Coverage of cervical cytopathological examination among women from Southern Brazil: prevalence rates and associated factors

Kevin Francisco Durigon Meneghini[1], Arnildo Agostinho Hackenhaar[2], Samuel Carvalho Dumith[3]

ABSTRACT

Objective: To determine the coverage of cervical cancer screening and its associated factors among women from southern Brazil aged 25 to 64 years. **Methods:** This was a cross-sectional population-based study conducted in the city of Rio Grande, RS. The outcome of interest consisted of a cytopathological examination of the uterine cervix in the previous three years in women aged 25 to 64 years, according to the criteria of the Brazilian National Cancer Institute. The data were collected in 2016, and the following independent variables were considered: age, skin color, marital status, schooling, socioeconomic status, gestational history, smoking habits, overweight, health insurance, having visited a physician or having been visited by a community health agent in the previous year, and household registered in a primary care facility (PCF) of the healthcare system. **Results:** This study included a total of 521 women, with a mean age of 44.3 years. The coverage of cervical cancer screening was 78.1% (95% CI: 73.5 to 82.7). The following characteristics were associated with the outcome: marital status, non-smoking habits, health insurance, having visited a physician in the previous year, and household registered in a PCF. **Conclusion:** The coverage of cervical cancer screening observed in our study (8 out of ten women) was close to the Brazilian Ministry of Health goals. Single women, smoking habits, no health insurance, having not visited a physician in the previous year, and not having their household registered in a PCF were considered risk factors.

Keywords: Papanicolaou Test; Mass Screening; Women's Health; Epidemiology. Secondary Prevention.

INTRODUCTION

Cervical cancer is a condition most commonly found in poor and socially vulnerable women, although cytopathological examination of the cervix is relatively simple and inexpensive[1]. More than 80% of the cases occur in developing countries and correspond to nearly 15% of all cancers in the female population compared to 3.6% in developed countries[2-4]. The World Health Organization registered 266,000 deaths due to cervical cancer in 2012, with approximately 90% of them in lower and middle-income countries[5]. Globally, cervical cancer is responsible for nearly 2.7 million years of life lost among women aged 25 to 64 years[6].

Cervical cancer is the fourth most frequent cause of cancer affecting the female population, accounting for 6.6% of the total number of cases in 2018[7]. According to the Brazilian National Cancer Institute, in 2018-2019, cervical cancer had an incidence ratio of 15.43/100,000 women, with 16,370 new cases each year. This condition ranked third place in the country, after non-melanoma skin cancer and breast cancer[8]. Importantly, there are critical epidemiological variations across the country to consider: the incidence rate of cervical cancer in the southeast was 9.97/100,000 women compared to 25.62/100,000 women in the north[8].

The main risk factors associated with cervical cancer are infection by Human Papilloma Virus (HPV), smoking habits, immunosuppression, Chlamydia infection, a diet low in fruits and vegetables, overweight, chronic use of oral contraceptives, multiparity, full-term pregnancies under 17 years old, low income, and daughters of mothers who used diethylstilbestrol during pregnancy[9].

1 Federal University of Rio Grande, School of Medicine, Rio Grande, (RS) Brazil.
2 Federal University of Rio Grande, School of Medicine, Department of Gynecology and Obstetrics, Rio Grande, (RS) Brazil.
3 Federal University of Rio Grande, Graduate Program in Health Sciences, Rio Grande, (RS) Brazil.

While vaccines against bivalent (16 and 18) and tetravalent (6, 11, 16, 18) HPV are primary preventive measures, the cytopathological examination of the uterine cervix or Pap smear is a secondary measure for identifying potentially precancerous lesions[10] which are classified according to Bethesda as Cervical Intraepithelial Neoplasia (CIN) of grades 1, 2, or 3, with CIN2+ lesions being most likely cancerous. In agreement with an American meta-analysis that included 94 studies, the cytopathological examination has a sensitivity of 30-87% and a specificity of 86-100%, with a positive histological predictive value estimated at 27.1% (16.0 - 65.4) for CIN2+ lesions, according to the 2017 European consensus. Furthermore, this cancer screening procedure has been proven safe and well accepted by most patients[11,12].

