Profile of Cytopathological Exam Collections in a Municipality Gaucho: Analysis of the Three-year Period 2019-2021

Perfil das Coletas do Exame Citopatológico em um Município Gaúcho: Análise do Triênio 2019-2021
Perfil de las Colecciones de Exámenes Citopatológicos en un Municipio Gaucho: Análisis del Trimestre 2019-2021

RESUMO
Objetivo: analisar o perfil das coletas de exame citopatológicos realizadas em um município da região metropolitana de Porto Alegre - RS. **Métodos:** Trata-se de um estudo de caráter transversal de abordagem quantitativa, através da análise de dados secundários disponibilizados no Departamento de Informática do Sistema Único de Saúde (DATASUS). O período analisado foi o triênio de 2019-2021. **Resultados:** Foram 17.827 coletas de exame citopatológico, sendo 4.960 (27,82%) em 2019, 5.638 (31,63%) em 2020 e 7.229 (40,55%) em 2021. Dessas, a maioria (78,40%) dentro da faixa etária preconizada e com alterações reativas ou reparativas (84,52%). Entre as mulheres dentro da faixa etária 4.931 (39,34%) e fora do preconizado 1.056 (34,67%), há elevado percentual de mulheres que realizam o exame anualmente. Observou-se que 17.215 (96,56%) foram de rastreamento, 317 (1,77%) de repetição e 295 (1,65%) de seguimento dentre motivos para a realização do exame. **Conclusão:** Evidencia-se que o município em questão apresentou baixa cobertura de coletas de exames citopatológicos dentro da faixa etária preconizada nos anos de 2019, 2020 e 2021.
DESCRITORES: Exame de Papanicolau; Infecções por Papillomavírus; Neoplasias do colo do útero; Doenças do colo do útero; Epidemiologia.

ABSTRACT
Objective: analyze the profile of cytopathological exam collections carried out in a municipality in the metropolitan region of Porto Alegre - RS. **Method:** This is a cross-sectional study with a quantitative approach, through the analysis of secondary data available at the Departamento de Informática do Sistema Único de Saúde (DATASUS). The period analyzed was the triennium 2019-2021. **Results:** There were 17,827 cytopathological examination collections, 4,960 (27.82%) in 2019, 5,638 (31.63%) in 2020 and 7,229 (40.55%) in 2021. Of these, the majority (78.40%) within the recommended age group and with reactive or reparative alterations (84.52%). Among women within the age group 4,931 (39.34%) and outside the recommended 1,056 (34.67%), there is a high percentage of women who undergo the test annually. It was observed that 17,215 (96.56%) were screening, 317 (1.77%) were repeat and 295 (1.65%) for follow-up among reasons for performing the test. **Conclusion:** It is evident that the municipality in question had low coverage of collections of cytopathological tests within the recommended age group in the years 2019, 2020 and 2021.
DESCRIPTORS: Papanicolaou Test; Papillomavirus Infections; Uterine Cervical Neoplasms; Uterine Cervical Diseases; Epidemiology.

RESUMEN
Objetivo: Analizar el perfil de las recolecciones de exámenes citopatológicos realizadas en un municipio de la región metropolitana de Porto Alegre - RS. **Métodos:** Se trata de un estudio transversal de enfoque cuantitativo, a través del análisis de datos secundarios disponibles en el Departamento de Informática del Sistema Único de Salud (DATASUS). El período analizado fue el trienio 2019-2021. **Resultados:** Se realizaron 17.827 recolecciones de exámenes citopatológicos, siendo 4.960 (27,82%) en 2019, 5.638 (31,63%) en 2020 y 7.229 (40,55%) en 2021. De estas, la mayoría (78,40%) dentro del rango de edad recomendado y con alteraciones reactivas o reparativas (84,52%). Entre las mujeres dentro del rango de edad, 4.931 (39,34%) y fuera del recomendado, 1.056 (34,67%), se observó un alto porcentaje de mujeres que realizan

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el examen anualmente. Se verificó que 17.215 (96,56%) fueron de tamizaje, 317 (1,77%) de repetición y 295 (1,65%) de seguimiento entre los motivos para la realización del examen. **Conclusión:** Se evidencia que el municipio en cuestión presentó una baja cobertura de recolecciones de exámenes citopatológicos dentro del rango de edad recomendado en los años 2019, 2020 y 2021.
DESCRIPTORES: Examen de Papanicolaou; Infecciones por Papillomavirus; Neoplasias del cuello uterino; Enfermedades del cuello uterino; Epidemiología.

