

Cytological screening for cervical cancer and associated factors in the penitentiary population of Peru

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ABSTRACT

Objective: To determine the prevalence and factors associated with the screening of cervical cancer by Papanicolaou in the penitentiary population of Peru.

Method: A cross-sectional study was conducted using data from the 2016 National Penitentiary Population Census of Peru.

The dependent variable was the cytological screening of cervical cancer during the last year. The independent variables were classified as facilitators, sociodemographic predisposers, and generators of need for the use of health services.

The multivariate association was estimated through adjusted prevalence ratios (aPR) and 95% confidence intervals (95% CI), using Poisson regression and using the variables with $p < 0.05$ in the bivariate.

Results: A total of 4515 women incarcerated in the 67 prisons of Peru entered the study. 69% (95% CI: 67.81-70.5) performed cytological screening during the last year and this is associated with having public health insurance (aPR 1.28, 95% CI: 1.21-1.36), go to prison health services (aPR 1.18, 95% CI: 1.12-1.24) and have a history of cancer (aPR 1.14, 95% CI: 1.02-1.26). Age, number of children, sports activities and the type of prison were also associated with cytological screening.

Discussion: There is an association between cytological screening and access to health services, sociodemographic predispositions and pathological backgrounds of women incarcerated in Peru. More research should be promoted on health prevention behaviors in this population.

Keywords: uterine cervical neoplasms; Papanicolaou test; early detection of cancer; women's health; public health; prisoners; vaginal smear; risk groups.

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INTRODUCTION

Cancer of the uterine cervix is the fourth most common cancer diagnosis among women, with an incidence of 528,000 new cases and an estimated death toll of 266,000 in 2012 worldwide. This condition is a major public health issue, mostly in low-income countries as in South America where it is the second most incident cancer and it ranks third for all casualties with rates of 11.5 and 9.3% respectively¹.

In Peru, cervical cancer ranks first for cancer incidence with a standardized incidence rate per age of 23.7 for every 100,000 women and second for mortality with a standardized rate of 12 cases for every 100,000 women².

The implementation of appropriate prevention measures, healthier diets and physical exercise can reduce the incidence of and mortality from cancer of the uterine cervix³. Primary prevention regards human papilloma virus (HPV) vaccination while secondary prevention regards screening methods such as the Papanicolaou test in high-risk populations such as imprisoned women⁴⁻⁶. The later involves certain limitations such as a poor commitment of women towards their own healthcare, low social and economic conditions, rural isolation, illiteracy, type of health insurance and rejection of gynecologic examination⁷.

The National Department of Corrections (INPE in Spanish) is responsible for administering Peru's

correctional system and through its Sub-Department of Health it manages the provision of healthcare in prisons with diagnosis and prevention programs (mainly HIV/AIDS and tuberculosis)⁸.

Prevention measures against cervical cancer among prisoners in Peru have been scarcely addressed in research studies. International publications suggest that the imprisoned population is at a higher risk of developing this disease as well as of risk behaviours, poorer follow-up and impaired cytological monitoring when compared with the general population^{5,6,9,10}.

Moreover, it is highly probable that the deficiencies observed in the general population such as poor medical coverage, the inadequate quality of services, the lack of family and social support be greater among imprisoned women and lead them to daily survival activities, with prevention taking a secondary role¹¹⁻¹³.

The main objective of our study was to determine the prevalence rate and risk factors associated to cytological screening of cervical cancer in the imprisoned population of Peru in 2016.

MATERIAL AND METHODS

Design, information sources and study population

We carried out a cross-sectional study with the data from the first National Prison Census of Peru in 2016.

The Census was executed in April 2016, thanks to the joint cooperation between the National Institute for Statistics (INEI in Spanish), the General Directorate of Political and Prison Policies and the INPE in an attempt to update information on social and family conditions among inmates, offence classification, living conditions within correctional facilities and the role of institutions such as the Police Department or the Office of the Prosecution¹⁴.

It included all prisons in Peru: 67 in total, located in 23 different counties and the Naval Base of Callao and it covered 98.8% of the imprisoned population. A pilot study was implemented in two correctional institutions prior to the execution of the National Census to standardize the items in the questionnaire. This database is available online and it was downloaded from the institution's website (<http://inei.inei.gob.pe/microdatos/>).

We initially reviewed the database and decided to include in the analysis data from women who fully completed the questionnaire. Data from incomplete, rejected or non-submitted questionnaires were excluded.

Dependent variable

A positive answer to the following question was considered for pursuing cytological screening: "In the last year did you undergo a Papanicolaou test, a preventive or an early diagnostic test for cancer?"