The 2002 World Health Survey, conducted in 57 countries, showed heterogeneous effective coverage rates. Developed countries had a screening coverage of approximately 60% as compared to 20% in developing countries. The authors concluded that the global gross estimate of cervical cancer screening was 67.9% (67.6 - 68.2), but only 39.6% (39.3 - 40.0) of it was effective coverage, *i.e.*, last exam the previous three years[2]. The World Health Organization recommends at least 80% national coverage to consider it effective and comprehensive. While gross coverage data indicate the number of individuals who took the exam, the effective coverage measure considers three points - need, use, and quality, indicating that the population needed the service, used it, and obtained real health benefits through it[13].

A systematic review of the Pap smear coverage in Brazil between 1987 and 2003 showed screening coverage rates ranging from 60.8% to 92.9% "in the previous three years", with a tendency to increase over time the percentage of the target population undergoing cytopathological examination of the cervix. However, the age groups analyzed were different, either between the study groups or the current screening criteria. More importantly, the findings of this systematic review were from a few cross-sectional studies with probabilistic and non-probabilistic samples, and whose sample sizes were insuficient[9], indicating poor methodological standardization and the need for further research[4].

In the 2016 guidelines (last published), the National Cancer Institute recommended that cervical cancer screening should be conducted as follows: women between 25 and 64 years of age who had already had sexual intercourse - with the first two exams performed annually; if tested negative, an interval of three years should be considered for the upcoming exams; the screening should be interrupted at age 65, after two consecutive negative tests in the previous five years; women over 64 years of age who had never been screened could be discharged after two negative Pap smears with an interval of one to three years in between them[10].

Thus, this study determined the coverage of cervical cytopathological examination and its associated factors in women aged 25 to 64 years in the city of Rio Grande, Rio Grande do Sul, Brazil.

METHODS

This was a cross-sectional study with a population-based sampling. This study was part of a research consortium entitled "Health of the Riograndina Population" with the Graduate Program in Health Sciences and Public Health at the Federal University of Rio Grande[14].

Rio Grande is a municipality located in the extreme south of the state of Rio Grande do Sul, Brazil. It has a population of approximately 200,000 inhabitants, of which nearly 95% reside in the urban area. Port activity is the basis of the municipal economy[14]. The local Human Development Index was 0.744 according to the last 2010 census of the Brazilian Institute of Geography and Statistics, and the Gross Domestic Product per capita was R$36,816.67 in 2016[14]. Moreover, the municipality of Rio Grande has 32 primary care facilities and two hospitals - one of which being exclusive to the Brazilian Healthcare System.

Two sample calculations were performed based on data from the 2010 Demographic Census[14], indicating a sample size of 138,996 individuals for the target population. The first

calculation was performed to determine the prevalence of the outcomes and the second to determine the factors associated with these outcomes. The parameters of the first calculation were set as follows: prevalence of the outcome estimated at 10%, with a 2% margin of error and 95% confidence interval, totaling 860 individuals; an additional 50% was added due to the design effect (estimated at 1.5), totaling 1,290 individuals; then, an additional 10% was considered due to possible sample losses or refusals, resulting in a final sample size of 1,420 individuals. In the second calculation, the following parameters were considered: prevalence of the outcome estimated at 10%, with 95% confidence interval and 80% statistical power. A prevalence ratio of 2.0 and a frequency of exposure between 20% and 60% were considered, totaling 784 individuals; an additional 50% was added due to the design effect (estimated at 1.5) and another 15% was added to minimize confounding factors, totaling 1,294 individuals. Lastly, an additional 10% were added due to possible sample losses or refusals, totaling a final sample size of 1,423 individuals.

The sampling process consisted of two stages. First, census tracts were considered, then households and residents. From a total of 1,420 individuals - with an average of two residents aged at least 18 years per household – a total of 710 households were included for analysis. A systematic selection of 72 out of 293 (75%) eligible census tracts was performed, with an average of 10 households per tract. To minimize the effect of the design, more census tracts and fewer households were preferred.

For systematization purposes, all selected households (77,835) were allocated in descending order by the income of the head of the family. A random selection of the first household was performed by "jumping" from 1080 to the selected census tract – *i.e.*, 72 tracts corresponded to 23,439 households. Then, 711 households were selected from 30 neighborhoods by "jumping" 32. Two tracts were excluded from the analysis because no households were drawn therefrom.

The data were collected from adults and elderly in the urban area of Rio Grande, Rio Grande do Sul, in 2016. The analyses were restricted to female individuals aged between 25 and 64 years. A total of 521 women were considered eligible, excluding those institutionalized in nursing homes, hospitals, and prisons, and those with physical and/or cognitive disabilities that prevented them from answering the study questionnaire.

