at Telefônica, organized by prefixes, led to the implicit stratification by regions of the city. Afterwards, the selected lines were drawn again and divided into 25 replicates of 200 lines, each one reproducing the same proportion of lines per telephone prefix. This division was necessary due to the difficulty to previously estimate the proportion of lines that were eligible for the system (active residential lines), that is, the total of lines required to achieve 2,000 interviews[12].

In Campinas, 4,800 telephone lines distributed in 24 replicates received phone calls, and 2,773 eligible lines were identified. For each eligible line, after the users agreed to participate, the individuals of each household aged 18 years or more were listed and selected for the interviews[12].

The questionnaire was developed to enable the option to perform the telephone interviews with computers – in these interviews, all the questions are read directly from the screen, and the answers are instantaneously typed. VIGITEL questions addressed demographic and socioeconomic characteristics, eating

habits, physical activity associated with CNCD, weight and height, smoking and drinking frequency, self-rated health and reports of their past medical history[14].

Weighting factors were used to decrease the bias created by the non-universal coverage of telephone line. The final weight given to each interviewed individual is the result of the multiplication of the following factors: the inverse of the number of telephone lines in the participant's household, the number of adults in the participant's household and the ratio between the relative frequency of individuals present in the 2000 Census and the relative frequency in the studied sample (already considering the two first factors); taking into account 36 strata of the population: as to sex (male or female), age group (18–24, 25–35–44, 45–54, 55–64 and 65 years or more), and schooling (0–8, 9–11 and 12 years or more)[12].

Study

In order to perform this study, 2,636 non-institutionalized adults (aged 18 years or more) living in the urban area of Campinas sampled by ISACamp in 2008, and 2,015 individuals (aged 18 years or more) interviewed by VIGITEL-Campinas were included.

In the analyzed databases, post-stratification adjustment considered the sociodemographic composition according to the 2000 Census, based on ISACamp data, which was the same weighting strategy previously described, also used by VIGITEL[12].

Sex, age group and schooling were used to analyze the population. The variables to assess and compare the estimates were: hypertension, diabetes, osteoporosis and asthma/bronchitis/emphysema. At ISACamp, the information was obtained with the following question: "Has any doctor or health professional ever said you had any of the following diseases?". The response categories were "yes", "no" and "do not know". At VIGITEL, the questions to collect such conditions/diseases were: "Has any doctor ever said you had high blood pressure? What about diabetes and osteoporosis (disease/bone weakness)? And diseases such as asthma, asthma bronchitis, chronic bronchitis or emphysema?". In this case, the responses could be "yes", "no", or "not to my recollection".

In this study, the differences between surveys were estimated by a combined data file. Thus, the variables of both databases were renamed and classified according to values that were equal for the same response category, enabling comparative analyses[15].

Prevalence and 95% confidence intervals were calculated for selected variables obtained from both survey types. As to the previously mentioned chronic diseases, estimates according to sex, age group and schooling were also calculated. The statistical difference between ISACamp and VIGITEL-Campinas estimates was ascertained by the independent (two-sample) t-test[15]. Aspects such as complex sample design were considered and analyzed by Stata 11 software[6].

The household survey research project was approved by the Ethics Committee of *Universidade Estadual de Campinas* (Report nº 079/2007), and the establishment of VIGITEL was approved by the National Committee of Ethics in Research, Health Ministry (CONEP 13081/2008).

Results

The mean age of the adults interviewed by ISACamp (n=2,636) was 40.1 years old (95%CI: 39.0–41.3), and of those interviewed by VIGITEL-Campinas (n=2,015) was 39.9 years old (95%CI: 38.9–40.9). Response rates were 85.6% and 72.7% (performed interviews/eligible lines) by household and telephone surveys, respectively.

Sociodemographic characteristics of participants in both surveys

are demonstrated in Table 1. There are similarities in the analyses regarding sex, age group and schooling, due to the weighting recalculation of ISACamp database, according to the sociodemographic structure used by VIGITEL. More than half of the participants were women, and there were mostly young adults.

