ORIGINAL ARTICLE / *ARTIGO ORIGINAL*

Pap-test coverage in women aged 25 to 64 years old, according to the National Health Survey and the Surveillance System for Risk and Protective Factors for Chronic Diseases by Telephone Survey, 2013

Cobertura de exame Papanicolaou em mulheres de 25 a 64 anos, segundo a Pesquisa Nacional de Saúde e o Sistema de Vigilância de Fatores de Risco e Proteção para Doenças Crônicas por Inquérito Telefônico, 2013

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ABSTRACT: *Objectives:* To estimate and describe the coverage of the Pap Smear test reported by women aged 25 to 64 years old from data collected by the National Health Survey (Pesquisa Nacional de Saúde - PNS) and to compare the estimates made by the Surveillance System for Risk and Protective Factors for Chronic Diseases using a Telephone Survey (Vigitel) for the same indicator in the Brazilian capital cities and the Federal District in 2013. *Methods:* Based on the data from the PNS and Vigitel, we estimated prevalence and 95% confidence intervals (95%CI) of women who reported having had a Pap test screening in the past 3 years. *Results:* According to the PNS, 79.4% (95%CI 78.5 – 80.2) of the women had had a cervical cancer screening in the past 3 years in Brazil. Women aged 55 to 64 years old (71.0%, 95%CI 68.7 – 73.3) and without an education or incomplete elementary school (72.1%, 95%CI 70.6 – 73.7) had the lowest prevalence, and 88.4% (95%CI 87.5 – 89.2) received test results within 3 months. There was no difference when comparing the estimates of the Vigitel with the PNS for the capital city and Federal District totals. In the PNS, the prevalence was 83.8% (95%CI 82.8 – 84.7) and in the Vigitel, it was 82.9% (95%CI 81.9 – 83.8). In addition, there were no differences by capital, except for Recife, Boa Vista, and João Pessoa. *Conclusion:* Cervical cancer screening coverage for the target population is below the target of 85%. When comparing the data for the capital city and Federal District totals, we verified that the Vigitel System has been effective in monitoring this indicator, which is similar to PNS estimates.

Keywords: Uterine cervical neoplasms. Pap smear. Risk factors. Epidemiological surveillance. Health surveys. Descriptive epidemiology.

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RESUMO: *Objetivos:* Estimar e descrever a cobertura do exame Papanicolaou, relatado por mulheres brasileiras entre 25 e 64 anos, na Pesquisa Nacional de Saúde (PNS), e comparar as estimativas do Sistema de Vigilância de Fatores de Risco e Proteção para Doenças Crônicas por Inquérito Telefônico (Sistema Vigitel) para o mesmo indicador nas capitais brasileiras e no Distrito Federal em 2013. *Métodos:* A partir dos dados da PNS e do Vigitel, foram estimadas as prevalências e os respectivos intervalos de confiança de 95% (IC95%) de mulheres que referiram ter realizado o exame de Papanicolaou nos últimos 3 anos. *Resultados:* Segundo a PNS, 79,4% (IC95% 78,5 – 80,2) das mulheres realizaram exame Papanicolaou nos últimos 3 anos no Brasil. Mulheres de 55 a 64 anos (71,0%; IC95% 68,7 – 73,3) e sem instrução ou com ensino fundamental incompleto (72,1%; IC95% 70,6 – 73,7) apresentaram as menores prevalências; 88,4% (IC95% 87,5 – 89,2) receberam resultado do exame em até 3 meses. Não houve diferença ao comparar as estimativas do Sistema Vigitel com a PNS para o total das capitais e Distrito Federal. Na PNS, a prevalência foi de 83,8% (IC95% 82,8 – 84,7) e no Vigitel, de 82,9% (IC95% 81,9 – 83,8); além disso, não houve diferenças por capitais, exceto para Recife, Boa Vista e João Pessoa. *Conclusão:* A cobertura do exame Papanicolaou para a população-alvo encontra-se abaixo da meta de 85%. Ao comparar os dados para o total de capitais e o Distrito Federal, verificou-se que o Sistema Vigitel tem sido efetivo no monitoramento desse indicador, assemelhando-se às estimativas da PNS.

