

Acceptance date: 18/02/2025

INCIDENCE OF CERVICAL CANCER EVIDENCED BY PAP SMEAR DURING THE PANDEMIC OF COVID-19 IN A BRAZILIAN MUNICIPALITY

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Keywords: cervical cancer. covid-19. Pap smears

INTRODUCTION

In Brazil, cervical cancer (CC) is the third most common type of cancer among women. In the meantime, in terms of mortality, in 2017, for example, there were 6,385 deaths in Brazil, and the mortality rate from cervical cancer was 6.17/100,000. In addition, the number of new cases of cervical cancer expected for each year of the 2020-2022 triennium will be 16,590, with an estimated risk of 15.43 cases per 100,000. In view of this, in the regional analysis, CC ranks fifth in the Southeast region, and more specifically, in the state of Minas Gerais (MG) the number of new cases of CC in 2021 was 1,270. Based on this data, the public health problem that cervical cancer represents and the possible impact of the pandemic on screening programs becomes clear, with negative consequences for prognosis, capable of increasing the mortality rate of patients (INCA).

In this context, Primary Health Care (PHC) promotes strategies for the prevention and control of CC through health education, vaccination of indicated groups and early detection of cancer and its precursor lesions through screening, with the Pap smear being the main strategy and its periodic performance reducing the occurrence and mortality from the disease. Thus, among the actions carried out in PHC, there are those aimed at preventing sexually transmitted diseases (STDs), as well as those aimed at the early detection of cancer, such as informing and clarifying the population about screening, identifying the female population in the priority age group, calling for the examination, carrying out the cytology collection, identification of women with positive screening results for case surveillance, referral of women to a secondary unit, evaluation of cytology coverage in the area, evaluation of collection quality, planning

and execution of actions in the area under the team's health responsibility, aimed at improving screening coverage (1). Furthermore, the recommended age range for screening women for CC is 25 to 64 years, given that CC usually starts at 30 years of age and shows a drop in cases after 50 years of age (2).

Furthermore, it is well known that infection with the human papillomavirus (HPV), an oncogenic viral type, can lead to the development of precursor lesions, which, if not identified and treated, can progress to cancer, especially in the cervix. Vaccines are therefore known to be preventative, with the aim of avoiding infection by the types of HPV they contain (INCA). In this sense, HPV vaccination coverage has a direct influence on cases of CC. However, the implementation of vaccination in 2014 by the National Immunization Program (PNI) resulted in a drop in new cases of CC in Minas Gerais.

Gerais, in the long term. Therefore, the total number of doses of the HPV vaccine (Bivalent and Quadrivalent) applied in 2013 was 121, while in 2014, the number was 648,608 doses, i.e. a significant increase that directly influences the incidence of CC.

In 2020, with the COVID-19 pandemic, there were disruptions in the provision of health services in most countries as a direct consequence of the pressures imposed by an overwhelming number of COVID-19 cases and as an indirect effect of strict infection containment measures, such as social distancing and lockdowns. In this context, the postponement of public cervical screening programs has been widespread, reported by more than 50% of countries, according to surveys promoted by PAHO (Pan American Health Organization).

This was consistent with the WHO's initial recommendations to minimize non-urgent care while dealing with the pandemic.

As such, the COVID-19 pandemic has led to a substantial reduction in preventive healthcare, including HPV vaccines and cervical cancer screenings, so disruptions to elective healthcare services related to cervical screening, management of abnormal screening test results and treatment of precursor lesions could lead to increases in cervical cancer incidence and exacerbate existing health disparities.

Furthermore, a major concern in relation to delays in cervical screening, management and treatment is that precursor lesions are not detected or are not treated properly and can progress to invasive cancer (3). This is justified, as CC is considered a 'category 1' neoplasm, i.e. tumors with a short volume doubling time, in which prolonging treatment beyond 2 days should be avoided in 95% of patients (4).

