ORIGINAL ARTICLE

Implications of the Covid-19 pandemic for cervical cancer screening

Implicações da pandemia de Covid-19 frente ao rastreamento do câncer do colo de útero

Implicaciones de la pandemia de Covid-19 para la detección del cáncer de cuello uterino

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ABSTRACT

Objective: To analyze the implications of the COVID-19 pandemic on cervical cancer screening. **Methodology**: This is an epidemiological, documentary, observational and retrospective study, employing a quantitative-descriptive approach, carried out in a specialized service. Data collection was performed through cytopathological results registered in the Cancer Information System. Data analysis was performed through descriptive statistics, using the Statistical Package for the Social Sciences Software. **Results**: The analysis included 2,654 reports of patients who underwent preventive examinations between May 2019 and December 2021. Among individuals aged 25 to 64 years, 2,241 tests were evaluated. **Conclusion**: This study identified the number of cytopathological results, enabling a comparison across the years and an examination of the sociodemographic profile, as well as cervical samples identified in the results. The research also observed interruptions and reductions in gynecological services.

DESCRIPTORS: Covid-19; Screenings Programs; Cervical Neoplasms; Human Papilomavirus; Women.

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RESUMO

Objetivo: Analisar as implicações da pandemia de Covid-19 no rastreamento do câncer do colo de útero. **Metodologia**: Trata-se de um estudo epidemiológico, documental, observacional e retrospectivo, com abordagem quantitativa-descritiva, realizada em um serviço especializado A coleta de dados foi realizada por meio dos resultados citopatológicos contidos no Sistema de Informação do Câncer. A análise de dados ocorreu por meio da estatística descritiva, sendo utilizado o *software Statistical Package for the Social Sciences*. **Resultado**: Os dados foram coletados no período de maio de 2019 a dezembro 2021, sendo analisados 2.654 laudos de pacientes submetidas ao exame preventivo neste período. Dentre a faixa etária identificada de 25 a 64 anos, foram analisados 2.241. **Conclusão**: O presente trabalho identificou o quantitativo de resultados dos exames citopatológicos, sendo possível estabelecer a comparação entre os anos e a partir disso analisar o perfil sociodemográfico, assim como as amostras cervicais encontradas nos resultados, observando-se também a interrupção e redução nos serviços ginecológicos.

DESCRITORES: Covid-19; Programas de Seguimiento; Neoplasias cervicales;   Virus del papiloma humano; Mujeres.

RESUMEN

Objetivo: Analizar las implicaciones de la pandemia de Covid-19 en la detección del cáncer de cuello uterino. **Metodología**: Estudio epidemiológico, documental, observacional y retrospectivo, con un enfoque cuantitativo-descriptivo, realizado en un servicio especializado. La recolección de datos se realizó a partir de los resultados citopatológicos del Sistema de Información de Cáncer. El análisis de datos se realizó mediante estadística descriptiva, con auxilio del *software Statistical Package for the Social Sciences*. **Resultado**: Se recolectaron datos desde mayo de 2019 a diciembre de 2021 y se analizaron 2654 reportes de pacientes sometidos a examen preventivo durante este período. En el grupo de edad identificado, de 25 a 64 años, se analizaron 2241 reportes. **Conclusión**: Este estudio identificó el número de resultados de exámenes citopatológicos y permitió establecer una comparación entre los años y, a partir de ello, analizar el perfil sociodemográfico, así como las muestras cervicales encontradas en los resultados, habiéndose observado además la interrupción y reducción de la atención ginecológica.

DESCRIPTORES: Covid-19; Programas de Rastreamento; Neoplasias do Colo de Útero; Papilomavírus Humanos; Mulheres.

INTRODUCTION

Pandemics are widespread disease outbreaks that quickly spread across countries, imposing new rules and social habits. In 2020, the World Health Organization (WHO) declared a state of public emergency following the discovery of the new coronavirus strain, Sars-CoV-2, which causes Covid-19. The global pandemic altered the trajectories of health systems as measures were adopted to control infection. As a result, several non-emergency services, including cervical cancer screening programs in primary care settings[1], were suspended. Thus, the effects of the Covid-19 pandemic may disrupt preventive screening and, consequently, early diagnosis of the disease, not implying that the prevalence of precursor lesions of uterine cervical cancer (UCC) has decreased in the population, but rather that

these lesions are simply not being detected early[2].

Human Papillomavirus (HPV) is present worldwide, with over 100 types identified; roughly 17 of these are oncogenic[3]. According to the National Cancer Institute (Instituto Nacional do Câncer, INCA), in 2019, the mortality rate for uterine cervical cancer (UCC) was reported at 6,596 cases, representing 6.0% of deaths[4].