According to the National Cancer Institute's recommendations, the outcome of the present study was the coverage of cervical cytopathological examination[10]. This criterion establishes that women aged between 25 and 64 should have been screened for cervical cancer in the previous three years. The following independent variables were considered: age group (in years), skin color (white or black, mixed-race, yellow), marital status (single or married, widowed, separated, divorced), schooling (in years), socioeconomic status (in tertiles), gestational history (yes or no), smoking habits (non-smoker or current smoker), obesity, health insurance (yes or no), consultation with a physician in the previous year (yes or no), household registered in a PCF (yes or no / does not know), visit of a health agent in the previous 12 months (yes or no / does not know).

Socioeconomic data were obtained by analyzing main components from a list of 11 items of goods or household characteristics. The first component that explained 30% of the variance in all variables (*eigenvalue* of 3.3) was extracted and divided into tertiles. Obesity was defined as a body mass index (BMI) greater than or equal to 30.0 kg/m² based on self-reported weight and height data.

During data collection, the questionnaires were reapplied partially to 10.5% of the participants for quality control, with a kappa coefficient of 0.80. The questionnaires were coded, revised, and double-entered into Epi-Data 3.1 program. Next, the data were transferred to the Stata 15.1 statistical package for exploratory analysis and the creation and categorization of variables.

Firstly, the data were analyzed descriptively through the absolute and relative frequencies of the variables. Secondly, bivariate and multivariate analyses were performed using Poisson regression, considering a sample design effect of 1.3. Adjusted analysis was carried out by dividing the variables into two levels (same level or higher level). In

the first level, demographic and socioeconomic variables were included, whereas the second level included behavioral variables and access to health services. The Wald test for heterogeneity was used, and the variables with a *P*-value ≤ 0.20 were maintained in the adjusted model. A 5% statistical significance was considered in two-tailed tests.

This study was approved in March 2016 by the Research Ethics Committee at the Federal University of Rio Grande (protocol CAAE: 52939016.0.0000.5324). All study participants signed an informed consent form to authorize their participation. Illiterate respondents agreed by fingerprinting after the consent form was read out loud to them.

RESULTS

The study sample consisted of 521 female individuals aged between 25 and 64 years (mean: 44.3 years; standard deviation: 11.6). Based on self-reports, most women had white skin color (83%); were married, divorced, or widowed (54%); had more than 8 years of schooling (62%); and had been pregnant before (85%). Approximately 20% of the study sample were smokers, 25% were obese, 50% had health insurance, and 83% had consulted with a physician in the previous year. One-third of the sample had their household registered in a PCF of the Brazilian healthcare system, and 25% of them had been visited by a health agent in the previous year (Table 1). The variables skin color, schooling, socioeconomic status, obesity, and household registered in a PCF had missing data (not shown in Table 1). The highest percentage of missing data was observed for the variable obesity (5.4%, *n* = 493).

The prevalence of women who had been submitted to cervical cytopathological examination in the previous three years was 78.1% (95% CI: 73.5 to 82.7). The highest prevalence of cervical screening coverage was observed for the group with health insurance (85.6%), while the lowest was found among those who had not seen a physician in the previous year (62.2%). In the crude analysis, the following groups were associated with the coverage of cervical cytopathological examination: married/widowed/divorced, higher economic status, non-smoker, health insurance, and having consulted with a physician in the previous year. The association between cervical screening and socioeconomic status was no longer significant in the adjusted analysis, while having their household registered in a PCF was statistically significant (Table 1).

Table 1

Demographic, socioeconomic, behavioral, and health characteristics of women aged 25 to 64 years, who were the target population of cervical cancer screening programs and underwent a cytopathological examination in the previous three years, interviewed in Rio Grande, RS, 2016 (n = 521).