Those who answered no or who did not answer at all (no/no reply) were excluded from the analysis.

Independent variables

Independent variables were classified in the following categories: predisposing socio-demographic factors, facilitators-inhibitors, needs from healthcare services, as in previous screening studies⁷ (Table 1).

Statistical analysis

Absolute and relative frequency rates for cervical cancer screening were calculated. Bivariate analysis was used to identify the relationship between cytological screening and socio-demographic predisposing factors, facilitators, generators for the need of healthcare. P values under 0.005 were considered statistically significant through chi-square test for categorical variables and linear trend for ordinal variables.

Bivariate analysis was executed by a Poisson regression model and built with the introduction of variables with a significant association in the bivariate analysis. This allowed to calculate crude and adjusted prevalence ratios (cPR and aPR) and 95% confidence intervals (95% CI).

For statistical analysis Stata v-14 software was used. Statistical association tests were employed since the census did not provide full coverage of the imprisoned population. Nevertheless, the results can be extrapolated to the rest of the population.

Ethical considerations

This study used publicly available data (2016 National Prison Census) which does not provide the name of the registered inmates and therefore keeps the confidentiality and does not entail ethical conflicts whatsoever

RESULTS

Out of the total of registered inmates, 4515 fulfilled inclusion criteria and were included in the study. Figure 1 and Table 2 depict the selection flow and this population's characteristics respectively.

69.17% of cases (95%CI: 67.81-70.5) underwent cytological screening for cervical cancer during the previous year. By addressing this screening according to facilitators, it shows that women with public insurance are more likely to report this condition (73.50%; 95% CI, 72.22-74.25) as well as those who pursue consultation in the correctional health services (7.79%; 95% CI 71.17-74.18) and those who engaged in sporting activities (70.66%; 95%, CI 68.86-72.4).

The prevalence of screening according to socio-demographic characteristics showed that the prevalence of cytological screening increased from the 18- 29 age group (60.63%; 95% CI 57.81-63.38) to the 40-49 age group (74.71%; 95% CI, 72.08-77.17), the dropping among women over 50 years old (71.05%; 95%CI: 67.68-74.19). The prevalence rate was lower among women with no children and it increased progressively with the number of children with higher

Table 1. Socio-demographic predisposing factors; facilitators-inhibitors and generators of need for health services.

| Factor | Measure and categories |
|--|---|
| Predisposing socio-demographical factors | |
| Marital status | Categories: single, married, partner, widowed, divorced, separated. |
| Education | According to the following question: "Prior to imprisonment, what was the last complete academic year that you passed?". Ordinal variables: none-primary school (complete or incomplete), high-school (complete or incomplete) and higher education (non-university or university, complete or not and postgraduate). |
| Ethnical considerations | Multiple choice question: "According to your ancestors and your habits do you consider yourself?", Alternatives: quechua, aymara, native, part of another people, bblack/afroperuvain, white, mestizo, other, no reply. Therefore we created a nominal variable including the following categories: mestizo, quechua, no reply and other (including the rest). |
| Age | Categories: 18-29; 30-39; 40-49; 50 or older. |
| Number of children | Categories: none, 1 to 2, 3 to 4, 5 or more. |
| Facilitators* | |
| Type of health insurance | Multiple choice question: "type of health insurance?", Alternatives: none, ESSALUD, private health insurance, healthcare prvider, FFA/FFPP insurance , comprehensive health insurance, university insurance, other. Therefore we created a nominal variable including the following categories: none (lack of health insurance), public health insurance (comprehensive health insurance and ESSALUD) and private health insurance (the rest). |
| Pursues consultation in prison healthcare services | Yes/No from the following question: "Have you accessed the prison's healthcare services?". |
| Prison sporting activities | Yes/No from the following question: "¿Have you engaged sporting activities within the prison?". |
| Type of prison | Mixed or female-only. |
| Factors generating needs for healthcare services† | |
| Previous sexually-transmitted disease (STD) | Yes/No from the following questions: "¿Do you suffer from any sexually transmitted disease (STD)?" and "¿Were you diagnosed by a healthcare professional?". |
| HIV/AIDS | Yes/No from the following questions: "Are you HIV-positive or have AIDS?" "¿Were you diagnosed by a healthcare professional?". |
| Cancer‡ | Yes/No from the following questions "Do you have cancer?" and "¿Were you diagnosed by a healthcare professional?". |
| Alcohol and smoking | Yes/No from the following questions: "Prior to entering prison did you drink alcohol?" and "Prior to entering prison did you smoke?". |

Note. *Factors enabling access to cervical cancer cytological screening.