Palavras-chave: Neoplasias do colo do útero. Teste de Papanicolau. Fatores de risco. Vigilância epidemiológica. Inquéritos epidemiológicos. Epidemiologia descritiva.

INTRODUCTION

Cervical cancer was the fourth most common form of cancer found in women worldwide, with approximately 528,000 new cases, according to estimates made by Globocan 2012. The highest standardized incidence rates were observed in less developed countries, reaching 42.7 new cases per 100,000 women in East Africa, and the lowest rates were observed in Australia / New Zealand (5.5 per 100,000 women) and West Asia (4.4 per 100,000 women)[1]. In Brazil, in 2014, it was estimated that cervical cancer was the third most frequent type of cancer among women (15,590 new cases), representing 5.7% of the cancers in this group (except non-melanoma skin cancer), with an incidence rate of 15.3 new cases per 100,000 women[2].

Although Brazil has a medium-level incidence rate, when compared to the rates in other regions of the world[1], the incidence estimates of the Brazilian National Cancer Institute (*Instituto Nacional de Câncer* - INCA) showed differences according region of residence. Excluding non-melanoma skin cancers, cervical cancer was the most frequent type of cancer found in the northern region (23.6 per 100,000 women), the second most frequent in the Midwest (22.2 per 100,000 women) and in the Northeast (18.8 per 100,000 women), the fourth most frequent in the Southeast (10.2 per 100,000 women) and the fifth most frequent in the South (15.9 per 100,000)[2], demonstrating regional inequalities in this cancer's epidemiology.

When cervical cancer diagnosis and treatment in early stages or in precursor stages, it has a high cure potential, reaching 100%. As such, this justifies the necessity to perform population screenings in women[3]. In Brazil, a Pap smear screening (a cytopathological examination or an oncotic cytology) is recommended in the target population of women between 25 and 64 years old, who have had sexual intercourse. The interval between each examination should be three years, after the woman has received negative results two years in a row[4]. This age group is in accordance with the recommendations from the World Health Organization (WHO)[3]. Pap smears are low cost, safe, easy to perform and, in general, well accepted by the female population[5], in addition to being offered in all Basic Health Units. Brazil aims to perform a Pap smear among 85% of all women in the recommended age range, by 2022[6,7].

The National Household Sample Survey (*Pesquisa Nacional por Amostra de Domicílio*—PNAD), conducted by the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística* - IBGE) in 2008, showed that 84.6% of women aged 25-59 reported having at least 1 Pap smear in the 3 years prior to the survey, though there was a smaller percentage among low-income women and among residents in the northern and north-eastern regions of the country[8].

A study that uses data from the Surveillance System for Risk Factors for Non-Communicable Chronic Diseases by telephone survey (Vigitel System) in Brazilian capital cities, estimated that women ages 25 to 64 years old had a percentage of 82% in 2007 and 82.3% in 2012, a steady trend in the period (2007 to 2012). It also showed differences between levels of schooling, with 78% (2007) and 78.3% (2012) between 0-8 years of schooling, and 87.9% (2007) and 88.6% (2012) with 12 years or more of schooling. It also showed differences between the regions in all of the years studied. In 2012, the lowest percentages were in the North (78.0%) and in the Northeast (75.5%)[9].

The National Health Survey (*Pesquisa Nacional de Saúde* - PNS), conducted by the IBGE and in partnership with the Ministry of Health, collected information related to women's health, including the Pap smear exam. The objectives of the present study were to estimate and describe the percentage of Pap smears performed in the last 3 years, as reported by Brazilian women between 25 and 64 years of age in the PNS, and to compare this same indicator, present in the Vigitel System, in women residing in Brazilian capitals and in the Federal District, in 2013.

METHODS

To estimate the percentage of Pap smears performed in Brazil, data from the PNS in 2013 were used. The PNS is a household survey with data on adult residents (≥ 18 years) of permanent households, located in urban or rural areas in the 5 major geographic regions, the 27 federation units (FU), the capitals and the municipalities of each FU[10].

Sampling was defined by clusters in three stages: in the first stage, census tracts were selected; in the second, households were selected; and in the third, 1 resident aged 18 years or older was selected for the interview among all of the adult residents of the household[10].