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Cláudia Laidete Luz da Silva
Specialist in Primary Care; University of Vale do Rio dos Sinos - UNISINOS
ORCID: https://orcid.org/0009-0007-3667-5754

Mariana do Couto Soares
Specialist in Primary Care; University of Vale do Rio dos Sinos - UNISINOS
ORCID: https://orcid.org/0000-0002-8860-4874

Murilo Santos de Carvalho
Specialist in Primary Care; University of Vale do Rio dos Sinos - UNISINOS
ORCID: https://orcid.org/0000-0003-1862-4754

Vania Celina Dezoti Micheletti
Doctor in Pulmonary Sciences; University of Vale do Rio dos Sinos - UNISINOS
ORCID: https://orcid.org/0000-0003-1254-7479

Scheila Mai
Doctoral student in Public Health; University of Vale do Rio dos Sinos - UNISINOS
ORCID: https://orcid.org/0000-0003-1800-0140

INTRODUCTION

The Human Papilloma Virus (HPV) is considered a public health problem, being considered the main cause of cervical cancer and presenting a high incidence and high mortality rate among women.[1,3] There are currently more than 150 different types of HPV, which are related to the origin of benign lesions such as warts and laryngeal papillomas (non-oncogenic or low-risk HPV); precursor lesions; and various types of cancer (oncogenic or high-risk HPV), such as cervical cancer, and less frequently anus, vagina and penis.[1-5]

HPV types 16 and 18 cause approximately 70% of cervical cancer cases, the third most common among women and the third leading cause of cancer deaths in Brazil. They are also linked to up to 90% of anal cancers, 60% of vaginal cancers and 50% of vulvar cancers. Types 6 and 11 predominate in genital warts and laryngeal papillomas, without a significant risk of malignancy.[1-6]

The Ministry of Health and the National Cancer Institute (INCA - I*nstituo Nacional do Câncer*) recommend that women aged 25 to 64 undergo cytological testing. Given the high incidence of cervical cancer, it is essential that health professionals prioritize strategic actions for prevention, education and quality care.[1]

In 2012, the new Cancer Information System (SISCAN - *Sistema de Informação do Câncer*) was implemented. The system is the web platform version that integrates the Cervical Cancer Information System (SISCOLO - *Sistemas de Informação do Câncer do Colo do Útero*) and the Breast Cancer Information System (SISMAMA) and aims to record requests for cytopathological and histopathological screening and diagnostic investigation of cervical and breast cancer, mammograms, results of all exams and follow-up of abnormal exams. In addition, it generates data that support monitoring and evaluation.[7]

With the Previne Brasil Program (PPB - *Programa Previne Brasil*) (Ordinance No. 2,979/2019), which changes the financing of Primary Health Care (APS), the importance of monitoring and active search in cervical cancer screening is reinforced, considering the "Proportion of women with cytology collection in APS" as an evaluation indicator. 8

Seeking to fill gaps in the monitoring and effectiveness of cervical cancer screening strategies, evaluating adherence to cytopathological examination and the influence of health policies, such as SISCAN and PPB, in the early detection of

diseases, this study aimed to analyze the profile of three years of cytopathological examination collections carried out in a municipality in the metropolitan region of Porto Alegre, in the state of Rio Grande do Sul.

METHOD

This is a descriptive, cross-sectional observational study.

The cytopathological collection data considered the period from 2019 to 2021 and were extracted from the Department of Information Technology of the Unified Health System - DATASUS, on the TABNET platform, with free online access, through Epidemiological and Morbidity information, Cancer Information System - SISCAN (cervical and breast), by place of residence and by period.