In Brazil, statistics show that uterine cervical cancer (UCC) is the second most common cancer among women in the five macroregions: 21.20 per 100,000 in the North, followed by 17.62 per 100,000 in the Northeast, 15.92 per 100,000 in the Central-West, 17.48 per 100,000 in the South (fourth position), and 12.01 per 100,000 in the Southeast (fifth position). Under this scope, the North region stands out, with Pará state showing the highest incidence in 2023 with 780 new cases, whereas the capital Belém recorded 110 new cases[5].

In this context, uterine cervical cancer (UCC) remains the most frequent cancer among Brazilian women. Although preventable and characterized by slow progression, it maintains high incidence and mortality rates[6]. Preventive actions have been established to control the disease, such as introducing the HPV vaccine into the National Immunization Program (Programa Nacional de Imunização, PNI) within the Unified Health System (Sistema Único de Saúde, SUS) since 2014, alongside continued screening for precursor lesions through cytopathological examination (Pap smear) as an early detection strategy[7].

The implementation of cancer screening methods must involve federal, state, and municipal levels, encompassing all tiers of healthcare, with primary care playing a key role based on the pillars of communication, planning, monitoring, and evaluation. These measures collectively enhance the effectiveness of screening strategies[8]. Accordingly, identifying the target population, guiding women's adherence strategies, ensuring the availability of resources and supplies, offering examinations, and tracking women with abnormal results are factors critical to guaranteeing effective treatment and care[9].

Therefore, the effects of the Covid-19 pandemic may interfere with preventive examinations and early diagnosis of the disease, not indicating a reduction of precursor lesions of uterine cervical cancer (UCC) in the population, but rather that they are not being detected early.

OBJECTIVE

To analyze the implications of the Covid-19 pandemic on screening for uterine cervical cancer.

METHODOLOGY

Design, study setting, and period

This study is an epidemiological, cross-sectional, documentary, and retrospective investigation with a quantitative approach.

Population and sample

The study population comprised all patients who underwent sampling for the Preventive Examination of Uterine Cervical Cancer (PUCC), with exam results recorded in the Cancer Information System (Sistema de Informação do Câncer, SISCAN). A total of 2,654 reports from patients submitted to the PCCU during the study period were available; however, only 2,241 reports from individuals aged between 25 and 64 were analyzed.

Inclusion and exclusion criteria

Data included in the analysis correspond to results recorded in SISCAN of women aged 25 to 64 years who performed the preventive exam. The age range was selected as part of a screening strategy, considering that uterine cervical cancer progresses slowly, and this interval provides a greater likelihood of identifying precursor lesions[10]. Records with incomplete data from patients who underwent cytopathological examination, including those lacking slide identification or presenting with unsatisfactory sample results, were excluded from the study.

Study protocol

Data collection for the present study was conducted at a specialized service in the gynecological department from January to June 2022, based on data referring to the period from May 2019 to December 2021.

Initially, authorization was requested from the management of the practice site. Following that, the health establishment's authorization document was submitted to the University Ethics Committee. After the project was reviewed and approved by the Ethics Committee, it was presented to the head of the Gynecological Service where Pap smear collection is performed. Data collection commenced only after authorization from the service head and signing of the Term of Authorization for Access to Secondary Sources. The study began with a visit to the gynecological sector to introduce the researchers to the responsible nurse and staff.

The variables analyzed in SISCAN included: age; date of sample collection; origin (neighborhood, municipality, state); and cytopathological exam results (epithelial types present in the sample, representation of the transformation zone, benign reactive or reparative cellular changes, and diagnosis). Additionally, the number of women who did not return to collect their results was recorded.

Analysis of the results and statistics

Data analysis was performed using descriptive statistics via the Statistical Package for the Social Sciences (SPSS), IBM SPSS Statistics version 27. This software facilitated the analysis and management of the research data volume, enabling access to case quantities in the database, variable creation, conceptualization and modification, as well as table construction.

Ethical aspects

The study was approved by the Ethics Committee of the "Magalhães Barata" School of Nursing under opinion number CEP: 5,433,581.

RESULTS

Of the 2,241 cases analyzed between May 2019 and December 2021, the majority (29.71%, n = 666) belonged to the age group from 44 to 53 years. This was followed by the 54 to 64 years group, accounting for 26% of cases (n = 583), and then the 34 to 43 years group, representing 24.81% (n = 556). Lastly, 19.45% of cases (n = 436) were concentrated in the 25 to 33 years age range.

According to the data in Table 1, the distribution of participants by age group from 2019 to 2021 was observed. Among the 2,241 women who underwent the examination, the greatest number of recorded exams corresponded to the 44 to 53 years age group, totaling 666 women (29.71%). For this same age group, 251 (29.4%) women were reported in 2019. In 2020, there were 157 (29.3%) patients, indicating a decline compared to the previous year. In 2021, a significant increase was noted, with approximately 258 (30.4%) participants. Additionally, over the three years, women aged 25 to 33 were the least frequent users of the service, totaling 436 participants, with 173 patients recorded in 2019. In 2020, 110 women attended, representing a 15% decrease relative to 2019. In 2021, only 153 women underwent the PUCC, which corresponds to a 10% increase compared to the previous year (Table 1).