The final sample consisted of 64,348 households, in which 60,202 interviews were conducted with individuals aged 18 years old or over. The present analysis used data from 25,222 women aged 25-64 years old, who answered the module on women's health and reported having had sexual intercourse[5,10].

In order for the sample to be representative of the entire country and of the geographic strata analyzed, each stage of the sample selection was weighed, even if there was no response. Data were collected using personal digital assistance (PDA) tools[10].

Indicators for the Pap smear were estimated from the following PNS questions:

1. pap smear in the last three years prior to the survey: "When was the last time you had a pre-cancer screening for cervical cancer?" Possible answers: less than 1 year ago; between 1 and 2 years ago; and between 2 and 3 years ago;
2. pap smear in the last three years prior to the survey and received the result within three months of the examination: "When did you receive the result of your last screening? Possible answers: less than 1 month later; between 1 and 3 months later.

The indicators were described according to the following characteristics:

1. age range (25 to 34, 35 to 44, 45 to 54, and 55 to 64 years old);
2. level of education (no education and incomplete primary education; completed middle school, but not high school; completed high school but not any form of higher education; completed some degree of higher education;
3. race / skin color (white, black, black with light skin);
4. place of residence (urban, rural);
5. region of residence (North, Northeast, Southeast, South, Midwest).

Considering the PNS estimates as a gold standard, this study decided to compare the results regarding the Pap smear test obtained by the Vigitel System, in order to verify similarities and differences between the prevalences estimated by the two surveys for this indicator in the Brazilian capital cities and the Federal District in 2013.

The Vigitel System is a telephone survey conducted with an adult population (≥ 18 years old) living in Brazilian capitals and the Federal District. This research had a probabilistic sampling process, using fixed telephone line records from the localities beings studied. The sample was composed of 5,000 telephone lines divided into 200 subsamples for each city, in order to identify eligible (active residential) lines. Then, from this information, the resident to be interviewed was randomly chosen[11].

Vigitel System estimates were weighed using the post-stratification rake method, using estimates of age, gender and schooling of the population, projected for the year of the

survey. The objective was to match the distribution of the population interviewed with the distribution of the estimated population. For more information, the publication of the annual Vigitel results is recommended[11].

The questions used by the Vigitel System to compile the indicator were: "Have you ever had a Pap smear, a cervical cancer screening test?" (Possible answers: yes, no); and "How long has it been since you had a Pap smear?" (Possible answers: less than 1 year ago, between 1 and 2 years ago, and between 2 and 3 years ago).

The analyses were performed using Stata software version 11.0, through the survey module, which considers the effects of complex sampling. The prevalences and the respective 95% confidence intervals (95%CI) were calculated for all of the indicators. The non-overlapping of the 95%CI was considered for comparison, even between the two surveys, as a significant difference.

The two surveys were approved by the National Commission on Ethics in Research (*Comissão Nacional de Ética em Pesquisa*), the PNS under Case No. 328,159, on June 26, 2013, and the Vigitel System under Case number 355.590 on June 26, 2013. The participants agreed to participate in both surveys, and signed a Free and Informed Consent Form.

RESULTS

According to the PNS in Brazil in 2013, the percentage of women aged 25-64 years old who received a Pap smear in the 3 years prior to the survey was 79.4% (95%CI 78.5 – 80.2). Women between the ages of 35 and 44 and between 45 and 54 years of age presented higher prevalences: 83.2% (95%CI 81.6 – 84.6) and 81.6% (95%CI 79.8 – 83.2), respectively. There was an increase in the percentage in accordance with a higher level of education, reaching 88.8% (95%CI 86.9 – 90.4) among women who had completed some form of higher education. The prevalence of Pap smears was higher among white women (82.6%, 95%CI 81.4 – 83.9) and residents of urban areas (80.1%, 95%CI 79.2 – 81.1). Regarding region of residence, the North (75.5%, 95%CI 73.2 – 77.6) and the Northeast (75.1%, 95%CI 73.2 – 77.6) had the lowest percentages according to the PNS (Table 1).