Therefore, given that the COVID-19 pandemic has had a worldwide impact on CC screening, the aim is to correlate the number of Pap smears carried out during this period with the levels of CC incidence in the municipality of Passos. Considering the context of Passos as an important focus of incidence and prevalence, as a regional hub and micro-region in the health area, and as a city that supports another 159 municipalities with specialized oncological care, through the Regional Cancer Hospital, it is necessary to analyze the impact of the coronavirus pandemic on the demand for cytopathological tests in order to promote strategies that reduce and control the severity of possible negative consequences of interruptions in cervical cancer screening services. This study aims to identify the impact of the COVID-19 pandemic on cervical cancer screening in a city in the southwest of Minas Gerais.

METHODOLOGY

In view of the situational diagnosis of the Health Strategies of the region. Family (ESF) in the city of Passos (MG), it was possible to detect impasses in the health area during the COVID-19 pandemic. It is a fact that during this period there was a substantial reduction in preventive health care, in this sense, taking into account the criteria of importance, relevance and urgency, the following problem was prioritized: low coverage of pap smears in the municipality during the years 2020 to 2021.

Once the problem had been identified, data was collected to support the proposed actions. In the meantime, the following descriptors were used: uterine cervical neoplasm, pap smear, COVID-19, Brazil, using the boolean operator "and", in the PubMed database; in order to make a regional, national and global analysis of the impacts of the pandemic on CC screening. Thus, the collection was only carried out on one platform, since other platforms, such as Scielo, had duplicate articles. Thus, 53 articles were found during this process, including review articles, randomized control cases and original articles, on which to base the information for this study.

As inclusion criteria, articles from the last 5 years (2017 - 2022) were selected to emphasize up-to-date information on the topic. The exclusion criteria included: unavailable texts, subjects not specifically related to the topic, those that only described cervical cancer; thus aiming to avoid ambiguity in the collections and to cover disconnected and irrelevant subjects for the research. Of the 53 articles, 16 were selected manually, by reading them in their entirety, and they involved the main subjects of the research: cervical cancer and COVID-19. In the end, 6 articles were selected, which faithfully addressed the topic, with concise and up-to-date information. (Image 1.)

Furthermore, the theoretical basis was expanded by including pertinent bibliographical references, such as the Guidelines for Cervical Cancer Screening and data from the World Health Organization and the National Cancer Institute (INCA) (1).

The study, by sequence, was based on visualizing the incidence of cervical cancer in the municipality of Passos, MG, between January 2017 and December 2021. In this way, this incidence was correlated with the variation in preventive collections found in the same period analyzed (2017-2021). To do this, we mainly used the DataSUS database, which is a government information system, which allows us to evaluate data relevant to health in Brazil, and in the case of the research in question, we selected both the number of pap smears performed, with the purpose of confirming the drop in collection, and the incidence of CC during the pandemic period. To select the data on this site, the following filters were used: collection of Pap smears, municipality of Passos, between 2017-2021.

It must be said that the research was carried out over an extended period of time, before the pandemic, in order to support the hypothesis of variation in collection numbers and incidence of CC during the COVID-19 pandemic, with the previous situation as a means of comparison.

Finally, a correlation will be made between the number of Pap smears carried out between 2017 and 2021 - the appropriate period to compare data before and during the COVID pandemic in Brazil - and the levels of incidence of CC during the same period of time in the municipality of Passos, which will be used to justify the analysis of the pandemic's impact on CC screening in the municipality, and the consequences of late diagnosis and treatment, as well as the variation in the incidence of the neoplasm in question. Based on this observation, it was possible to estimate the need for

an increase in the number of cytopathological tests, diagnosis and early treatment of CC for future improvements in the municipality's health system, through adequate screening and massive action by primary health care in disease prevention.

DISCUSSION

During the COVID-19 pandemic, obstacles have arisen related to screening and maintaining health care for non-essential services, which has had a certain impact on the prevention and early treatment of many diseases, but most visibly on cancer screening. Pap smears carried out to screen for cervical cancer (CC) have been affected, whether due to delays in health services, infrastructure restrictions or patients themselves being unwilling to attend screening due to fear of contact with other people as a result of the pandemic (5).

This has had an impact on CC screening worldwide, and in some countries it has even been paralyzed, as was the case in a study carried out by Puricelli Perin et. Al (2021), in which 98 institutions from 35 countries were included in the research and 60 sites reported suspending cancer screening in 2020 (5). However, in this same study, it was shown that of these 60 settings that suspended screening services, 52 were already developing plans to resume activities.

