Original article

Factors associated with not having Pap Smears in São Leopoldo, Rio Grande do Sul, Brazil, 2015: a cross-sectional population-based study*

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Juvenal Soares Dias-da-Costa[1] – orcid.org/0000-0003-3160-6075
Cândido Norberto Bronzoni de Mattos[1] – orcid.org/0000-0003-0083-1771
Heloísa Marquardt Leite[1] – orcid.org/0000-0002-5955-2294
Heloísa Theodoro[2] – orcid.org/0000-0001-8109-371X
Lisiane Morelia Weide Acosta[1] – orcid.org/0000-0002-2923-4869
Melina Wedoy de Freitas[1] – orcid.org/0000-0003-3802-6823
Rafaela Balzaretti Bordin[1] – orcid.org/0000-0001-5311-6216
Fernanda Bairros[3] – orcid.org/0000-0002-8611-058X
Tonantzin Ribeiro Gonçalves[1] – orcid.org/0000-0003-0249-3358
Maria Teresa Anselmo Olinto[1] – orcid.org/0000-0002-3950-4594

[1]Universidade do Vale do Rio dos Sinos, Programa de Pós-Graduação em Saúde Coletiva, São Leopoldo, RS, Brasil
[2]Universidade de Caxias do Sul, Área do Conhecimento da Vida, Caxias do Sul, RS, Brasil
[3]Universidade Federal do Rio Grande do Sul, Departamento de Assistência e Orientação Profissional, Porto Alegre, RS, Brasil

Abstract

Objective: to estimate the prevalence of Pap tests not performed in the last three years and never performed in women and to analyze factors. **Methods:** this was a cross-sectional study with women aged 20 to 69 years living in São Leopoldo, RS, Brazil, in 2015; prevalence ratios (PR) were calculated using Poisson regression. **Results:** among 919 women, prevalence of delayed testing was 17.8% (95% confidence interval [95%CI]15.4;20.3) and never tested prevalence was 8.1% (95%CI6.3%;9.8%); in the adjusted analysis, the increase in the prevalence of delayed testing was associated with economic class D/E (PR=2.1 – 95%CI1.3;3.5), being aged 20-29 years (PR=3.2 – 95%CI2.1;4.9) and not having had a medical appointment (PR=3.0 – 95%CI2.1;4.1); never having tested was associated with economic class D/E (PR=2.6 – 95%CI1.4;5.0), being aged 20-29 years (PR=24.1 – 95%CI6.4;90.9), and not having had a medical appointment (PR=2.9 – 95%CI1.7;4.8). **Conclusion:** coverage of the test was high but characterized by social inequality.

Keywords: Vaginal Smears; Women's Health; Secondary Prevention; Social Inequity; Cross-Sectional Studies.

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Correspondence:
Juvenal Soares Dias-da-Costa – Universidade do Vale do Rio dos Sinos, Programa de Pós-Graduação em Saúde Coletiva, Avenida Unisinos, No. 950, São Leopoldo, RS, Brazil. Postcode: 93022-000
E-mail: episoares@terra.com.br

Introduction

Early diagnosis of cervical cancer is performed by Pap test screening. Preventing cervical cancer by performing this test continues to be one of the main women's health care actions.[1] The World Health Organization (WHO) recommends that coverage of this examination should reach 80% of women aged 25 to 64 years in order for programs to be effective.[2] A national study found different rates of Pap test coverage in the five Brazilian macroregions among women aged 25 to 64 years between 2006 and 2013: Northern region, 54%; Northeast region, 64%; Midwest region, 65%; Southern region, 76%; and Southeast region, 87%.[3] Specific data from the Southern region showed that in 2016 in Porto Alegre, capital of Rio Grande do Sul, percentage coverage was 88.7% (95% confidence interval [95%CI] 85.7;91.7),[4] while in 2003 in the municipality of São Leopoldo it was 85.5% (95%CI83.1;87.8).[5]