Table 1. Distribution of participants by age group over three years. CSEM UEPA, Belém- PA, 2022

Age group	Year						
	2019	%	2020	%	2021	%	Total
25-33	173	20.2	110	20.5	153	18.00	436
34-43	219	25.6	135	25.2	202	23.76	556
44-53	251	29.4	157	29.3	258	30.35	666
54-64	212	24.8	134	25.0	237	27.88	583
Total	855	100.0	536	100.0	850	100.00	2,241

Source: Ministry of Health – Cancer Information System.

It is noteworthy that in 2019, the highest number of records occurred from May to December, totaling 855 women (38.15%). In 2020, the Covid-19 pandemic affected demand for gynecological services, leading to a decline in screening exams, with 536 clients (23.92%) identified. Services were suspended for four months, between April and July 2020. In 2021, during the entire twelve months, 850 records (37.93%) were noted, showing a recovery in attendance compared to 2020. Additionally, the most prevalent age group across the three years was 44 to 53 years.

Concerning epithelial cell types with the highest indices in the results, squamous and glandular epithelium were predominant, encompassing 1,114 participants. The predominant age group for glandular epithelium was 54 to 64 years. Squamous epithelium accounted for 802 samples, mainly

within the 44 to 53 years age group.

According to Table 2, among the PUCC exam results for the 2,241 participants, 1,916 (85.50%) showed negative results for malignancy. Next, 7.14% of the exams indicated alterations within normal limits. A total of 2.14% revealed squamous cell atypia consistent with low-grade intraepithelial lesions, including cytopathic effects of HPV and cervical intraepithelial neoplasia grade I. Furthermore, 1.92% displayed atypical squamous cells of undetermined significance, possibly non-neoplastic (ASC-US) (Table 2).

Table 2. Distribution of women by age group submitted to cytopathological examination with the most relevant results. CSEM Belém-Pará, 2022

Cytopathological exam results	Age group								
	24-33	%	34-43	%	44-53	%	54-64	%	Total
Squamous cell atypia: High-grade intraepithelial lesion (CIN II and III)	3	0.7	5	0.9	4	0.6	4	0.7	16
Squamous cell atypia: Low-grade intraepithelial lesion (including HPV cytopathic effect and CIN I)	13	3.1	16	2.9	14	2.2	5	0.9%	48
Atypical cells of undetermined significance: Squamous: Possibly non-neoplastic (ASC-US)	12	2.8	11	2.0	13	2.0	7	1.2	43
Within normal limits in examined material	30	7.1	47	8.7	46	7.1	37	6.5	160
Negative for malignancy	364	86.3	461	85.4	570	88.1	521	90.7	1916
Total	422	100.0	540	100.0	647	100.0	574	100.0	2183

Source: Ministry of Health – Cancer Information System.

Another point to highlight is the high number of women who did not return to collect their exam results. Over the three-year period, 389 participants failed to retrieve their results. During this time, 119 women did not return in 2019, representing 30.6% of patients; 145 in 2020, equivalent to 37.3%; and 125 in 2021, which corresponds to 32.1%. Thus, 2019 showed the highest percentage relative to 2020, when there were more Covid-19 cases registered nationwide. In the following year, the number of women who returned to receive their results increased gradually by approximately 5.2% due to the relaxation of isolation protocols (Table 3).

Table 3. Distribution of women who did not return to collect cytopathological exam results. CSEM Belém-Pará, 2022.

Number of women who did not return to collect their results	Year						
	2019	%	2020	%	2021	%	**Total**
Women	119	30.6	145	7.3	125	32.1	389

Source: Ministry of Health – Cancer Information System.

DISCUSSION

The Covid-19 pandemic significantly impacted health services worldwide, both public and private, triggering disruptions in elective health programs such as uterine cervical cancer (UCC) screening. This interference affected the management of altered preventive exam results, and consequently, the early diagnosis and treatment of precursor lesions caused by HPV[11].

Considering age groups and municipalities, it was observed that the highest number of users reside in the municipality of Belém, followed by Ananindeua. However, the study shows that women from other municipalities still seek screening services in the capital for testing[12]. The Preventive Examination for Uterine Cervical Cancer (PUCC) is a crucial test for preventing UCC. Nonetheless, an organized program infrastructure is essential, including trained professionals dedicated to actively seeking women, performing examinations, and following up on altered results, as well as improvements in information systems to achieve satisfactory outcomes[13]. Although this may seem straightforward, such infrastructure is not available in all municipalities in the state of Pará, contributing to increased demand for the exam in the metropolitan region of Belém.