Level	Independent variable	Number of women	Screening coverage (%)	Crude analysis P-value PR (95% CI)	Adjusted analysis P-value PR (95% CI)
1					
	Age (years)			*P* = 0.322	*P* = 0.387
	25-34	142	76.1	1.00	1.00
	35-44	120	76.7	1.01 (0.90; 1.15)	1.08 (0.92; 1.26)
	45-54	131	84.7	1.02 (0.89; 1.17)	1.05 (0.91; 1.20)
	55-64	128	75.0	1.13 (0.98; 1.30)	1.13 (0.98; 1.31)
	Skin Color			*P* = 0.123	*P* = 0.170
	White	433	79.7	1.12 (0.97; 1.29)	1.10 (0.96; 1.27)
	Black, mixed-race, or yellow	87	71.3	1.00	1.00
	Marital Status			*P* = 0.030	*P* = 0.042
	Single	238	72.7	1.00	1.00
	Married, widowed, separated, or divorced	283	82.7	1.14 (1.01; 1.28)	1.13 (1.00; 1.27)

(Continues)

(Continuation)

Level	Independent variable	Number of women	Screening coverage (%)	Crude analysis P-value PR (95% CI)	Adjusted analysis P-value PR (95% CI)
	Schooling (years)			*P* = 0.120	*P* = 0.079
	0 to 8	199	77.4	1.00	1.00
	9 to 11	153	73.9	0.95 (0.82; 1.11)	0.97 (0.84; 1.12)
	≥ 12	168	83.3	1.08 (0.95; 1.22)	1.09 (0.97; 1.24)
	Socioeconomic status (tertile)			*P* = 0.033*	*P* = 0.182*
	Poorer	171	72.5	1.00	1.00
	Intermediate	180	78.3	1.08 (0.96; 1.22)	1.06 (0.94; 1.18)
	Richer	169	83.4	1.15 (1.01; 1.31)	1.09 (0.96; 1.23)
2					
	Gestational history			*P* = 0.684	*P* = 0.544
	No	75	80.0	1.00	1.00
	Yes	446	77.8	1.03 (0.90; 1.18)	0.96 (0.83; 1.10)
	Current smoker			*P* = 0.029	*P* = 0.033
	No	417	79.9	1.12 (1.01; 1.25)	1.12 (1.01; 1.24)
	Yes	104	71.2	1.00	1.00
	Obesity (BMI ≥ 30 kg/m²)			*P* = 0.497	*P* = 0.441
	No	362	79.3	1.04 (0.93; 1.16)	0.96 (0.87; 1.06)
	Yes	131	76.3	1.00	1.00
	Health Insurance			*P* = 0.002	*P* = 0.045
	No	265	70.9	1.00	1.00
	Yes	256	85.6	1.21 (1.08; 1.35)	1.14 (1.00; 1.30)
	Consulted with a physician in the previous year			*P* = 0.004	*P* = 0.026
	No	90	62.2	1.00	1.00
	Yes	431	81.4	1.31 (1.09; 1.57)	1.22 (1.03; 1.45)
	Household registered in a PCF			*P* = 0.465	*P* = 0.044
	No	344	77.0	1.00	1.00
	Yes	176	80.1	1.04 (0.94; 1.16)	1.11 (1.00; 1.23)
	Visit of a health agent			*P* = 0.591	*P* = 0.885
	No	401	77.6	1.00	1.00
	Yes	120	80.0	1.03 (0.92; 1.16)	0.99 (0.85; 1.15)
Total			**78.1**		**73.5 – 82.7**

PCF: Primary Care Facility; BMI: Body Mass Index.

* Linear trend estimation test.

DISCUSSION

In this study, we determined the coverage and factors associated with a cervical cytopathological examination in women aged 25 to 64 years in the city of Rio Grande, Rio Grande do Sul, Brazil. Our findings revealed that approximately 4 in 5 women had been screened for cervical cancer over the previous three years.

The adjusted analysis for possible confounding factors showed that non-single women, non-smokers, those with health insurance, who had consulted with a physician in the previous 12 months, and those who had their household registered in a PCF of the Brazilian healthcare system were more likely to have been screened for cervical cancer in the previous three years.