The study found that the proportion of women aged 25-64 years old who underwent a Pap smear in the 3 years prior to the survey and received the result within 3 months after the exam was 88.4% (95%CI 87.5 – 89.2). The highest prevalence was among women with some form of higher education (93.6%; 95%CI 91.7 – 95.1), and residents of urban areas (89.3%, 95%CI 88.3 – 90.1). The lowest prevalence was among residents of the northern region (82.0%, 95%CI 79.6 – 84.2). There was no difference in the studied age groups and with regard to race/skin color for Brazil (Table 1).

For capita city totals, the prevalence of Pap smears was 83.8% (95%CI 82.8 – 84.7) in the PNS and 82.9% (95%CI 81.9 – 83.8) through the Vigitel System. By capital, differences were only observed for Recife, Boa Vista and João Pessoa, with proportions estimated by the PNS (Table 2).

Table 1. Description of the coverage (and respective 95% confidence intervals) of women aged 25 to 64 years who underwent a Pap smear in the 3 years prior to the survey, and who received the result within 3 months after the test, according to the variables selected. National Health Survey (*Pesquisa Nacional de Saúde* – PNS), Brazil, 2013.

Variables	Pap smear exam in the last 3 years		Results from the pap smear exam received with 3 months	
	%	(95%CI)	%	(95%CI)
Age range (years)				
25 to 34	79.6	(77.9 – 81.1)	88.4	(86.8 – 89.8)
35 to 44	83.2	(81.6 – 84.6)	88.2	(86.5 – 89.7)
45 to 54	81.6	(79.8 – 83.2)	88.8	(87.0 – 90.4)
55 to 64	71.0	(68.7 – 73.3)	88.0	(85.7 – 90.0)
Level of Schooling				
No schooling and incomplete elementary school	72.1	(70.6 – 73.7)	84.5	(82.8 – 86.1)
Completed elementary school, but not high school	77.8	(75.3 – 80.0)	86.9	(84.3 – 89.1)
Completed high school, but not higher education	83.1	(81.8 – 84.7)	89.9	(88.5 – 91.1)
Higher Education complete	88.8	(86.9 – 90.4)	93.6	(91.7 – 95.1)
Race/ skin color				
White	82.6	(81.4 – 83.9)	90.2	(88.9 – 91.3)
Black	77.4	(74.2 – 80.4)	88.3	(85.3 – 90.7)
Brown-skinned	75.9	(74.6 – 77.2)	86.4	(85.0 – 87.7)
Place of Residence				
Urban	80.1	(79.2 – 81.1)	89.3	(88.3 – 90.1)
Rural	74.1	(71.9 – 76.1)	81.8	(79.3 – 84.2)
Region of Residence				
North	75.5	(73.2 – 77.6)	82.0	(79.6 – 84.2)
Northeast	75.1	(73.5 – 76.6)	87.6	(86.1 – 88.9)
Southeast	81.1	(79.5 – 82.6)	89.0	(87.4 – 90.4)
South	83.0	(81.8 – 84.0)	90.5	(88.4 – 92.2)
Midwest	80.9	(79.1 – 82.6)	89.0	(87.3 – 90.6)
Brazil	79.4	(78.5 – 80.2)	88.4	(87.5 – 89.2)

95%CI: 95% confidence interval.

Table 2. Proportion of women aged 25 to 64 years who underwent a Pap smear in the 3 years prior to the survey. They live in the Brazilian capital cities and in the Federal District, according to the National Health Survey (*Pesquisa Nacional de Saúde* – PNS) and the Surveillance System of Risk Factors and Protection for Chronic Diseases by Telephone Inquiry. Brazil, 2013.