In relation to the prevalence of the chronic conditions selected in this study, a higher prevalence of arterial hypertension and osteoporosis was detected on the population aged 18 years or more at the telephone survey. The prevalence of diabetes and asthma/bronchitis/emphysema was similar (Table 2).

The prevalence regarding sociodemographic variables is shown in Table 3. Telephone survey data pointed to a higher prevalence of arterial hypertension among men (p=0.023), people aged between 18 and 59 years (p=0.005) and those who reported 9 to 11 (p=0.029) and 12 or more (p=0.014) years of study. Likewise, the

Table 1. Frequency distribution of adult population (≥18 year of age), according to sociodemographic characteristics. ISACamp and VIGITEL. Campinas, 2008

Tabela 1. *Distribuição percentual da população adulta (18 anos ou mais), segundo características sócio-demográficas. ISACamp e VIGITEL. Campinas, 2008*

Variables and categories	ISACamp		VIGITEL	
	n	(%)[1]	n	(%)[1]
Sex				
Male	1,141	47.9 (45.6–50.2)	851	47.9 (44.8–51.0)
Female	1,495	52.1 (49.8–54.4)	1,164	52.1 (49.0–55.2)
Age group (years)				
18 to 24	321	19.4 (17.0–21.8)	240	19.4 (16.3–22.5)
25 to 34	273	24.5 (21.1–27.9)	379	24.5 (21.6–27.4)
35 to 44	222	21.8 (19.2–24.5)	471	21.8 (19.6–24.1)
45 to 54	206	15.6 (13.2–17.9)	360	15.6 (13.7–17.4)
55 to 64	570	9.5 (7.9–11.2)	275	9.5 (8.2–10.9)
65 and more	1,044	9.1 (7.6–10.7)	290	9.1 (7.9–10.4)
Schooling				
0 to 8 years	1,568	54.5 (48.1–60.9)	711	54.6 (51.6–57.5)
9 to 11 years	528	25.7 (22.5–28.9)	703	25.6 (23.4–27.8)
12 years or more	540	19.8 (13.5–26.1)	592	19.8 (18.0–21.7)

n – number of individuals in the unweighted sample;[1]prevalence in the weighted sample.
n – número de indivíduos na amostra não ponderada; [1]prevalência na amostra ponderada

Table 2. Prevalence of chronic conditions in the adult populations (≥18 year of age). ISACamp and VIGITEL. Campinas, 2008

Tabela 2. *Prevalência de condições crônicas na população adulta (18 anos ou mais). ISACamp e VIGITEL. Campinas, 2008*

Variables and Categories	ISACamp		VIGITEL		Estimated difference		p*
	n	%[1] (95%CI)	n	%[1] (95%CI)	%	(95%CI)	
Chronic Conditions[1]							
Hypertension	959	18.6 (16.8–20.4)	533	22.3 (20.0–24.6)	-0.038	(-0.067– -0.009)	0.011
Diabetes	369	5.9 (4.6–7.2)	140	6.0 (4.8–7.2)	-0.001	(-0.019–0.017)	0.944
Osteoporosis	241	2.7 (2.0–3.3)	102	3.8 (2.9–4.7)	-0.011	(-0.022– -0.006)	0.039
Asthma, bronchitis or emphysema	136	3.9 (2.8–5.0)	63	3.3 (2.2–4.3)	0.006	(-0.009–0.021)	0.434

*Differences between ISACamp and VIGITEL-Campinas, based on Student's t-test for two independent samples;[1]prevalence in the weighted sample
**Diferenças entre o ISACamp e o VIGITEL-Campinas, baseada no teste t de Student para duas amostras independentes;[1]prevalência na amostra ponderada*

Table 3. Prevalence of chronic conditions in the adult population (≥18 year of age), according sociodemographic variables. ISACamp and VIGITEL. Campinas, 2008

Tabela 3. *Prevalência de condições crônicas na população adulta (18 anos ou mais), segundo variáveis sócio-demográficas. ISACamp e VIGITEL. Campinas, 2008*