As one of the objectives of screening programs is to increase coverage of the target population, it is important to identify the characteristics of people excluded from these actions, in order to alert the health services.[6] It is possible to estimate the population reached by the programs and prioritize groups at greater risk of sexually transmitted infections.[7] Unequal access to health services in order to have Pap tests has been found by population-based studies in different Brazilian regions and municipalities.[5,8,9] For example, Black women and women belonging to the lower socioeconomic classes were found to have less access to this examination.[5,8,9]

Because of the slow evolution of cervical cancer, it is important to identify women who have never undergone the test.[9] It is particularly relevant for health services to be aware of the characteristics of these women, since this group is a priority target with regard to the impact of the disease and, therefore, for screening as well.[10]

> *As one of the objectives of screening programs is to increase coverage of the target population, it is important to identify the characteristics of people excluded from these actions, in order to alert the health services.*

The objective of this study was to estimate the prevalence of Pap tests not performed in the last three years and never performed in women and to analyse associated factors.

Methods

This was a cross-sectional study of women living in São Leopoldo, RS, Brazil, in 2015.

The study included women aged 20 to 69 years living in the urban area of São Leopoldo, RS. This article refers to one element of the research project entitled 'Living conditions and health of adult women: a population-based study in the Vale do Rio dos Sinos - evaluation 10 years on'. The purpose of that research project was to diagnose and reveal determinants of women's health status, such as lifestyle habits, nutritional and psychological aspects, prevention procedures, contraceptive methods, chronic conditions and use of health services.

São Leopoldo, located in the Metropolitan Region of Porto Alegre, had an estimated population of 230,914 inhabitants in 2017, 99.7% of whom resided in the urban area of the city.[11]

The study included women residing in selected households, between February and October 2015. Forty-five census tracts were randomly selected from the 370 census tracts existing in the urban area of São Leopoldo. The selection of the sample followed a systematic procedure: the sectors were arranged in descending order, starting with the sector with highest "amount of monthly nominal income of people aged 10 years or older (with or without income)" according to the Brazilian Institute of Geography and Statistics (IBGE). In each selected sector, a block and a street corner were randomly selected. The interviews started with the first home located to the left of the street corner, jumped two houses and then interviewed the residents of the third home, and so on successively.

If the women of the household were absent, new visits were scheduled. Women who were not resident in the selected household, pregnant women and those with mental disabilities were excluded from the study.

We considered two outcomes: delayed cervical screening (not conducted in the last three years);[12] and never having had cervical screening.

The independent variables we considered were classified as socioeconomic, demographic and gynecological variables, as well as variables related to health services.

The socioeconomic variables were: economic class (according to the Brazilian Association of Research Companies [ABEP]: A/B; C; D/E); education level (years

of study: 15 or more; 12-14; 8-11; 5-7; 0-4); and per capita income (in minimum wages: 3 or more; 1 to 2.99; less than 1). The ABEP economic classification took into consideration ownership of certain material goods at home, schooling of the head of the family and number of residents employed.[13] Per capita family income was based on the amount of the regional minimum wage at the time of the survey - R$1,006.88 - and the number of persons residing in the household.

The demographic variables considered were: age (categorized into ten-year age groups: 20-29; 30-39; 40-49; 50-59; 60-69); ethnicity/skin color, as reported by the interviewee (White; non-White); and marital status (married/partnership; single/divorced/widowed). We also considered gynecological variables: number of children (none; 1-3; 4 or more); age of menarche (in years: 8-11; 12-13; 14 or more); use of condoms in sexual intercourse (yes; no). Regarding the variables related to health services, we analyzed the number of visits to health services in the last year (5 or more; 3-4; 1-2; none) and the nature of the type of health service used in the most recent appointment (private/health plan; public).

Approximately 30 students from the Vale do Rio dos Sinos University underwent a training program for them to conduct individual interviews. Standardized and pre-coded questionnaires were administered to all women in the age range studied and resident in the selected households. The outcomes were measured by the following question:

How long is it since you had your last cancer prevention examination (cytopathology, pre-cancer screening, Pap smear, cervical cancer prevention test)?