Studies carried out in California between January 2020 and September of the same year showed that CC screening for women aged 21 to 29 fell by 78% and among women aged 30 to 65 it fell by 82% (6). In another study carried out by Giancalo et al (2020) in 23 countries, it was observed that in absolute terms, there was a 74.6% reduction in cervicovaginal tract samples during the pandemic (7). The problem with this sharp reduction in both scenarios, and in several others, was the way in which they warned their patients during the pandemic period or failed to take them

back to the healthcare setting to continue the post-pandemic screening, since many women started to become careless and thought that they wouldn't need to be evaluated after having gone for a while without carrying out the appropriate tests.

While some countries were lacking proposals to better manage screening, others, such as the United States and Scotland, began to introduce screening methods that patients could perform through the use of the primary HPV test with self-sampling kits, with the aim of not allowing the total suspension of exams (8)(9). The first country to implement the use of the HPV test was the Netherlands in 2017, and today it is being followed by other countries, becoming more widely used during the COVID-19 pandemic, so as not to paralyze CC screening care (9), and it is very helpful because it can be done by the patient herself. This test has also been increasingly used in the post-pandemic period as a primary cervical screening test, as it has shown greater sensitivity for high-grade cervical intraepithelial neoplasia and also provides a stronger negative value than cytology, which in a way would make it possible to extend the screening interval for a longer time after a negative result (8).

At the national level, in Brazil, there was an even greater drop in screening in March 2020, when INCA recommended that health professionals advise people not to seek health services for cancer screening, an ordinance that was revoked in June 2020. Studies carried out in São Paulo in 2022 evaluated data from 2017 to 2021, with 2,495,435 exams being recorded in the southeastern state, while 3,598,050 were expected to be carried out, i.e. a 69% reduction on what was expected (10). When looking at the state of Minas Gerais, while the average number of tests carried out from 2016 to 2019 was 852,918, in 2020 it was 479,627, characterizing a 56.2% reduction in the number of Pap smears (INCA).

In some health systems with more organized screening, where there are reminders and tracking of people who are not seeking out the health system for screening tests, it has been easier to continue the process of control and return to activities. However, in Brazil, where people seek out the health system spontaneously, it has become even more complex to allow prevention to return with annual screening tests, since the pandemic has allowed this search to regress.

There has also been a noticeable increase in the treatment of metastatic cervical cancer, because as screening has regressed, the cases "not discovered before the pandemic" have joined the cases "not discovered during the pandemic" and, because of this delay in diagnosis, some cases are being discovered with greater severity (10).

Not unlike the others mentioned, the municipality of Passense, which was the subject of our research, has also suffered a reduction in the prevention and screening services offered by the SUS and, in the case of Pap smears, while the average from 2017 to 2019 was 7,549 tests per year, the year 2020 saw a drastic reduction, with 4,266 tests having been carried out, a reduction of 56% (DataSus). This shows that the pandemic has also affected the number of tests carried out in the municipality and that this could cause future problems, as mentioned above with the discovery of more advanced cases, which is why it is necessary for public health policies to focus on these tests so as not to delay diagnoses.

Firstly, in order to evaluate CC screening, the DataSus (Department of Informatics of the Unified Health System) databases were analyzed, which confirmed a decrease in the collection of pap smears at the municipal level during the COVID-19 pandemic. When evaluating the total number of cervical cytopathology tests, it was found that in 2019, 7,139 tests were collected, while in 2020, the

year the COVID-19 pandemic began, only 4,266 were collected, so there was a reduction of 2,873 preventive tests in the year, which is considered a high number at municipal level. With regard to altered cytopathology tests, in 2019, 199 tests were evaluated, while in 2020 only 74 were recorded, making it possible to state that the lack of collections hindered CC screening. In addition, when analyzing the number of diagnoses of CC per year, it can be seen that there was also a decrease in 2020, which is also justified by the low coverage of collections, but does not exclude the possibility of an increase in cases of the neoplasm in question, at the national and municipal levels. (TABLE 1)

In addition, another website used to verify the research was SISAB (Health Information System for Primary Care), which also confirmed a drop in the collection of Pap smears during the pandemic period, both municipally and nationally. In view of this, the collection figures between 2017 and 2021 were evaluated, which showed a significant drop in collections in 2020. In Brazil, 5,294,957 Pap smears were collected in 2019, while 3,139,644 were collected in 2020, showing a drop of approximately 40.7% in one year (GRAPH 1). In the municipality of Passos, it was possible to observe the same decrease: in 2019 the number of pap smears was 5201 and in 2020 there were 3398, a drop of 36.7% in collections (GRAPH 2) (TABLE 2).