	Arterial hypertension (%)[1]		Diabetes (%)[1]		Osteoporosis (%)[1]		Asthma/bronchitis/ emphysema (%)[1]	
	ISACamp	VIGITEL	ISACamp	VIGITEL	ISACamp	VIGITEL	ISACamp	VIGITEL
Sex								
Male	15.5 (13.0–18.0)	20.4 (17.0–23.8)*	4.9 (3.4–6.5)	4.9 (3.3–6.5)	0.9 (0.4–1.5)	1.4 (0.5–2.3)	3.4 (2.0–4.7)	2.1 (1.0–3.2)
Female	21.4 (18.9–23.8)	24.1 (21.0–27.2)	6.8 (5.2–8.5)	6.9 (5.2–8.7)	4.3 (3.2–5.3)	6.0 (4.6–7.4)	4.3 (2.6–6.0)	4.4 (2.7–6.1)
Age group (years)								
18 to 59	13.0 (11.2–14.8)	17.2 (14.8–19.6)*	3.3 (1.9–4.7)	4.0 (2.9–5.2)	0.7 (0.2–1.2)	1.6 (0.9–2.2)*	3.5 (2.3–4.8)	3.5 (2.3–4.6)
60 or more	53.4 (50.1–56.6)	54.8 (49.0–60.5)	21.9 (19.5–24.2)	18.2 (13.8–22.6)	14.8 (12.3–17.2)	17.8 (13.4–22.2)	6.1 (4.3–7.8)	2.0 (0.6–3.4)*
Schooling								
0 to 8 years	25.7 (22.4–29.0)	28.3 (24.3–32.2)	8.4 (6.1–10.7)	8.2 (6.1–10.2)	4.1 (2.9–5.3)	5.4 (3.9–6.9)	4.2 (2.5–5.8)	3.8 (2.1–5.5)
9 to 11 years	9.6 (6.3–12.9)	14.3 (11.7–17.0)*	2.6 (1.0–4.2)	3.0 (1.6–4.3)	0.8 (0.2–1.4)	1.7 (0.8–2.6)	3.5 (1.6–5.4)	3.0 (1.6–4.3)
12 years or more	10.5 (7.5–13.5)	16.1 (12.8–19.5)*	3.3 (1.8–4.8)	3.7 (2.0–5.4)	1.1 (0.5–1.7)	1.8 (0.8–2.9)	3.6 (1.6–5.6)	2.2 (0.9–3.5)

*Significant difference (p<0.05) and between ISACamp and VIGITEL-Campinas, based on Student's t test for two independent samples; [1]prevalence in the weighted sample

**Diferença significativa (p<0,05) entre o ISACamp e o VIGITEL-Campinas, baseada no teste t de Student para duas amostras independentes; [1]prevalência na amostra ponderada*

prevalence of osteoporosis was higher for the group aged between 18 and 59 years (p=0.004). In relation to asthma/bronchitis/emphysema in the elderly, a higher prevalence (p<0.001) was observed in the household survey.

Discussion

ISACamp and VIGITEL surveys have different sample designs and data collection methods, but there are some similarities too. Both were performed in 2008, which reduces the seasonal trend, and comprised similar questions for many measurements, such as the investigated chronic conditions. In this study, household and telephone surveys presented similar global results for the prevalence of self-reported diabetes and asthma/bronchitis /emphysema. A higher prevalence of hypertension and osteoporosis was estimated by the telephone survey.

Population surveys are important sources of information in the health field[1,10] and and it is important to increase knowledge of strategies and instruments used, such as face-to-face interviews, telephone surveys, self-applicable questionnaires, which are sent by mail, and others. Many authors consider the face-to-face interview as the method of choice or gold standard for data collection; however, some studies have shown that it is similar to other strategies[5,17].

According to some studies, the accuracy of the self-reported morbidity

may vary according to the analyzed pathology, presence of comorbidities, severity of the disease, and socio-demographic characteristics[18-22]. The recognition of the disease by the individual still depends on the level of perception of signs and symptoms, the access to health care services and diagnostic tests, as well as the type and quality of information provided by health professionals.