The importance of professional qualification is emphasized to ensure high-quality smear samples, as these need to be well distributed on the slide and properly fixed for accurate visualization[14]. Therefore, effective specimen collection reflects in the epithelial cells found in cytopathological samples, which must contain squamous, glandular, and/or metaplastic cells. However, the combined presence of these three epithelia accounted for only 13% of the total, which may indicate poor collection and/or fixation quality[15].

It is important to highlight the representativeness of the Transformation Zone (TZ), the site of squamous metaplasia, which plays a critical role in Pap smear performance since most cervical cancers originate in this zone. This zone is the initial site for cervical HPV infection, and lesions here may regress, persist, or progress to invasive cancer[16]. Exams containing material representative of this zone can reflect the quality of the collection, requiring greater attention from professionals conducting the test. Some studies demonstrate a decrease in the proportion of reports with this epithelium, which may result in false-negative outcomes[17].

According to the research, the most evident abnormal results were Low-grade Squamous Intraepithelial Lesions (LSIL) and Atypical Squamous Cells of Undetermined Significance (ASCUS). LSIL is characterized by cytological infection caused by HPV, highly prevalent and frequently regressible[18]. Most of these lesions originate in the squamous epithelium, and due to their location in the ectocervix, the spontaneous regression rate is high, classifying them as low risk. LSIL is caused by various low- and high-risk HPV types. Low-grade lesions may regress spontaneously, persist for prolonged periods, or progress to high-grade lesions[19].

ASCUS indicates atypia, meaning alterations in the normal characteristics of squamous cells without clear signs of premalignant changes. It may be caused by inflammation, infections, or vaginal atrophy during menopause, for example[20].

It is worth clarifying that ASCUS is a benign finding that often resolves spontaneously. However, the risk of developing a premalignant lesion, while very low, cannot be entirely ruled out[21]. Therefore, upon receiving an ASCUS result, the recommended approach is to repeat the exam after six months for women aged 30 years and older, and after twelve months for those younger than 30, as most cases resolve within this timeframe. If two consecutive tests at six or twelve-month intervals are negative, women should return to routine cytological screening every three years. If the repeated test shows the same or suggestive result of intraepithelial lesion, referral for colposcopy is required[22].

Cytopathological exam reports may be classified as either altered or unaltered. Unaltered results indicate no presence of malignant or premalignant cells and include descriptions such as negative for malignancy, within normal limits, absence of atypia, and no neoplastic cells. The most common alterations found in screening exams are ASCUS and Atypical Squamous Cells, where high-grade lesions cannot be ruled out (ASCH)[23].

Study limitations

This study has limitations due to the low number of articles found in databases according to the selection criteria. The literature review highlighted the need for increased scientific production addressing the implications of the Covid-19 pandemic on uterine cervical cancer screening.

Contributions to Nursing, Health, or Public Policy

Regarding contributions, this study provides relevant support for the development of public policies and the strengthening of cervical cancer prevention strategies within the scope of Primary Health Care. In addition to expanding scientific production in Nursing, the research represents an important source of knowledge for Higher Education Institutions, promoting critical and up-to-date reflections on the topic. Moreover, its findings have the potential to directly benefit the community by supporting educational and awareness actions aimed at promoting women's health.

CONCLUSION

This study analyzed the implications of the Covid-19 pandemic by identifying the volume of cytopathological exam results during the studied time series, enabling comparisons among them and subsequent analysis of the sociodemographic profile as well as the cervical samples found in the results. The investigation also observed the interruption and reduction of gynecological services. Furthermore, throughout the three years, prevalence was noted in findings suggestive of low-grade lesions, including HPV cytopathic effect grade I and high-grade intraepithelial lesions encompassing

cervical neoplasias grades II and III, predominantly among women aged 34 to 43 years. It is also important to clarify that during the pandemic period, a decrease was observed in the number of exams performed due to underreporting, which may influence early diagnosis and, consequently, result in the detection of neoplasias at more advanced stages.

Data analysis demonstrated that the Covid-19 pandemic had significant impacts on uterine cervical cancer screening, resulting in a considerable reduction in preventive examinations such as the Preventive Examination for Uterine Cervical Cancer. The overload on health services, social distancing measures, and the reallocation of resources to address the public health emergency compromised the continuity of prevention and early diagnosis actions. These implications increase the risk of delayed diagnosis and higher morbidity, and mortality associated with the disease, especially among women facing greater vulnerability. In light of this, urgent implementation of strategies prioritizing the resumption and strengthening of screening is necessary, focusing on equity, service reorganization, and expanded access to mitigate the negative impacts caused by the pandemic on women's health.

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