In order to assess diagnoses of CC, cases were also looked at between 2017 and 2021. In Brazil, 18,180 cases were observed in 2019, and 18,001 in 2020, showing a reduction in diagnoses of CC, albeit a subtle one. In 2021, there was an increase of 19,133 new cases of CC, a fact that can be justified by the postponement of cytopathological examination during the pandemic crisis period and also by the gradual return of health services with the subsequent decrease in COVID-19 cases

(GRAPH 3). Finally, we analyzed the diagnosed cases of CC in the municipality of Passos, which confirmed a drop in the number of malignant neoplasms between 2017 and 2021. This situation is justified once again due to the reduction in the number of Pap smears during the pandemic. Thus, while in 2018 and 2019 52 and 68 cases of malignant neoplasms were diagnosed, respectively, in 2020, when the pandemic began, 40 new cases of CC were recorded, resulting in a significant reduction of 41.1% in new cases in the 1-year interval (GRAPH 4).

It should be noted that the survey also showed that government campaigns, such as “Pink October”, have a significant influence on the collection of tests nationwide. This is demonstrated by the increase in the number of tests taken in October in all the years of the survey (CHART 5). However, this campaign only had significant importance when evaluated at a national level, since in the municipality of Passos there was no variation in the number of collections in the months of October in the corresponding years, demonstrating that the campaign is not influential in the region, and it is necessary to propose other measures to cover the municipal target audience in order to increase screening coverage.

Another fact in question was the evaluation of the health indicators on the coverage of cytopathological exams, which analyze whether there were sufficient or insufficient collections. Through this, it was possible to observe that at the national level, coverage for the entire period analyzed was considered insufficient, affirming the fact that it is essential to create measures to encourage the performance of cervical cytopathology. In contrast, in the municipality of Passão, between 2018 and 2020, coverage was considered sufficient, demonstrating the municipality’s interest and investment in women’s health. However, in 2021, the health indicator was considered to

be below that recommended by the Ministry of Health, justified by the fact that screening was still low due to the pandemic, as well as the instability of the service after the costs of the pandemic. (TABLE 3)

To this end, the surveys were sufficient to confirm the reduction in adherence to health services and consequently lower uptake of CC screening strategies, which confirms the hypothesis that the incidence of CC has decreased within the time frame evaluated in the municipality of Passos. This was due to the influence of the COVID-19 pandemic, which changed the entire health context in the country and around the world.

CONCLUSION

The research shows that the incidence of CC decreased in the municipality of Passos-MG, within the time frame evaluated, due to lower adherence to the health service and consequently lower incorporation of CC screening strategies. In other words, the COVID-19 pandemic has resulted in a reduction in the number of cervical cytology test collections, which has had an impact on CC diagnoses in the municipality. However, it is hoped that this reality will change with the reduction in COVID-19 cases, the flexibilization of opening hours and the return to normal activities in the ESF, thus allowing for expanded screening of the neoplasm and a reduction in the incidence of CC in the region.