A pilot study conducted in a census tract not selected for this research was part of the interviewer training program, in order to test the questionnaire and the logistics of the survey. Interview quality control was done by means of telephone contact with 10% of the women interviewed selected at random, whereby a simplified version of the questionnaire (with no alterations to the questions) was administered shortly after the original interviews.

We used Epi Info version 7.2.2.2 to calculate the sample size, taking into account the following data: 95% confidence level; power of 80%; non-exposed/exposed ratio of 1:2, according to economic class distribution in São Leopoldo in 2003 (non-exposed women were taken to be those belonging to classes A/B); outcome prevalence of 6% (delayed cervical screening); and risk ratio of 2.0.5 This resulted in an estimated sample size of 905 women, plus 10% for losses and 15% to control for confounding factors, whereby a total of 1,130 women were needed for the study.

We performed double data entry with the aim of identifying typing errors. The data were tabulated using SPSS version 22.0 (SPSS Inc., Chicago, USA). The analyses were performed using Stata version 13.0 (StataCorp, College Station, TX, USA), showing the outcome prevalence rates, prevalence ratios (PR) and respective 95% confidence intervals (95%CI), in addition to applying the Wald test. The adjusted analysis was performed according to the conceptual model, using Poisson regression, and using the svy command to take design error into account. The conceptual model had two hierarchical levels: the first level contained the socioeconomic and demographic variables, while the second level contained the gynecological variables and those related to health services. Variables with a p-value <0.20 in the crude analysis were included in the adjusted model, as were variables with a p-value <0.05.

The study project was approved by the University of Vale do Rio dos Sinos (Unisinos) Research Ethics Committee: Protocol 653,394, on 20 May 2014. All the participants signed a Free and Informed Consent Form, in accordance with National Health Council (CNS) Resolution No. 466 dated 12 December 2012.

Results

We interviewed 1,128 women out of the 1,281 we visited; 153 (11.9%) were classified as losses and refusals. Nine hundred and twenty-nine of the women interviewed reported having an active sex life in the year preceding the interview, but ten of them had no information about having had Pap tests. As such, 919 women with an average age of 40.9±12.5 years were included in the study (Figure 1).

We found delayed Pap tests among 164 (17.8% - 95%CI15.4;20.3) women and 74 (8.1% - 95%CI6.3;9.8) women had never had a Pap test. Most women were found to belong to economic class C (50.9%), with schooling of 8-11 years (36.4%) and per capita income lower than one minimum wage (59.7%). The majority of the women were aged up to 49 years old (73.6%), reported their ethinicity/skin color as being White (74.4%) and were married/living in partnership

(72.9%). We identified that 69.4% of the participants had one to three children, 46.2% with menarche at 12 or 13 years old, and 76.9% who did not use condoms in their sexual relations; 35.5% had had five or more health service appointments in the last year, with the majority using private services or a health plan: 57.1% (Table 1).

In the crude analysis, greater probabilities of delayed Pap tests were found in women belonging to class C (PR=2.4 95%CI1.6;3.6) and D/E (PR=4.2 – 95%CI2.6;6.8), with 5-7 years of schooling (PR=4.4 95%CI1.8;11.0) and 0-4 years of schooling (PR=3.9 95%CI1.6;9.9), those who had not had a health service appointment in the year preceding the interview (PR=3.3 95%CI2.2;4.8) and those who had had their most recent medical consultation at a public health service (PR=2.5 95%CI1.2;5.3) (Table 2). After adjustments, delayed examination remained associated with women belonging to class D/E (PR=2.1 95%CI1.3;3.5), taking class A/B as a reference, those aged 20-29 (PR=3.2 95%CI2.1;4.9), when compared to those aged 40-49, and not having had a medical consultation in the last year (PR=3.0 95%CI2.1;4.1), in comparison with women who had had five or more appointments in the year preceding the study (Table 2).