To tabulate the data, the recommended and non-recommended age groups for the collection of cytopathological exams were considered, the results of the cytopathological exam with changes according to the recommended and non-recommended age groups, and the frequency of collection of the cytopathological exam from the recommended and non-recommended age groups, according to the place of residence (municipality under study) and by year.

The following alterations were considered: atypical squamous cells of undetermined significance, possibly non-neoplastic (ASC-US); atypical squamous cells of undetermined significance that cannot exclude high-grade intraepithelial lesion (ASC-H); atypia of undefined origin (AIO); high-grade undefined glandular atypia (AGC-H); low-grade squamous intraepithelial lesion (LSIL); high-grade squamous intraepithelial lesion (HSIL); high-grade intraepithelial lesion that cannot exclude micro-invasion and invasive squamous cell carcinoma (SCC).

Data collection took place between May and August 2022. The data were compiled in an Excel database (extension.xlsx), and analyzed descriptively, where categorical variables were presented as relative and absolute frequency.

Studies that use secondary data available in public information systems (following Data Protection Law No. 13,709/2018) are exempt from evaluation by Research Ethics Committees, according to resolution 466/2012 of the National Council for Ethics and Research (CONEP - *Conselho Nacional de Ética e Pesquisa*). The records made are kept by the researchers, in a safe place that is free from violations, and will remain for a period of 10 years. After this period, they will be destroyed.

RESULTS

A total of 17,827 cytopathological exam collections were found during the three-year period studied. In 2019, 4,960 (27.82%) were performed, in 2020, 5,638 (31.63%) and in 2021, 7,229 (40.55%) exam collections were performed. These data represent, respectively, 3.8%, 4.3%, 5.5% of collections estimated by the Previne Brasil program, in each year of the three-year period.

Table 1 shows the descriptions of the recommended and non-recommended age groups for cytopathological exam collection of women residing in the municipality under study, in the years 2019, 2020 and 2021.

Table 1 – Recommended and non-recommended age range in years for cytopathological examination collection of women residing in the study municipality, from 2019 to 2021. São Leopoldo, RS, Brazil

Collection year - Recommended age range	25 - 29 years	30 - 34 years	35 - 39 years	40 - 44 years	45 - 49 years	50 - 54 years	55 - 59 years	60 - 64 years	Total n(%)
2019	379	405	467	464	503	600	581	445	3844 (27,50)
2020	438	464	516	566	595	708	627	515	4429 (31,68)
2021	601	579	655	729	728	863	854	695	5704 (40,80)
Total n(%)	1418 (10,14)	1448 (10,35)	1638 (11,71)	1759 (18,68)	1826 (13,06)	2171 (15,53)	2062 (14,75)	1655 (11,84)	13977 (100)
Collection year - Age range not recommended	≤9 years	10 - 14 years	15 - 19 years	20 - 24 years	65 - 69 years	70 - 74 years	75 - 79 years	≥79 years	Total n(%)
2019	0	5	223	375	321	135	40	17	1116 (28,98
2020	0	7	229	448	347	137	32	9	1209 (31,40)
2021	1	10	276	564	437	175	47	15	1525 (39,61)
Total n(%)	1 (0,02)	22 (0,57)	728 (18,90)	1387 (36,02)	1105 (28,70)	447 (11,61)	119 (3,09)	41 (1,06)	3850 (100)

Source: prepared by the authors based on DATASUS [9]

Of the total 17,827 cytopathological exams performed in the three-year period, 7,497 (42.05%) showed alterations. Of these, the findings of benign reactive or reparative alterations represented 1660 (85.9%), 2259 (86.2%) and 2418 (82.0%) in the years 2019, 2020 and 2021 respectively. Alterations of atypia of undetermined significance, atypia in squamous cells and atypia in glandular cells represented 269 (13.9%), 365 (13.9%) and 526 (17.9%) in the years 2019, 2020 and 2021 respectively.