Arterial hypertension is considered to be one of the leading risk factors for non-communicable diseases[9], and is also seen as morbidity for others. The validity of the self-reported information for arterial hypertension is widely described in literature[9,18,19,21,23,24]. Besides, for the female gender, characteristics such as older age, overweight and use of health services are described as factors which increase the validity of self-reported hypertension[9,21,23,24]. With regard to the comparison of estimates about the prevalence of the disease in surveys, Nelson et al.[5] observed significant differences for the population aged 18 to 34 years (higher prevalence in the telephone survey) and for those who are older than 55 years (higher prevalence in the household survey), according to data from the National Health Interwiew Survey (NHIS) and Behavioral Risk Factor Surveillance System (BRFSS). Authors did not find differences related to gender or schooling.

Among chronic non-communicable diseases, diabetes stands as the most important cause of morbidity and mortality, especially among the elderly. For Cicrelli et al.[18] and Okura et al.[19], the self-reported response for diabetes is highly accurate. However, to investigate the validity of the self-reported information among the elderly who participated in *Projeto Bambuí,* Lima-Costa et al.[22] registered a sensitivity of 57.1% and high specificity (96.0%), and observed that schooling and adequate access to health care services were essential to enable the elderly to inform his or her diabetes condition correctly. A study from Holland, conducted with individuals aged 18 years or more found sensitivity and specificity of 58.9 and 99.4%, respectively, for self-reported diabetes[20]. In the data analysis from NHIS and BRFSS, collected in 1997, some differences as to the estimates for the prevalence of diabetes among people aged 55 years or more, and also among men (higher prevalence in NHIS)[5], were identified. Data from BRFSS (2004), NHIS and the *National Health and Nutrition Examination Survey* (NHANES) showed no differences in global estimates regarding sex, age and schooling[17].

Although osteoporosis is the most common osteometabolic disorder, there are few studies on its prevalence in the country[25]. For Martini et al.[26], racial, genetic, anthropometric, social, cultural, economic and nutritional differences, besides the access to health care services in different countries, are factors that could explain the divergences as to the incidence and the prevalence of the disease. This study showed the importance of the disease, especially among women and older people, just as it has been ascertained by other studies[25,26]. No study regarding the validation study of self-reported osteoporosis was found, but it is noteworthy that conditions with more precise diagnostic criteria are more prone to reliable reports than those with less clear criteria and/or less disabling pathologies. No study comparing prevalence estimates of osteoporosis with data from household and telephone surveys was found.

As to respiratory conditions, some authors emphasize the validity of self-reported respiratory symptoms, asthma and chronic obstructive pulmonary disease in surveys, with adequate sensitivity and specificity in population screenings, which may indirectly reflect on the real prevalence in the community[27,28]. Fahimi et al.[17] found global differences when comparing prevalence estimates of self-reported asthma and sociodemographic characteristics, such as: age, sex, race and schooling ($p<0.001$). The telephone survey data (BRFSS) presented a higher

prevalence in relation to household survey (NHIS).

Chronic disease estimates based on self-reported morbidity present the short time to receive the information and low-cost as advantages, especially in telephone surveys, which can be employed in large populations. However, among the limitations imposed by this kind of research, it is important to consider that the data are subject to interpretation, since they depend on the knowledge of the participants, their ability to remember, and motivation to inform. Besides, the disease may not have been diagnosed, that is, the prevalence of morbidity or the investigated chronic condition may be underestimated[29,30].

In the past decades, population-based studies have gained strength among the research field due to its effectiveness to measure modifiable risk factors. The results of this study have shown the potential of the surveys to obtain information on the studied chronic conditions. The similarity of the results also shows the adequacy of the instrument, since both studies were conducted with different sample designs. Chrestani, Santos and Matijasevich[9] point to the need to standardize the question for comparing information in different surveys. In addition, the order of the questions may also influence the results[5].