Never having had a Pap test was more frequent in economic classes D/E (PR=2.6 95%CI1.4;5.0), in comparison to women belonging to class A/B. Women aged 20-29 (PR=24.1 - 95%CI6.4;90.9), 30-39 (PR=6.2 95%CI1.6;23.4) and 60-69 (PR=8.6 95%CI1.6;46.8) were more likely to have never had the examination, when compared to those aged 40-49 years. We found a higher probability of never having had the examination among women who had not consulted at health services during the previous year (PR=2.9 95%CI1.7;4.8), compared to those having five or more appointments. Having children was a protective factor against never having had the examination: prevalence rates of never having tested were lower for those with one to three children (PR=0.3 95%CI0.2;0.5) and with four or more children (PR=0.4 95%CI0.2;0.8), when compared to women who had never had children (Table 3).

Discussion

Pap test coverage in women was high in São Leopoldo. Delayed testing and never having tested were higher among poor and younger women and those who had never had a medical consultation. Parity was a protective factor against not having Pap tests.

Our study included women aged 20 to 69 years, although the Ministry of Health recommended target population for screening are women aged 20 to 65 years.[14] The increased age range may have increased access, since being older was a protective factor against not having Pap tests. Our study was representative of the municipality and was strictly conducted, thus enabling comparison with a very similar study, conducted in the previous decade, in the same municipality and with women in the same age range.[5] Owing to losses, the sample size was not achieved. This reduced the power of the study to 69.5% and increased the possibility of type 2 errors, i.e., differences not being detected when, effectively, they do exist.

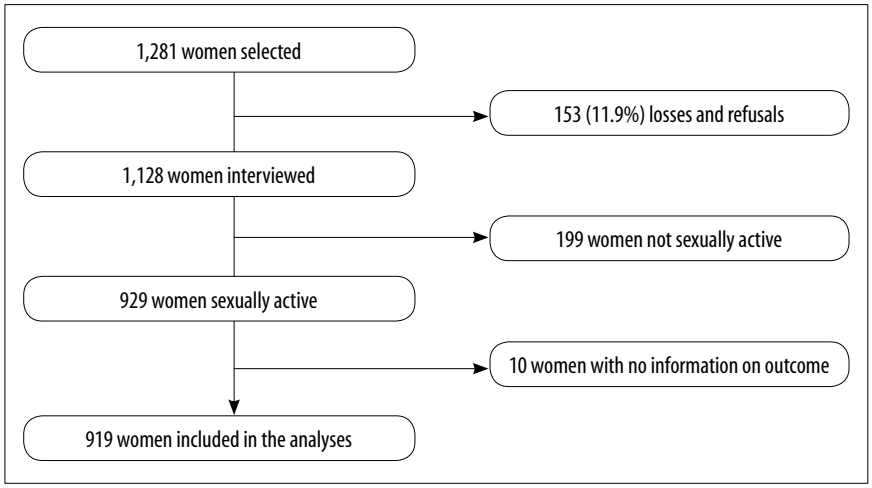

Figure 1 – Women selection process

Table 1 – Characteristics of participants (n=919) and prevalence of delayed testing and never testing, according to socioeconomic, demographic, gynecological and health service utilization variables, São Leopoldo, Rio Grande do Sul, 2015