Tables 2 and 3 describe the results of altered cytopathological tests, collected outside and within the recommended age range (25 to 64 years) of women residing in the study municipality, in the 2019-2021 triennium.

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Table 2 – Result of cytopathological examination with alterations in the recommended age range of women residing in the study municipality, three-year period from 2019 to 2021. São Leopoldo, RS, Brazil

Collection year	25 - 29 years	30 - 34 years	35 - 39 years	40 - 44 years	45 - 49 years	50 - 54 years	55 - 59 years	60 - 64 years	Total n(%)
2019	28	34	32	32	28	15	12	10	191 (22,69)
2020	35	42	40	48	36	20	23	16	260 (30,86)
2021	68	58	57	59	53	47	29	19	390 (46,45)
Total n(%)	131 (15,57)	134 (15,93)	129 (15,33)	139 (16,52)	117 (13,91)	82 (9,75)	64 (7,60)	45 (5,35)	841 (100)

Source: prepared by the authors based on DATASUS [9]

Table 3 – Results of cytopathological exams with abnormalities in a non-recommended age group of women residing in the study municipality, for the 2019–2021 triennium. São Leopoldo, RS, Brazil.

Collection year	≤9 years	10 to 14 years	15 to 19 years	20 to 24 years	65 to 69 years	70 to 74 years	75 to 79 years	≥79 years	Total n(%)
2019	-	1	30	37	9	2	-	-	79 (24,76)
2020	-	1	24	55	13	6	3	2	104 (32,60)
2021	-	1	46	69	11	7	1	1	136 (42,64)
Total n(%)	-	3 (0,94)	100 (31,34)	161 (50,47)	33 (10,34)	16 (5,01)	4 (1,25)	3 (0,94)	319 (100)

Source: prepared by the authors based on DATASUS [9]

When evaluating Tables 2 and 3, it is observed that the altered exams within the recommended collection age range represented 72.68%. It is worth mentioning that the alterations considered benign reactive or reparative, such as: inflammation, metaplasia, repair, atrophy with inflammation, undefined non-neoplastic glandular alterations and cells of undefined non-neoplastic origin, were not described in Tables 2 and 3, as they do not include the object of analysis.

In Tables 4 and 5, it is identified that both in women in the age range 4931 (39.34%) and outside the recommended age range 1056 (34.67%), there is a high percentage of women who perform the exam annually.

Table 4 – Frequency of cytopathological examination collection, according to the recommended age range, of women residing in the study municipality, from 2019 to 2021. São Leopoldo, RS, Brazil

Time Period	25 - 29 years	30 - 34 years	35 - 39 years	40 - 44 years	45 - 49 years	50 - 54 years	55 - 59 years	60 - 64 years	Total n(%)
Same year	64	60	54	65	62	68	64	47	484 (3,86)
1 year	393	424	553	622	677	818	826	618	4931 (39,34)
2 years	342	378	445	475	513	649	600	489	389 (31,05)
3 years	143	157	167	185	193	193	200	165	1403 (11,19)
4 years or more	146	155	163	152	133	178	140	133	1200 (9,57)

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Ignored/blank	129	77	83	85	67	72	63	48	624 (4,28)
Total n(%)	1217 (9,71)	1251 (9,98)	1465 (11,68)	1584 (12,63)	1645 (13,12)	1978 (15,78)	1893 (15,10)	1500 (11,96)	12533 (100)

Source: prepared by the authors based on DATASUS [9]

Table 5 – Frequency of cytopathological examination collection, according to non-recommended age group, of women residing in the study municipality, from 2019 to 2021. São Leopoldo, RS, Brazil

Collection year	≤9 anos	10 a 14 anos	15 a 19 anos	20 a 24 anos	65 a 69 anos	70 a 74 anos	75 a 79 anos	≥79 anos	Total n(%)
Same year	0	0	26	46	34	7	5	0	118 (3,87)
1 year	0	0	126	321	404	162	32	11	1056 (34,67)
2 years	0	0	71	317	331	115	36	7	877 (28,79)
3 years	0	0	18	127	110	43	12	7	317 (10,41)
4 years or more	0	0	4	82	80	43	17	7	233 (7,65)
Ignored/blank	1	10	186	186	32	23	3	4	445 (14,61)
Total n(%)	1 (0,03)	10 (0,32)	431 (14,14)	1079 (35,42)	991 (32,53)	393 (12,90)	105 (3,44)	36 (1,18)	3046 (100)