In our study sample, the coverage of cervical cancer screening was close to the goal proposed by the Brazilian Ministry of Health, which corresponded to 85% in 2020[15], and it was similar to the national average reported in previous studies, as follows: (i) the 2013 National Health Survey (PNS in Portuguese), in which 79% of the 25,000 interviewed Brazilians and 82% of the surveyed southerners aged 25 to 64 years met the coverage

criteria; and (ii) the 2013 Surveillance System for Risk and Protection Factors for Chronic Diseases by Telephone Survey (VIGITEL), which surveyed 32,000 women aged 25 to 64 years and found coverage rates of 81% nationwide and 88% in the city of Porto Alegre, Rio Grande do Sul[3,16,17]. Of note, the VIGITEL data may have overestimated the national coverage of cervical cancer screening since this survey was performed only in state capitals, which provide better socioeconomic conditions relative to the national context. According to the Social Care Information Center (SCIC), from 2007 to 2012, the prevalence of cervical cancer screening coverage in England was 78% among women aged 25 to 64, consistent with our findings. However, the SCIC considered a broader time criterion, that is, 3.5 years for the age group 25-49 years and 5 years for 50-64 years[18]. Our data are also similar to the coverage rates in the North American population aged 21 to 64, which was estimated to be between 76% and 88%, varying according to each state, with a national average of 83%[14,19].

In the years 1995 and 2004, approximately 1,300 women of childbearing age (15-49 years) were interviewed in Rio Grande, RS, Brazil. The authors demonstrated that 40% (1995) and 58% (2004) had undergone cytopathological examination of the uterine cervix[20]. These findings suggest that the quality of preventive care for the female population concerning cervical cancer screening substantially improved over 20 years.

Consistent with other studies, we found that married, widowed, separated, or divorced women were more likely to have been screened for cervical cancer during the coverage period. A Thai study found that in both the 2007 Health and Welfare survey and the 2009 Reproductive Health Survey, the coverage of cervical cancer screening was 5 to 7-fold higher among women who were or had been married[21]. In Latin America, this characteristic was more favorable for married, divorced women or those with a partner and was less associated with separated or widowed women[1,3,22]. In Ethiopia, however, the adjusted analysis did not indicate any statistical significance between the coverage of cancer screening and marital status[23].

In agreement with a time series of American studies, we showed that the likelihood of undergoing cervical cancer screening was higher among non-smoking women. The Behavioral Risk Factor Surveillance System (BRFSS) and the Missouri Enhanced Survey reported that smoking North American women aged 18 and older were 30% less likely to have been screened for cervical cancer in the previous three years [24,25]. Based on a more uniform criterion (21-64 years) and the 2006 BRFSS data, the adjusted analysis in our study showed that non-smoking women and ex-smokers were about 30% more likely to have undergone cytopathological examination of the cervix in the 3-year coverage period than were smokers[26].

Health insurance proved to be a factor associated with greater coverage of cytopathological examination of the cervix. Even in Brazil, where cervical cancer screening is provided at no cost by the healthcare system, looking for a private service through health insurance programs seems to progressively increase the likelihood of undergoing preventive cervical cancer screening on a frequent basis[3]. The same was observed in the United States, where only women insured in the 12 months before the interview had reached the national average of cervical cancer screening coverage compared to those uninsured in the previous 12 months or more, suggesting that health insurance does affect the 3-year cancer screening coverage[19].

In line with our findings, an American study carried out a multivariate analysis and found a strong statistical association between the coverage of cervical cancer screening and having had a medical appointment in the previous year[25]. In Florianópolis, Santa Catarina, southern Brazil, a study showed that considering the same 3-year coverage period, having consulted with a physician 15 days before the interview reduced by half the participant's likelihood of having an outdated cervical cancer screening[22].

Our findings also revealed a greater coverage of cervical cancer screening among women whose household was registered in a PCF. PCFs are strategically located in peripheral neighborhoods, where people have lower socioeconomic conditions and less access to healthcare services. Nevertheless, while this finding reflects the principle of equity in health, the service where participating women were examined was not specified. Hence, it is not known whether cervical cancer screening was performed in

a PCF. No other studies were found in the Brazilian literature to compare this finding.

This study has important limitations to consider, namely: (i) the cross-sectional design does not allow to infer causality between the outcomes and the study variables; (ii) self-reported data could be subject to information bias; (iii) as this study was part of a population survey, it was not possible to obtain further information about the outcome, for instance, the proportion of hysterectomized women or the reasons for not being screened for cervical cancer in the three previous years.

The strengths of our study include the recruitment of a representative sample from a mid-sized city in southern Brazil; the inclusion of study factors that are poorly known and/or have been little mentioned in the Brazilian literature; and the assessment of the outcome based on the most current recommended criteria.