Capital Cities	PNS		Vigitel System	
	%	(95%CI)	%	(95%CI)
Porto Alegre	92.0	(88.7 – 94.4)	89.3	(86.5 – 92.1)
Vitória	91.7	(87.8 – 94.4)	84.7	(81.4 – 88.1)
Curitiba	91.2	(88.2 – 93.6)	87.9	(84.9 – 90.9)
Recife	90.6	(86.6 – 93.5)	78.4	(75.0 – 81.8)
Palmas	88.2	(83.6 – 91.6)	86.1	(82.3 – 89.9)
Cuiabá	87.9	(82.8 – 91.6)	81.2	(77.8 – 84.7)
Boa Vista	87.8	(83.8 – 91.0)	78.1	(73.6 – 82.6)
Campo Grande	87.7	(83.4 – 91.0)	86.6	(83.4 – 89.7)
Rio Branco	87.7	(83.5 – 91.0)	83.4	(79.5 – 87.2)
São Luís	86.7	(82.5 – 90.0)	82.0	(78.8 – 85.3)
São Paulo	84.8	(82.3 – 86.9)	89.1	(86.5 – 91.6)
Salvador	84.7	(80.5 – 88.1)	81.0	(77.6 – 84.3)
Porto Velho	84.7	(79.9 – 88.5)	83.9	(79.9 – 87.9)
Goiânia	83.5	(78.5 – 87.6)	79.8	(76.3 – 83.2)
Distrito Federal	83.5	(80.5 – 86.1)	76.9	(73.0 – 80.7)
Rio de Janeiro	83.4	(79.4 – 86.7)	84.3	(81.1 – 87.5)
Belém	83.2	(77.3 – 87.8)	78.6	(75.1 – 82.1)
Belo Horizonte	82.1	(78.1 – 85.5)	83.1	(79.7 – 86.6)
Florianópolis	81.8	(75.1 – 87.1)	86.3	(83.1 – 89.5)
João Pessoa	81.1	(76.6 – 85.0)	70.3	(66.2 – 74.5)
Teresina	80.7	(76.0 – 84.7)	73.6	(69.3 – 77.9)
Manaus	80.6	(76.4 – 84.2)	83.1	(79.5 – 86.7)
Natal	80.1	(74.5 – 84.7)	79.0	(75.2 – 82.8)
Fortaleza	75.9	(70.5 – 80.6)	73.0	(69.2 – 76.8)
Maceió	72.1	(66.8 – 76.9)	67.7	(63.2 – 72.1)
Aracajú	70.1	(62.7 – 76.6)	75.5	(71.5 – 79.4)
Macapá	69.8	(63.4 – 75.5)	77.1	(72.7 – 81.6)
Capital cities total	83.8	(82.8 – 84.7)	82.9	(81.9 – 83.8)

PNS: *Pesquisa Nacional de Saúde* – National Health Survey; Vigitel: System of Surveillance of Risk Factors and Protection for Chronic Diseases by Telephone Inquiry; 95%CI: 95% confidence interval.

DISCUSSION

Results from the National Health Survey of 2013 indicate that, for Brazil, 79.4% of women between 25 and 64 years of age underwent a Pap smear in the 3 years prior to the survey. Considering data from the capital cities and the Federal District, this proportion increased to 83.8%, without the difference described by the Vigitel System (82.9%).

For Brazil as a whole, the highest percentage was observed among women aged 35 to 54 years old, with higher levels of schooling, white women and residents of urban areas. Residents in the North and Northeast had the lowest proportions of the exam. These socio-demographic differences were also verified for Brazil, according to PNAD 2008[8] data, and for all of the Brazilian capital cities monitored by the Vigitel System[11], especially those regarding schooling and the region of residence of these women, thus showing socioeconomic inequalities. In the population surveys conducted in São Paulo and Campinas, high percentages (86.5 and 92.8%, respectively) were observed, however there was no difference according to level of schooling[12,13].

The largest percentages of the Pap smear exam were reported by white women. PNAD 2008 data point to differences in access to health services regarding socio-demographic characteristics, with the population with higher income and schooling having more access[8], which in turn varies according to race / skin color.

The Vigitel 2013 system also showed a lower proportion of Pap smear exams among women aged 25-35 years old (78.8%),[11] demonstrating the need to explore access strategies for specific age groups.

The differences between urban and rural areas and regions of residence may be related to the concentration of health services. In a study on medical consultations, using PNAD data from 1998, 2003 and 2008, unequal access to health services between the regions was demonstrated[14]. Other studies show that the better the socioeconomic status of individuals or of regions, the better the state of health and the greater the access to health services[15,16]. Although Brazil has a percentage of almost 80%, there are still differences in terms of schooling, skin color and place of residence. The study that dealt with the iniquities regarding the Pap smear exam indicated sociodemographic differences, even after an adjusted analysis, [17].