Variables	N (%)	% delayed	% never tested
Economic Classification			
A/ B	347 (38.0)	8.6	3.5
C	465 (50.9)	20.4	9.0
D-E	102 (11.1)	36.3	17.6
Education level (in years of schooling)			
≥15	83 (9.1)	6.0	2.4
12-14	126 (13.8)	14.3	6.4
8-11	333 (36.4)	13.5	7.5
5-7	203 (22.2)	26.6	11.8
0-4	169 (18.5)	23.7	7.7
Family income (in monthly minimum wages)			
≥3	59 (6.6)	10.2	1.7
1-2.9	301 (33.7)	8.0	3.7
<1	534 (59.7)	23.6	11.0
Age (in years)			
20-29	207 (22.5)	33.8	23.7
30-39	228 (24.8)	15.8	6.1
40-49	242 (26.3)	9.9	1.2
50-59	167 (18.2)	13.8	1.8
60-69	75 (8.2)	14.7	6.7
Ethnicity/skin color			
White	684 (74.4)	17.4	7.5
Non-White	235 (25.6)	19.2	9.8
Marital status			
Married/partnership	670 (72.9)	16.4	6.7
Single/divorced/widowed	249 (27.1)	21.7	11.6
Number of children			
None	178 (19.4)	18.5	15.2
1-3	636 (69.4)	15.9	5.8
≥4	103 (11.2)	29.1	9.7
Age of menarche			
8-11	217 (23.7)	19.8	7.8
12-13	422 (46.2)	18.2	9.2
≥14	275 (30.1)	15.6	6.2
Use of condoms			
Use	179 (23.1)	16.9	9.6
Do not use	594 (76.9)	18.7	8.7
Number of medical appointments			
≥5	326 (35.5)	13.2	6.1
3-4	170 (18.5)	9.4	3.5
1-2	277 (30.1)	15.2	6.1
None	146 (15.9)	43.2	21.2
Nature of health service			
Private/healthcare plan	160 (57.1)	34.4	46.7
Public	120 (42.9)	65.6	42.7

Table 2 – Factors associated with delayed Pap tests in sexually active women (n=919), São Leopoldo, Rio Grande do Sul, 2015

Variables	Crude analysis		Adjusted analysis	
	PR[c](95%CI[d])	P-value	PR[c](95%CI[d])	P-value
First block - sociodemographic				
Economic classificationa		<0.001		0.021
A/ B	1.0		1.0	
C	2.4 (1.6;3.6)		1.5 (1.0;2.3)	
D-E	4.2 (2.6;6.8)		2.1 (1.3;3.5)	
Education level (in years of schooling)[a]		<0.001		0.038
≥15	1.0		1.0	
12-14	2.4 (0.9;6.4)		1.4 (0.6;3.5)	
8-11	2.2 (0.9;5.6)		1.3 (0.5;3.1)	
5-7	4.4 (1.8;11.0)		2.3 (0.9;5.6)	
0-4	3.9 (1.6;9.9)		2.1 (0.9;5.0)	
Family income (in monthly minimum wages)[a]		<0.001		0.005
≥3	1.0		1.0	
1-2.9	0.8 (0.3;1.9)		0.6 (0.2;1.5)	
<1	2.3 (1.0;5.3)		1.1 (0.4;3.1)	
Age (in years)[a]		<0.001		<0.001
40-49	1.0		1.0	
20-29	3.4 (2.1;5.4)		3.2 (2.1;4.9)	
30-39	1.6 (0.9;2.7)		1.5 (0.9;2.4)	
50-59	1.4 (0.8;2.5)		1.3 (0.7;2.5)	
60-69	1.5 (0.7;3.0)		1.4 (0.7;2.8)	
Ethnicity/skin color		0.584		
White	1.0			
Non-White	1.1 (0.8;1.5)		–	
Marital status[a]		0.094		0.258
Married/Partnership	1.0		1.0	
Single/divorced/widowed	1.3 (0.9;1.8)		1.2 (0.9;1.6)	
Second block - clinical				
Number of children[b]		0.014		0.073
None	1.0		1.0	
1-3	0.9 (0.6;1.3)		0.7 (0.5;0.9)	
≥4	1.6 (0.9;2.6)		0.8 (0.5;1.3)	
Age of menarche		0.533		
8-11	1.0			
12-13	0.9 (0.6;1.3)			
≥14	0.8 (0.5;1.2)		–	
Condom use		0.618		
Yes	1.0			
No	1.1 (0.7;1.7)		–	

a) Variables included on the first level and adjusted between each other.
b) Variables adjusted between each other and adjusted for economic class and age.
c) PR: prevalence ratio.
d) 95%CI95% confidence interval.