ANNEXES

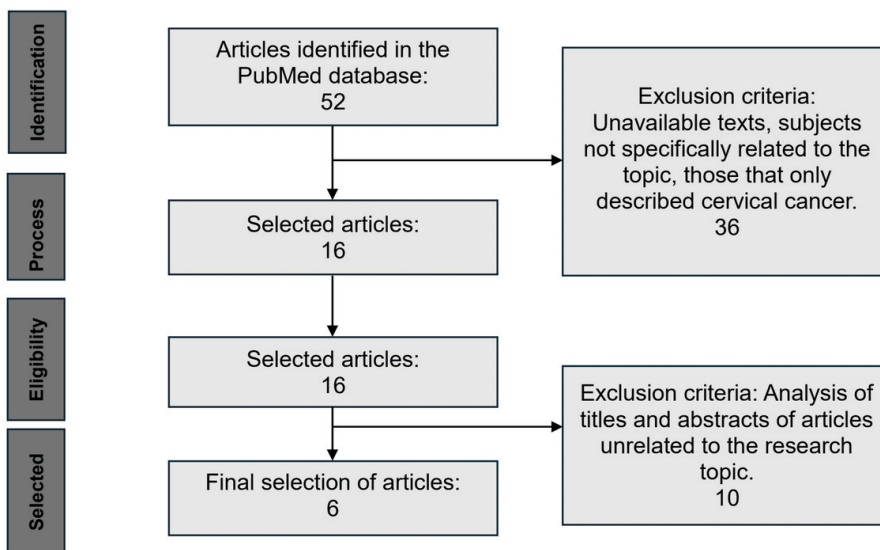


Image 1 - Flowchart of data collection and selection.

DATASUS - Total				
Total cervical cytopathology collections				
Year of	Cytopathology in Passos (total)	Cytopathology in Passos (altered)	Relative percentage of cytopathology	Cases per year of CC diagnosis in
2017	7797	151	1,93%	29
2018	7711	211	2,7%	52
2019	7139	199	2,78%	68
2020	4266	74	1,73%	40
2021	7607	123	1,61%	54

Table 1. Total number of cervical cytopathology samples (DataSUS)

SISAB - Total					
Total cervical cytopathology collections					
Year of			Relative percentage of	Ratio of exams to previous year	Comparison of exams with previous year
2017	4.112.143	4316	0,10%	x	x
2018	4.980.707	5671	0,11%	868.564	1.355
2019	5.294.957	5201	0,10%	314.250	
2020	3.139.644	3398	0,11%	-2.155.	-1.
2021	5.858.196	6864	0,12%	2.718.552	3.466

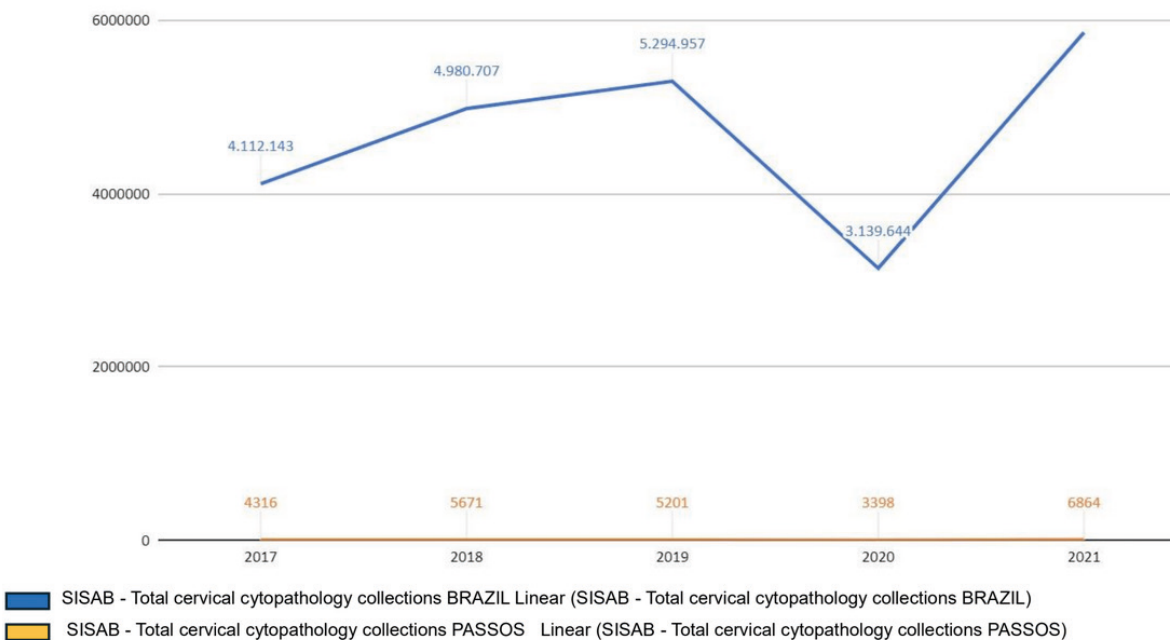
Table 2. Total cervical cytopathology collections (SISAB)