Source: prepared by the authors based on DATASUS [9]

DISCUSSION

When analyzing the data, of the total of 17,827 cytopathological exam collections performed in the three-year study period, we observed that 17,215 (96.56%) were for screening, 317 (1.77%) for repetition and 295 (1.65%) for follow-up among the reasons for performing the exam. The cytopathological collections represented 78.40% (13,977) within the recommended age range, while those outside the age range were 21.60% (3,850).

The Previne Brasil Program, one of the forms of financing for the APS, presented an estimate of cytopathological collections within the recommended age range (25 to 64 years) in women residing in the municipality studied, 128,455 in 2019, 129,421 in 2020 and 130,455 in 2021. [9]

According to the study by Ribeiro and Correa [10], the cytopathological collection test performed on women within the recommended age range in Brazil showed little variation between 2019, representing 80.4%, and 2020 (during the pandemic), representing 81.5%.

In the municipality under study, a lower percentage of tests performed than estimated was observed, however, there was an increase in the percentage of collections between the years analyzed. These data may suggest that the municipality merely followed the expected population growth, without increasing its collection coverage.

The Ministry of Health recommends that sexually active women undergo cytological examinations from the ages of 25 to 64. INCA highlights that cervical cancer is rare in women up to 30 years old, and that mortality increases progressively from the fourth decade of life onwards. [3,11-13]

The Previne Brasil program establishes payment for performance in health indicators, with the goal of performing cytopathological exams in primary health care. Cervical cancer screening should be performed by all women between the ages of 25 and 64 who are sexually active or have initiated their sexual life. The recommended interval is 3 years if the woman has 2 annual exams with negative results. [12,13]

For women aged 64 who have never had the test before, two tests with an interval of 1 to 3 years are recommended. In the case of a negative result, they may be exempted from taking new tests, as there is no scientific evidence to prove the effectiveness of screening after the age of 65. [12,13]

It is important to emphasize that the indicator of the financing program only considers collections carried out in the age range recommended by the technical note and other guidelines. As for the municipality, only collections carried out in the PHC are counted. The objective of this indicator is to evaluate the reach of the PHC teams in the municipalities, encouraging a greater active

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search. The evaluation of the indicator for calculation purposes is carried out through data from the Health Information System for Primary Care (SISAB), with a four-monthly frequency. [14,15]

According to the World Health Organization, data shows that to reduce the incidence of cervical cancer by 60% to 90%, at least 80% screening coverage is required. 13,14 Therefore, the parameter set was 80% of the proportion of women with cytological collection in PHC performed in the last 3 years. However, due to the pandemic scenario and the need to value PHC teams, at the time of data collection the target defined for this indicator was 40%. [14,15.]

According to the SISAB [16], the municipality under study presented the following coverage of cytopathological collection in the four-month periods (Q): 2019 - Q1 22%; Q2 23%; Q3 23%, (pre-pandemic period), however, in the following years (pandemic period), there was variation between the four-month periods, being 2020 - Q1 25%; Q2 17%; Q3 21%; 2021 - Q1 22%; Q2 19%; Q3 25%. The municipality has been showing a gradual increase in coverage, but it is still far from what is recommended by the World Health Organization.

The findings of the present study are higher when compared to similar studies in which the prevalence of cytopathological abnormalities was lower (5.72%) such as the Rocha, Bahia and Rocha study [17] in Pará, Coelho et al. [18] in Piauí, (5,32%) and Fonseca et al. [19], in Roraima (7%).