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Table 2 – Factors associated with delayed Pap tests in sexually active women (n=919), São Leopoldo, Rio Grande do Sul, 2015

Variables	Crude analysis		Adjusted analysis	
	PR[c](95%CI[d])	P-value	PR[c](95%CI[d])	P-value
Second block - clinical				
Number of medical appointments[b]		<0.001		<0.001
≥5	1.0		1.0	
3-4	0.7 (0.4;1.3)		0.7 (0.5;1.1)	
1-2	1.1 (0.7;1.8)		1.1 (0.7;1.8)	
None	3.3 (2.2;4.8)		3.0 (2.1;4.1)	
Nature of health service		0.012		0.124
Private/healthcare plan	1.0		1.0	
Public	2.5 (1.2;5.3)		2.0 (0.8;4.8)	

a) Variables included on the first level and adjusted between each other.
b) Variables adjusted between each other and adjusted for economic class and age.
c) PR: prevalence ratio.
d) 95%CI95% confidence interval.

Prevalence of not having Pap tests was higher among women with fewer years of schooling, although there was no statistical association. This finding may be related to probable collinearity with the ABEP economic classification, when the woman is the head of the family. Other studies have shown an association between social vulnerability and not having Pap tests. The 2013 National Health Survey identified that not having Pap tests in recent years was two times greater among women with no schooling than among those with university qualifications. In addition, the prevalence of never having had a Pap test was three times greater in women with no schooling.[15] A cross-sectional study with 2,238 mothers who had children in 2010, in Rio Grande, RS, which assessed failure to have Pap tests in the pre-natal period, found association between low schooling and not having this examination.[16]

A previous study conducted in São Leopoldo also found lower levels of screening among women belonging to lower socioeconomic classes, but with measures of effect exceeding those found in our study. This may possibly be evidence of improvement in access to and quality of care provided by the health system over time.[5]

In Boa Vista, RR, a cross-sectional study of 603 women aged 20-59 found coverage of 86%; however, even in the adjusted analysis, not having the examination was higher in lower-income participants.[17] In Rio Branco, AC, a cross-sectional study of 772 women aged 18-69 found 85% coverage; however, the same study found fewer examinations among women with low schooling and those with no income.[18] In a cross-sectional study conducted with 230 female users of the Family Health Strategy in Feira de Santana, BA, Pap test coverage was 87% but higher prevalence of non-adherence was found among women who had never attended school.[19] In Florianópolis, SC, a cross-sectional study with women aged 20-59 found 93% examination coverage over their lifetime, and that 14% had delayed having the examination; that study also found that examination prevalence rates were lowest among women with lower income and lower levels of schooling.[20]

The number of medical consultations in the year preceding the study was associated with the outcomes. Not having had any consultation doubled the probability of delayed examinations or never having had this examination. This result was consistent with those of other studies[5,16] and reaffirmed the thesis that seeking health services increases the likelihood of receiving preventive care.

Women who had had children were less likely to have never had the examination, when compared to nulliparous women. The examination is part of the activities of the prenatal program and, probably because of this, prevalence of not having a Pap test was lower among women who had had children. The cross-sectional study mentioned above involving puerperal women in Rio Grande, which assessed failure to have Pap tests during pre-natal care, also revealed that the fact of having had less than six prenatal care attendances was associated with not having Pap tests.[16]

Table 3 – Factors associated with Pap tests never having been performed in sexually active women (n=919), São Leopoldo, Rio Grande do Sul, 2015