SISAB - Total		
Health indicators - coverage of cytopathological tests		
Year of	Coverage of cytopathological examination - health indicators (BRAZIL)	Coverage of cytopathological examination - health indicators (PASSOS)
2017	-	-
2018	10%	29,6%
2019	13%	31,6%
2020	14%	28%
2021	14,3%	26%

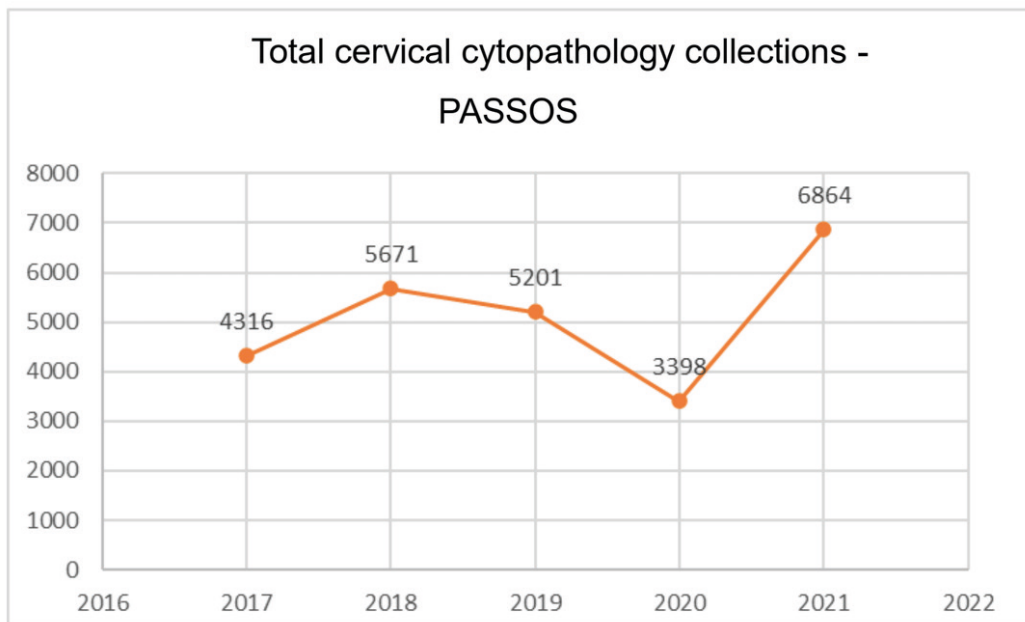
Health indicators - Coverage of cytopathological tests	
< 16.	coverage
≥ 16.0% e < 28.	Below the value
≥ 28.0% e <	Recommended by the Ministry
≥	Above the value

Table 3. Health indicators (SISAB)