It was observed that women between 25 and 49 years old represented the greatest demand for cytopathological examination, representing 63.34% of collections within the age group in the three-year study period. This finding diverges from the study by Monteiro et al., revealing that the age group of 50 to 59 years old was the one with the greatest demand for cytopathological examination. [20] This difference may be related to the study's data collection period, as the three-year period studied in this research was influenced by the Covid-19 pandemic.

Studies show that the estimated overall risk of exposure to HPV infection is 15% to 25% with each new sexual partner. Most sexually active people may be infected at some point in their lives. The prevalence of infection is highest in women under 30 years of age, and the vast majority of HPV infections in young women resolve spontaneously within approximately two years. [1,21]

The most prevalent alterations were atypia of squamous cells of undetermined significance (ASC-US), representing 65.6% of the alterations found in the study, followed by low-grade squamous intraepithelial lesions (LSIL), representing 23.45%, corroborating the study by Ströher et al., which identified a prevalence rate of 50.28% for atypia of squamous cells of undetermined significance (ASC-US) and 35.45% for low-grade intraepithelial lesions (LSIL). However, most of the alterations (72.64%) were identified within the recommended age range for cytopathological examination collection, reinforcing the importance of collecting the examination within the recommended period. [22]

It was observed that most of the alterations outside the recommended age range were low-grade lesions. Given the slow progression of cervical cancer, strategies are suggested to expand access to the target population as recommended by the Ministry of Health. Regarding the frequency of collection, the majority were carried out annually, with 96.56% being for screening purposes. This may suggest that the annual collections in the municipality may be screening the same women.

Regarding alterations due to invasive squamous cell carcinoma (AC), three cases were identified, diverging from the study by Monteiro et al. [20], where it was not possible to identify this type of alteration. The cases of invasive squamous cell carcinoma (CA) were identified in the age range recommended by the Ministry of Health (25 to 64 years), a finding that intensifies the importance of collecting samples from the age range of 25 to 64 years.

Changes in cervical cells can progress to cancer, however, this progression generally occurs slowly, taking approximately 10 to 20 years. During this period, precursor lesions (cervical intraepithelial neoplasia CIN II and III, also called high-grade lesions) may appear, which are asymptomatic. When these lesions are treated appropriately, there is a possibility of cure in most cases. [3,23]

The recommended interval between cytopathological tests is 3 years, if the woman has two tests at an annual interval with normal results or benign changes. For women over 64 years of age who have never undergone the test, it is recommended to perform two tests with an interval of 1 to 3 years. In the case of a negative result, they may be exempted from further tests since there is no evidence on the effectiveness of screening after the age of 65. [12,13]

There are situations in which a different frequency than recommended is necessary to monitor the changes found. In cases of atypia of undetermined significance in squamous cells and ASC-US in women between 25 and 29 years of age, a new test is recommended in 12 months. If this woman is ≥30 years of age, the follow-up and collection of the test should occur in 6 months. In situations in which there is atypia in squamous cells with LSIL, in women aged ≥25 years, repeat cytology in 6 months. [24]

CONCLUSION

The municipality studied showed low coverage of cytopathological test collections within the recommended age range in 2019, 2020 and 2021, well below the 80% recommended by the WHO. This low coverage is reflected in the financial transfer to the municipality's PHC, given the failure to achieve

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the target in the indicator "Proportion of women with cytopathological collection in PHC", as a way of ensuring timely detection and treatment, reducing the incidence of cancer and mortality in the target population.

PHC plays a fundamental role in developing actions to prevent cervical cancer through education and health promotion actions, vaccination and early screening. However, it is necessary to expand access to the test, actively searching the target population and providing greater coverage that can impact early screening.

The study was limited by the influence of the COVID-19 pandemic during the three-year period of analysis. Furthermore, since this was secondary data, it was not possible to perform cross-references to analyze the frequency of cytopathological tests that were abnormal. Finally, since the collection of cytopathological samples represents an indicator that measures the performance of PHC teams and health services, we suggest that health professionals receive ongoing health education on the subject and that the guidelines recommended by regulatory agencies be followed again. We also suggest future research that can compare the post-COVID-19 pandemic period.

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