Variables	Crude analysis		Adjusted analysis	
	PR[c](95%CI[d])	P-value	PR[c](95%CI[d])	P-value
First block - sociodemographic				
Economic classificationa		<0.001		0.015
A/ B	1.0		1.0	
C	2.6 (1.4;5.0)		1.7 (1.0;3.0)	
D/E	5.1 (2.5;10.6)		2.6 (1.4;5.0)	
Education level (in years of schooling)[a]		0.138		0.285
≥15	1.0		1.0	
12-14	2.6 (0.6;12.4)		1.2 (0.3;6.1)	
8-11	3.1 (0.7;13.1)		1.2 (0.3;5.2)	
5-7	4.9 (1.2;20.8)		1.9 (0.4;8.8)	
0-4	3.2 (0.7;14.7)		1.2 (0.3;5.6)	
Family income (in monthly minimum wages)[a]		<0.001		0.230
≥3	1.0		1.0	
1-2.9	2.2 (0.3;16.7)		1.4 (0.2;13.2)	
<1	6.5 (0.9;47.0)		2.4 (0.2;27.7)	
Age (in years)[a]		<0.001		<0.001
40-49	1.0		1.0	
20-29	19.1 (5.9;61.3)		24.1 (6.4;90.9)	
30-39	4.9 (1.4;17.2)		6.2 (1.6;23.4)	
50-59	1.4 (0.3;7.2)		2.2 (0.3;14.0)	
60-69	5.4 (1.3;22.5)		8.6 (1.6;46.8)	
Ethnicity/skin color		0.279		
White	1.0			
Non-White	1.3 (0.8;2.1)		–	
Marital status a		0.021		0.310
Married/Partnership	1.0		1.0	
Single/divorced/widowed	1.7 (1.1;2.8)		1.2 (0.8;1.7)	
Second block - clinical				
Number of children[b]		<0.001		<0.001
None	1.0		1.0	
1-3	0.4 (0.2;0.6)		0.3 (0.2;0.5)	
≥4	0.6 (0.3;1.3)		0.4 (0.2;0.8)	
Age of menarche		0.379		
8-11	1.0			
12-13	1.2 (0.7;2.1)			
≥14	0.8 (0.4;1.5)		–	
Condom use		0.726		
Yes	1.0			
No	0.9 (0.5;1.6)		–	

a) Variables included on the first level and adjusted between each other.
b) Variables adjusted between each other and adjusted for economic class and age.
c) PR: prevalence ratio.
d) 95%CI95% confidence interval.

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Table 3 – Factors associated with Pap tests never having been performed in sexually active women (n=919), São Leopoldo, Rio Grande do Sul, 2015

Variables	Crude analysis		Adjusted analysis	
	PR[c](95%CI[d])	P-value	PR[c](95%CI[d])	P-value
Second block - clinical				
Number of medical appointments[b]		<0.001		<0.001
≥5	1.0		1.0	
3-4	0.6 (0.2;1.4)		0.6 (0.2;1.2)	
1-2	1.0 (0.5;1.9)		0.9 (0.4;1.8)	
None	3.5 (2.0;6.1)		2.9 (1.7;4.8)	
Nature of health service		0.416		
Private/healthcare plan	1.0		–	
Public	1.5 (0.5;4.2)			

a) Variables included on the first level and adjusted between each other.
b) Variables adjusted between each other and adjusted for economic class and age.
c) PR: prevalence ratio.
d) 95%CI95% confidence interval.

Coverage of the cytopathological exam in São Leopoldo is high, with few women in arrears and never having done so. Difficulties of access to the exam were influenced by social inequities.

Authors' contributions

Dias-da-Costa JS participated in the design, analysis, interpretation of data and drafting of the paper. Mattos CB, Leite HM, Theodoro H, Acosta LMW, Freitas MW and Bordin RB participated in the analysis, interpretation of data and drafting of the paper. Bairros F, Gonçalves TR and Olinto MTA participated in the study design, interpretation of relevant data and critical review of the intellectual content of the manuscript. All authors approved the final version of the manuscript and declared themselves to be responsible for all aspects of the study, ensuring its accuracy and integrity.

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