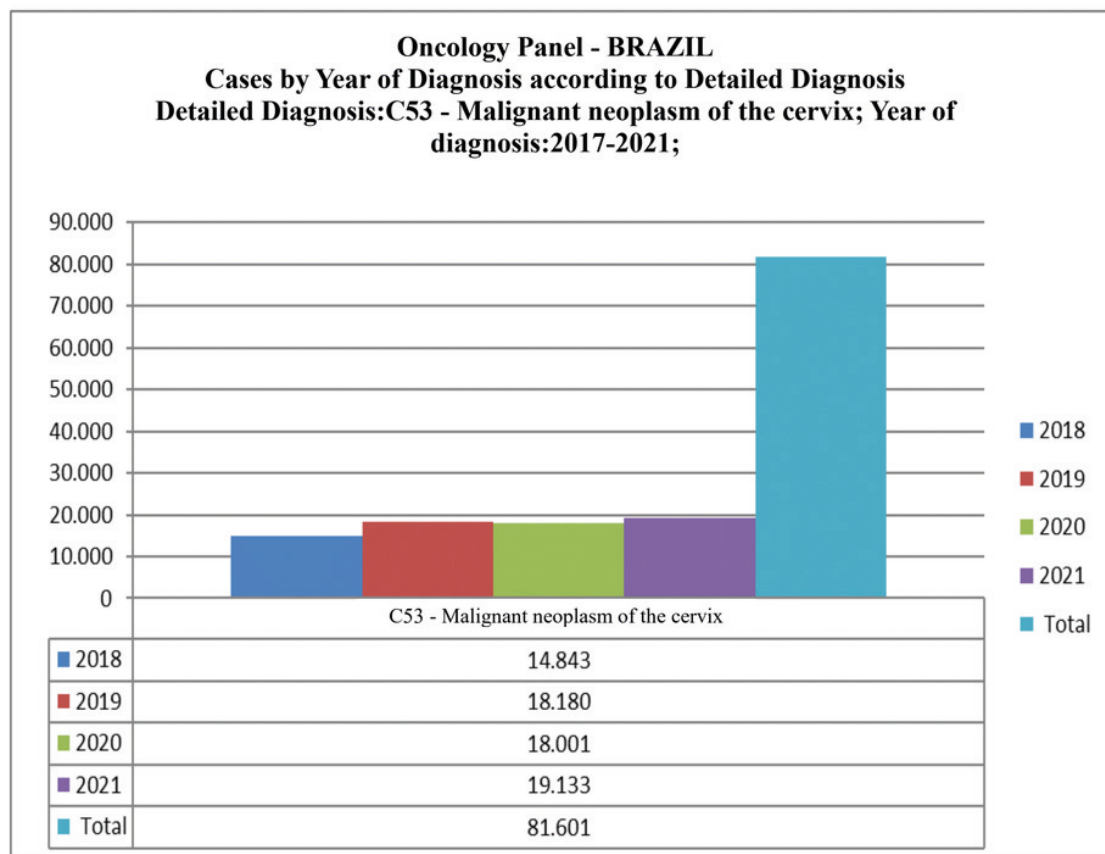
SISAB - Total cervical cytopathology collections



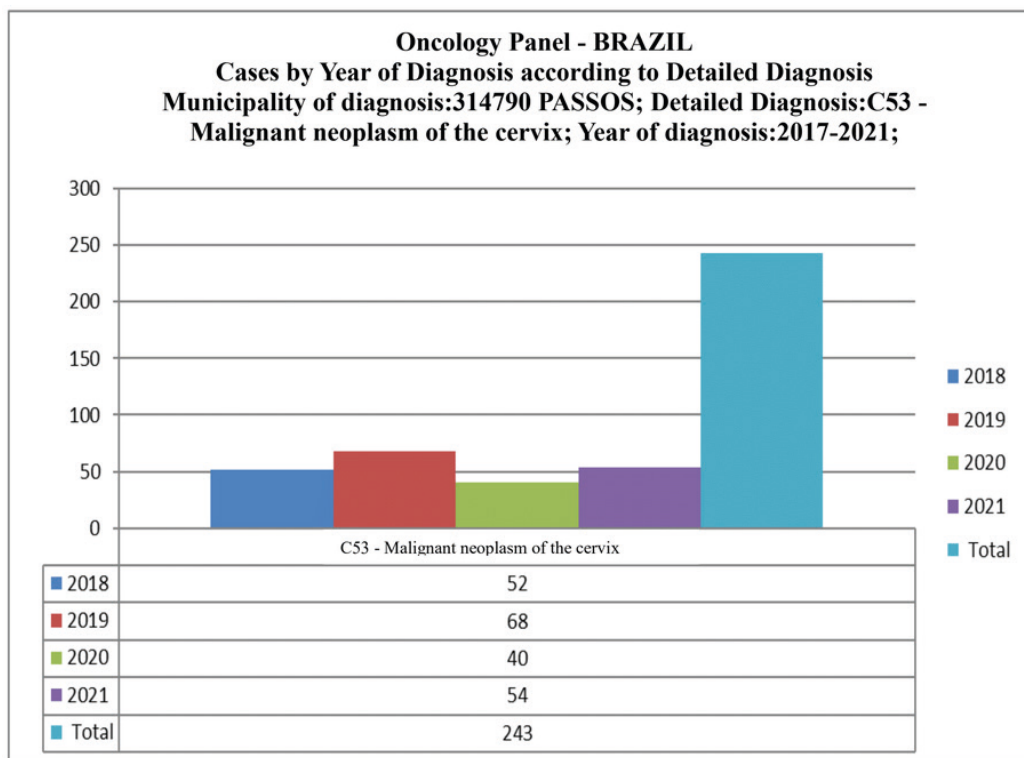
Graph 1. total number of cervical cytopathology samples collected (SISAB)