†Risk factors for cervical cancer.

‡Unspecified type of cancer.

results among women with four or more children (75.53%; 95% CI 72.22-78.64).

When the prevalence rate was analysed according to factors generating the need for the use of health services, a higher prevalence rate was observed among women with any kind of cancer (82.43%; 95% CI, 72.05-89.52), HIV/AIDS (78.72%; 95% CI: 64.78-88.15) and tuberculosis (72.55%; 95% CI: 58.82-83.02).

The analysis of prevalence according to the rest of variables is depicted on Table 2.

Multivariate analysis determined that the report of cytological screening for cervical cancer in imprisoned women is associated to having public (aPR: 1.28, 95%CI: 1.21-1.36) or private insurance policies (aPR: 1.32; 95%CI: 1.13-1.54), pursuing consultation in the correctional health services (aPR: 1.18; 95%CI: 1.12-1.24), being hosted in a female facility (aPR: 1.07, 95%CI: 1.03-1.11) and engaging sporting activities (aPR: 1.07; 95% CI: 1.02-1.11) (Table 3).

The age and number of children were also associated to cytological screening with the age group of

women between 40 and 49 years old having a stronger association (aPR: 1.16; 95%CI: 1.09-1.24) while inmates over 50 years old showed lower degrees of association (aPR: 1.08; 95%CI: 1.01-1.17) when compared to the age group 20-29; and women with five or more children are more likely to have undergone cytological screening than those who have no children (aPR: 1,3; 95%CI 1.12-1.34). A history of cancer (any type) would also be associated to reporting PAP in this population (aPR: 1.14; 95%CI 1.02-1.27) (Table 3).

DISCUSSION

Our results show the prevalence rate and associated factors of reporting cytological screening for cervical cancer in a scarcely studied population at high risk of this condition: imprisoned women in Peru.

The prevalence rate of screening for cervical cancer in the imprisoned population in Peru is similar to that of the national coverage and lower than that described by Binswanger et al. in an imprisoned population in America (69% vs 83%)¹⁵.

In Peruvian prisons there are areas aimed at the recovery of health in charge of professional healthcare providers: mainly aimed at controlling tuberculosis, sexually transmitted diseases, pregnancy and family planning, without a specific approach for cancer of the uterine cervix, as seen in other countries^{4,16}.

The screening of cervical cancer could increase if intra-penitentiary policies aimed at controlling this condition were implemented and enforced since we face an environment where other publications show that an improved coverage is possible^{6,15}.

Women deprived of their liberty who have health insurance, pursue consultation and engage in sporting activities within the centre are more likely to have preventive behaviours against cervical cancer, as reported by Barrionuevo et al and Nijhawan et al in the general and imprisoned population respectively^{7,17}.

We should expect that prisoners with lower socio-demographical and educational backgrounds and impaired access to health insurance are less likely to undergo cytological screening. This can be changed by turning prison health centres into a suited environment where access to information on healthcare, on the detection of diseases such as cervical cancer be promoted, and where optimal quality healthcare be provided¹⁷.

Previous studies such as that by Binswanger et al show that the prevalence rate of cytological screening

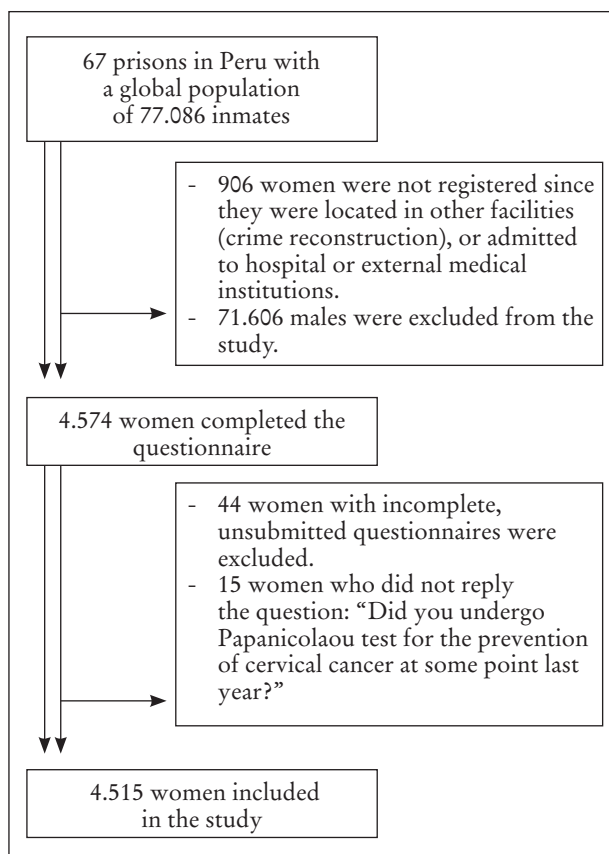


Figure 1. Women selected for the study on cervical cancer cytological screening in the imprisoned population in Peru, 2016.