CONCLUSION

The coverage rate of cytopathological examination of the uterine cervix was 8 in 10 female subjects. Non-single women, non-smokers, with health insurance, who had consulted with a physician in the previous 12 months, and who had their household registered in a PCF, were more likely to have been screened for cervical cancer during the 3-year coverage period. Further research should consider other municipalities in Brazil to determine whether the associated factors are the same and to include a question about the HPV vaccine. We recommend conducting an active search in single women who did not have health insurance and did not consult with a physician in the previous year. This population should be submitted to a cytopathological cervical examination for the detection of early lesions. By reaching the recommended coverage rate, it is possible to reduce cervical cancer incidence in the city of Rio Grande, RS, Brazil.

REFERENCES

1. Arrossi S, Ramos S, Paolino M, Sankaranarayanan R. Social inequality in Pap smear coverage: identifying under-users of cervical câncer screening in Argentina. Reproductive Health Matters. 2008; 16(32): 50-8
2. Gakidou E, Nordhagen S, Obermeyer Z. Coverage of cervical cancer screening in 57 countries: Low average levels and large inequalities. PLoS Med. 2008; 5(6): e132. https://doi.org/10.1371/journal.pmed.0050132.
3. Barbosa IR. Regional and Socioeconomic Differences in the Coverage of the Papanicolau Test in Brazil: Data from the Brazilian Health Survey 2013. Rev Bras Ginecol Obstet. 2017; 39: 480-87. https://doi.org/10.1055/s-0037-1604481.
4. Martins LFL, Thuler LCS, Valente JG. Cobertura do exame de Papanicolau no Brasil e seus fatores determinantes: uma revisão sistemática da literatura. Rev Bras Ginecol Obstet. 2005; 27(8): 485-92.
5. WHO (World Health Organization). Comprehensive cervical cancer control: a guide to essential practice – 2nd ed. Geneva; 2014.
6. Yang BH, Bray FI, Parkin DM, Sellors JW, Zhang ZF. Cervical Cancer as a Priority for Prevention in Different World Regions: an evaluation using years of life lost. Int. J. Cancer. 2004; 109(3): 418-24. https://doi.org/10.1002/ijc.11719.
7. World Health Organization. Early diagnosis and screening: Cervical Cancer [Online]. 2019 [Acess on Feb 10 2019]. Available at: http://www.who.int/cancer/prevention/diagnosis-screening/breast-cancer/en/
8. Instituto Nacional de Câncer José Alencar Gomes da Silva. Estimativa 2018: incidência de câncer no Brasil. Coordenação de Prevenção e Vigilância. Rio de Janeiro; 2017.
9. American Cancer Society. Cancer Facts & Figures 2018. Atlanta, Ga; 2018.
10. Instituto Nacional de Câncer José Alencar Gomes da Silva. Diretrizes brasileiras para o rastreamento do câncer do colo do útero. Coordenação de Prevenção e Vigilância. Divisão de Detecção Precoce e Apoio a Organização de Rede. 2. ed. Rio de Janeiro; 2016.
11. The European Union. Cancer Screening in the European Union (2017): Report on the implementation of the Council Recommendation on cancer screening. Lyon; 2017
12. Nanda K, McCrory DC, Myers ER, Bastian LA, Hasselblad V, Hickey JD, Matchar DB. Accuracy of the Papanicolau Test in Screening for and Follow-up of Cervical Cytologic Abnormalities: A Systematic Review. Ann Intern Med. 2000; 132: 810-19.
13. Ng M, Fullman N, Dieleman JL, Flaxman AD, Murray CJL, Lim SS. Effective Coverage: A Metric for Monitoring Universal Health Coverage. PLoS Med. 2014; 11(9): e1001730. https://doi.org/10.1371/journal.pmed.1001730
14. Dumith SC, Paulitsch RG, Carpena MX, Muraro MFR, Simões MO, Machado KP, Dias MS, Kretschmer AC,

Oliz MM, Pontes LS, Susin LRO. Planejamento e execução de um inquérito populacional de saúde por meio de consórcio de pesquisa multidisciplinar. Sci Med. 2018; 28(3): ID30407. https://doi.org/10.15448/1980-6108.2018.3.30407

15. Malta DC, da Silva Jr JB. O plano de ações estratégicas para o enfrentamento das doenças crônicas não transmissíveis no Brasil e a definição das metas globais para o enfrentamento dessas doenças até 2025: uma revisão. Epidemiol. Serv. Saúde. 2013; 22(1) :151-64. http://dx.doi.org/10.5123/S1679-49742013000100016.