Graph 2. Total number of cervical cytopathology samples collected in the municipality of Passos (SISAB)



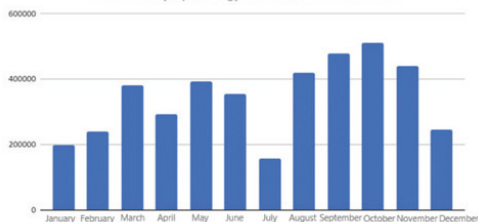
Graph 3. Incidence of CC/year in Brazil (DataSUS)



Graph 4. Incidence of CC/year in the municipality of Passos (DataSUS)

BRAZIL

SISAB – Brazil Year of competence: 2017
Number of cytopathology collections from the cervix



SISAB – Brazil Year of competence: 2018
Number of cytopathology collections from the cervix

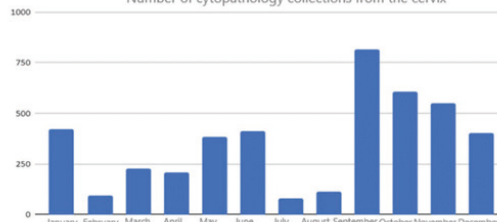


SISAB – Brazil Year of competence: 2019
Number of cytopathology collections from the cervix



STEPS

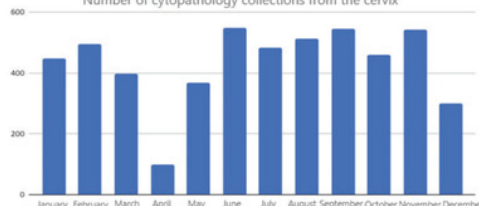
SISAB - Passos Year of competence: 2017
Number of cytopathology collections from the cervix

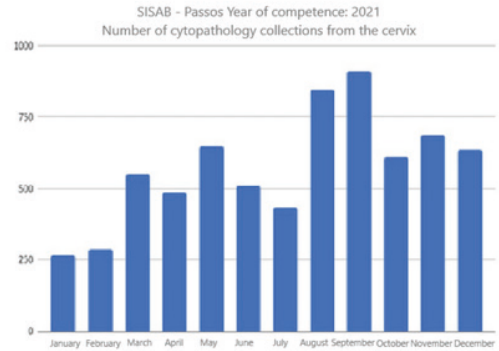
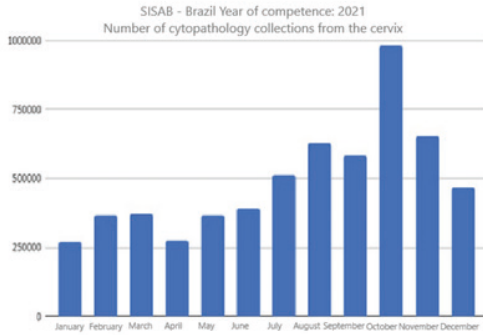
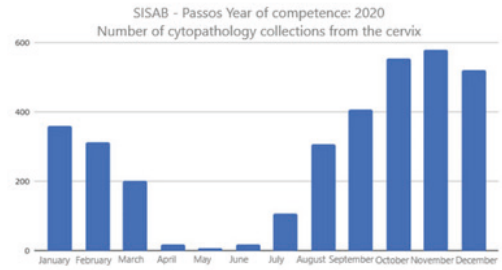


SISAB - Passos Year of competence: 2018
Number of cytopathology collections from the cervix



SISAB - Passos Year of competence: 2019
Number of cytopathology collections from the cervix





Graph 5. Number of cervical cytopathology samples collected at national and municipal level (2017-2021)

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