The PNS revealed that 88.4% of women received their test result 3 months after the date of collection, with differences in schooling and among women living in urban areas. In Brazil, there is no established recommendation proposed to monitor the time between performing the Pap smear and receiving the result. However, INCA recommends that the maximum time between receiving the material from the laboratory and issuing a report is 30 days[18]. As such, during these 3 months, the maximum time for processing the exam in the laboratory is 30 days, thus the remaining 60 days may be too long of a period to send the material to the laboratory, have it be received by the medical service and delivered to the patient.

Data from the Ontario Cervical Screening Program 2012 Report in Canada, revealed that in 90% of the women who underwent a Pap smear, the time between collection at the health facility and the processing of the exams in the laboratory was 21 days, less time than observed in 2009 (45 days)[19].

The success of a screening program does not only have to do with access to the first exam, but also with a follow-up for people who have some sort of abnormal result on the screening exam. The delay between receiving the test result, confirming a diagnosis, and going through appropriate treatment may influence the clinical evolution of the case, thus implying an increase in incidence, though not in mortality.

With the Plan to Strengthen the Network for Prevention, Diagnosis and Treatment of Cancer (*Fortalecimento da Rede de Prevenção, Diagnóstico e Tratamento do Câncer*), several measures were adopted to reduce the morbidity and mortality of cervical cancer. One of them was designing the Brazilian Guidelines for Cervical Cancer Screening, which contains clinical guidelines for the adequate care of women who have been identified as potential carriers of legions that are a precursor to cervical cancer. Furthermore, it established guidelines for expanding access to cytopathological examinations. Also in 2012, the National Cytopathology Quality Program was established (*Programa Nacional de Qualidade em Citopatologia*), which contains measures for the certification of large-scale cytopathology laboratories, and the establishment of 20 Diagnostic Confirmation and the Treatment of Precursor Lesions of Cervical Cancer Service Centers (*Serviços de Confirmação Diagnóstica e Tratamento das Lesões Precursoras do Câncer do Colo de Útero*) [6,18, 20-22]. In 2016, the Brazilian guidelines for the screening of cervical cancer were reviewed, highlighting the importance of this disease in the Brazilian context[23]. With this restructuring, the percentage of women who receive results in a timely manner is expected to increase.

The PNS is a tool that is used for monitoring the goals of the Strategic Action Plan for Coping with Chronic Noncommunicable Diseases (NCDs)[6]. In comparison with the baseline, there was no increase in the percentage of Pap smear's performed in women aged 25 to 64 years old in the last 3 years.

The results showed that, except for in three capital cities, there were no differences between the percentage estimates of the Pap smear when comparing the PNS and the Vigitel System. However, it should be considered that the Vigitel System sample is restricted to people with fixed telephone lines, a service that is less common in the North and Northeast regions. This is probably one of the reasons for the differences between the frequencies found in both surveys. The use of weighing factors reduces these biases, and aims to bring the population studied by Vigitel closer to the population estimated for each municipality studied in each year of the survey[11].

In spite of this limitation, the prevalences estimated by both surveys monitoring Pap smear percentages in Brazilian capital cities and in the Federal District were found to be very similar. This finding, in conjunction with the agility and low cost of telephone interviews (about one-fifth of the cost of a face-to-face interview)[24], shows that the Vigitel System is an adequate tool to monitor this indicator.

CONCLUSION

The PNS indicates a percentage of Pap smear exams below 80%, and there was no increase in prevalence when compared to the baseline. There are differences, mainly regional ones, in the coverage of this examination, which may negatively impact the coverage goal of the Pap smear.

In contrast, both the fact that this exam is offered in all Basic Health Units and the fact that cancer prevention, diagnosis and treatment networks have been undergoing reorganization in recent years, contributes to an increase in coverage and the achievement of the desired goal. As such, it is important to change to an organized tracking model, replacing the opportunistic one, in order to guarantee diagnostic confirmation and treatment, as foreseen in the Strategic Action Plan for coping with NCDs[6].

When comparing the estimates of the PNS and the Vigitel System, for the totals in Brazilian capital cities and the Federal District, it was verified that the Vigitel System has been a useful monitoring tool for professionals and managers, as it provides for surveillance and the prevention of cervical cancer in the country.

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