Among the limitations of the telephone survey, the fact that the sample was restricted to those who have a telephone line must be considered. However, in the city of Campinas, telephone coverage is satisfactory, which enables proper population estimates, as pointed out by Bernal and Silva[6]. Also, the use of expansion factors can reduce the bias, which approximates the study sample of the total population[6]. Within the advantages of this type of survey, the agility of the system to support health programs and policies , as well as the low-cost feature, are emphasized. On the other hand, household surveys are more expensive due to the training of the interviewers and the costs of transportation to perform the interviews. However, it reaches the population with and without a telephone line, and ascertains the conditions of life of the participant *in loco*, which makes the answers more reliable and allow the interview to be longer.

The importance of this study lies on the fact that it is one of the first in the country, and even in the international literature, which compares information from surveys using different data collection techniques and sample designs, however, both were conducted in the same period, region and used similar questions to obtain information on the analyzed chronic conditions, which enables comparison.

For Barros[10], local health surveys provide opportunities to experiment and validate instruments. Choosing one or the other survey will depend on the situation for which the estimates will be used.

Conclusion

There are limitations regarding the comparison of surveys, such as the sample design, non-standardized questions, time of questionnaire application, order of the questions, among others, which may change the estimates, that is, the measurements may vary according to the strategies used to collect information[5,17].

However, this study revealed that the telephone survey is a fast alternative that provides prevalence estimates of chronic conditions and presents results that are similar to those of the household survey. Periodic studies comparing data from telephone and household surveys in regions and locations with difference in coverage are important to evaluate and monitor the validity of VIGITEL system.

Moreover, further comparisons of estimates on chronic conditions and modifiable risk factors for chronic non-communicable diseases, obtained through different types of surveys in other populations are needed to generalize the findings of this study.

References

1. Viacava F. Informações em saúde: a importância dos inquéritos populacionais. Ciênc Saúde Coletiva. 2002;7(4):607-21.

2. Cesar CLG, Barata RB. Editorial Rev Bras Epidemiol. 2008;11Suppl 1:3-5..

3. Lavrakas PJ. Telephone survey methods: sampling, selection and supervision. London: Sage Publications, 1990.

4. Monteiro CA, Moura EC, Jaime PC, Lucca A, Florindo AA, Figueiredo ICR, et al. Monitoramento de fatores de risco para as doenças crônicas por entrevistas telefônicas. Rev Saúde Pública. 2005;39(1):47-57.

5. Nelson DE, Powell-Griner E, Town M, Kovar MG. A comparison of national estimates from the National Health Interview Survey and the Behavioral Risk Factor Surveillance System. Am J Public Health. 2003;93(8):1335-41.

6. Bernal R, Silva NN. Cobertura de linhas telefônicas residenciais e vícios potenciais em estudos epidemiológicos. Rev Saude Publica. 2009;43(3):421-6.

7. The World Health Report, 2002: reducing risks, promoting healthy life. Geneva: World Health Organization , 2002.

8. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de Análise de Situação de Saúde. Guia metodológico de avaliação e definição de indicadores: doenças não transmissíveis e Rede Carmem. Brasília: Ministério da Saúde, 2007.

9. Chrestani MA, Santos IS, Matijasevich AM. Hipertensão arterial sistêmica auto-referida: validação diagnóstica em estudo de base populacional. Cad Saúde Pública. 2009;25(11):2395-2406.

10. Barros MBA. Inquéritos domiciliares de saúde: potencialidades e desafios. Rev Bras Epidemiol. 2008;11 Suppl 1:6-19.

11. Cesar CLG, Carandina L, Alves MCGP, Barros MBA, Goldbaum M. Saúde e condição de vida em São Paulo: inquérito multicêntrico de saúde no Estado de São Paulo –ISA-SP. São Paulo: USP/FSP; 2005. 212p.

12. Ministério da Saúde. VIGITEL Brasil 2006. Vigilância de fatores de risco e proteção para doenças crônicas por inquérito telefônico: estimativas sobre freqüência e distribuição sócio-demográfica de fatores de risco e proteção para doenças crônicas nas capitais dos 26 estados brasileiros e no Distrito Federal em 2006. Brasília: Ministério da Saúde; 2007.

13. Lwanga SK, Lemeshow S Sample size determination in health studies: a practical manual. Geneva: World Health Organization,1991.

14. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Secretaria de Gestão Estratégia e Participativa. VIGITEL Brasil, 2008: vigilância de fatores de risco e proteção para doenças crônicas por inquérito telefônico. Brasília: Ministério da Saúde, 2009.

15. Lee S, Davis WW, Nguyen HA, McNeel TS, Brick JM, Flores-Cervantes I. Examining trends and averages using combined cross-sectional survey data from multiple years. CHIS Methodology Paper, 2007. [cited 2011 Jun 02]. Available from: http://www.chis.ucla.edu/pdf/paper_trends_averages.pdf.

16. Kish L. Survey sampling. New York: John Wiley and Sons; 1965.

17. Fahimi M, Link M, Schwartz DA, Levy P, Mokdad A. Tracking chronic disease and risk behavior prevalence as survey participation declines: statistics from the Behavioral Risk Factor Surveillance System and other national surveys. Prev Chronic Dis. 2008;5(3):A80.

18. Cricelli C, Mazzaglia G, Samani F, Marchi M, Sabatini A, Nardi R, et al. Prevalence estimates for chronic diseases in Italy: exploring the differences between self-report and primary care databases. J Public Health Med. 2003;25(3)254-7.

19. Okura Y, Urban LH, Mahoney DW, Jacobsen SJ, Rodeheffer RJ. Agreement between self-reported questionnaires and medical record data was substantial for diabetes, hypertension, myocardial infarction and stroke but not for heart failure. J Clin Epidemiol. 2004;57(10):1096-103.

20. Barros MBA, Cesar CLG, Carandina L, Torre GD. Desigualdades sociais na prevalência de doenças crônicas no Brasil, PNAD-2003. Ciênc Saúde Coletiva. 2006;11(4):911-26.

21. Molenaar EA, Van Ameijden EJ, Grobbee DE, Numans ME. Comparison of routine care self-reported and biomedical data on hipertension and diabetes: results of the Utrecht Health Project. Eur J Public Health. 2007;17(2):199-205.

22. Lima-Costa MF, Peixoto SV, Firmo JOA, Uchoa E. Validade do diabetes auto-referido e seus determinantes: evidências do projeto Bambuí. Rev Saúde Pública. 2007;41(6):947-53.

23. Vargas CM, Burt VL, Gllum RF, Pamuk ER. Validity of self-reported hypertension in the National Health and Nutrition Examination Survey III, 1988-1991. Prev Med. 1997;26(5):678-85.

24. Lima-Costa MF, Peixoto SV, Firmo JOA. Validade da hipertensão arterial auto-referida e seus determinantes (projeto Bambuí). Rev Saúde Pública. 2004;38(5):637-42.

25. Frazão P, Naveira M. Prevalência de osteoporose: uma revisão crítica. Rev Bras Epidemiol. 2006;9(2):206-14.

26. Martini LA, Moura EC, Santos LC, Malta DC, Pinheiro MM. Prevalência de diagnóstico auto-referido de osteoporose, Brasil, 2006. Rev Saúde Pública. 2009;43Suppl 2:107-16.

27. Hasselgren M, Arne M, Lindahl A, Janson S, Lundbäck B. Estimated prevalences of respiratory symptoms, asthma and chronic obstructive pulmonary disease related to

detection rate in primary health care. Scand J Prim Health Care. 2001;19(1):54-7.

28. Mullerova H, Wedzicha J, Soriano JB, Vestbo J. Validation of a chronic obstructive pulmonary disease screening questionnaire for population surveys. Respir Med. 2004;98(1):78-83.

29. Lima-Costa MF, Barreto SM, Giatti L. Condições de saúde, capacidade funcional, uso de serviços de saúde e gastos com medicamentos da população idosa brasileira: um estudo descritivo baseado na Pesquisa Nacional por Amostra de Domicílios. Cad Saúde Pública. 2003;19(3):735-43.

30. Goldman N, Lin IF, Weinstein M, Lin YH. Evaluating the quality of self-reports of hypertension and diabetes. J Clin Epidemiol. 2003;56(2):148-54.

Submitted on: 05/01/2011
Final version presented on: 17/02/2011
Accepted on: 19/02/2011