16. Oliveira MM, Andrade SSCA, Oliveira PPV, Azevedo e Silva G, Silva MMA, Malta DC. 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 Disease by Telephone Survey, 2013. Rev Bras Epidemiol. 2018; 21: E180014. https://doi.org/10.1590/1980-549720180014.

17. Xavier TV, Zibetti WB, Capilheira MF. Prevalência da realização do exame citopatológico do colo uterino, no Brasil, nos anos de 2007 e 2013. Rev Med (São Paulo). 2016; 95(2): 66-70. http://dx.doi.org/10.11606/issn.1679-9836.v.95i2p66-70.

18. Douglas E, Waller J, Duffy SW, Wardle J. Socioeconomic inequalities in breast and cervical screening coverage in England: are we closing the gap? J Med Screen. 2016; 23(2): 98-103. https://doi.org/10.1177/0969141315600192.

19. US Department of Health and Human Services/Centers for Disease Control and Prevention. Morbidity and Mortality Weekly Report: Surveillance for Health Care and Health Service Use, Adults Aged 18-64 years – Behavioral Risk Factor Surveillance System, United States, 2014; 2017.

20. Carlotto K, Cesar JA, Hackenhaar AA, Ribeiro PRP. Características reprodutivas e utilização de serviços preventivos em saúde por mulheres em idade fértil: resultados de dois estudos transversais de base populacional no extremo Sul do Brasil. Cad. Saúde Pública. 2008; 24(9): 2054-62. https://doi.org/10.1590/S0102-311X2008000900011.

21. Mukem S, Meng Q, Sriplung H, Tangcharoensathien V. Low coverage and disparities of breast and cervical cancer screening in Thai women: analysis of National Representative Household Surveys. Asian Pac J Cancer Prev. 2015; 16(18): 8541-51. http://dx.doi.org/10.7314/APJCP.2015.16.18.8541.

22. Gasperin SI, Boing AF, Kupek E. Cobertura e fatores associados à realização do exame de detecção do câncer de colo de útero em área urbana no Sul do Brasil: estude de base populacional. Cad. Saúde. Pública. 2011; 27(7): 1312-22. https://doi.org/10.1590/S0102-311X2011000700007.

23. Gelibo T, Roets L, Getachew T, Bekele A. Coverage and Factors Associated with Cervical Cancer Screening: Results from a Population-Based WHO Steps Study in Ethiopia. J Oncol Res Treat. 2017; 2(1): 115.

24. Simoes EJ, Neschaffer CJ, Hagdrup N, Ali-Abarghoui F, Tao X, Mack N, Brownson RC. Predictors of compliance with recommended cervical cancer screening schedule: a population-based study. J Community Health. 1999; 24(2): 115-30. https://doi.org/10.1023/a:1018754307718.

25. Coughlin SS, Uhler RJ, Hall HI, Briss PA. Nonadherence to breast and cervical cancer screening: what are the linkages to chronic disease risk? Prev Chronic Dis. 2004; 1(1): A04.

26. MacLaughlan SD, Lachance JA, Gjelsvik A. Correlation between smoking status and cervical cancer screening: a cross-sectional study. J Low Genit Tract Dis. 2011; 15(2): 114-9. https://doi.org/10.1097/LGT.0b013e3181f58d0d.

Conflict of interest
The authors have no conflict of interest to declare.

Author contributions
KFD Meneghini wrote the manuscript; AA Hackenhaar critically reviewed the manuscript; SC Dumith designed the study, performed the data analysis, and critically reviewed the manuscript. All authors agreed with the final version of the manuscript.

Funding
This study was supported by the FAPERGS (Rio Grande do Sul Research Foundation – Scientific training program – ARD / PPP 2014, grant number 16/2551-0000359-9).

Ethical aspects
This study was previously approved by the Research Ethics Committee at the Federal University of Rio Grande, under protocol number 20/2016 (CAAE: 52939016.0.0000.5324).

Acknowledgments
KFD Meneghini has a scientific training scholarship at FAPERGS (Rio Grande do Sul Research Foundation, Brazil). SC Dumith has a research productivity scholarship at CNPq (National Council for Scientific and Technological Development, Brazil).

Corresponding Author
Samuel Carvalho Dumith
scdumith@yahoo.com.br

Editor:
Prof. Dr Felipe Villela Gomes

Received in: sep 7, 2020
Approved in: aug 18, 2020