Table 2. Cervical cancer cytological screening in the imprisoned population of Peru according to predisposing socio-demographic factors, facilitators and generators of need for health services 2016.

| Factors/Variables | Registered women | Women with cytological screening of cervical cancer (Papanicolaou) | | | |
|--|------------------|--|-------|-------------|--------|
| | n° | n° | % | 95%IC | p |
| Predisposing sociodemographic factors | | | | | |
| Marital status | | | | | |
| Single | 2.295 | 1.522 | 66,32 | 64,36-68,22 | <0,001 |
| Partner | 1.038 | 737 | 71,00 | 68,16-73,68 | |
| Married | 525 | 382 | 72,76 | 68,79-76,40 | |
| Widowed | 222 | 165 | 74,32 | 68,17-73,68 | |
| Divorced | 82 | 52 | 63,41 | 52,51-73,10 | |
| Separated | 353 | 265 | 75,07 | 70,29-79,31 | |
| Age | | | | | |
| 18-29 | 1.181 | 716 | 60,63 | 57,81-63,38 | <0,001 |
| 30-39 | 1.465 | 1.038 | 70,85 | 68,47-73,13 | |
| 40-49 | 1.123 | 839 | 74,71 | 72,08-77,17 | |
| 50 or older | 746 | 530 | 71,05 | 67,68-74,19 | |
| Ethnics | | | | | |
| Mestizo | 2.459 | 1.721 | 69,99 | 67,97-71,6 | 0,12 |
| Quechua | 572 | 409 | 71,50 | 67,41-74,81 | |
| Other (C) | 1.112 | 744 | 66,90 | 63,84-69,37 | |
| No reply | 372 | 249 | 66,93 | 61,46-71,00 | |
| Education | | | | | |
| None-primary | 1.702 | 1.201 | 70,56 | 61,81-70,39 | 0,022 |
| High-school | 2.188 | 1.518 | 69,37 | 69,45-74,45 | |
| Higher education | 625 | 404 | 64,60 | 67,13-70,99 | |
| Number of children | | | | | |
| None | 613 | 337 | 54,98 | 51,01-58,88 | <0,001 |
| 1 to 2 | 1.867 | 1.299 | 69,58 | 67,45-71,62 | |
| 3 to 4 | 1.369 | 984 | 71,88 | 69,43-74,20 | |
| Over 4 | 666 | 503 | 75,53 | 72,11-78,64 | |
| Facilitators | | | | | |
| Health insurance | | | | | |
| None | 1.029 | 564 | 54,81 | 51,29-57,35 | <0,001 |
| Public | 3416 | 2.509 | 73,45 | 72,22-75,25 | |
| Private | 70 | 50 | 71,43 | 58,46-72,33 | |
| Pursues consultation in prison | 3.370 | 2.458 | 72,79 | 71,17-74,18 | <0,001 |
| Engages Sporting activities in prison | 2.553 | 1.804 | 70,66 | 68,86-72,4 | 0,003 |
| Type of prison | | | | | |
| Mixed | 1.965 | 1.271 | 64,68 | 62,18-66,41 | <0,001 |
| Women-only | 2.550 | 1.852 | 72,63 | 70,75-74,21 | |

(Continued)

Table 2. Cervical cancer cytological screening in the imprisoned population of Peru according to predisposing socio-demographic factors, facilitators and generators of need for health services 2016 (Continuation).

| Factors/Variables | Registered women | Women with cytological screening of cervical cancer (Papanicolaou) | | | |
|---|------------------|--|-------|-------------|-------|
| | n° | n° | % | 95%IC | p |
| Generators of need for health services | | | | | |
| History of Cancer | 74 | 61 | 82,43 | 72,05-89,52 | 0,013 |
| History of STD | 75 | 59 | 78,66 | 67,97-86,50 | 0,072 |
| History of HIV/AIDS | 47 | 37 | 78,72 | 64,78-88,15 | 0,154 |
| History of alcohol | 1.799 | 1.271 | 70,65 | 68,19-72,40 | 0,079 |
| History of smoking | 919 | 629 | 68,44 | 64,85-70,86 | 0,593 |
| TOTAL | 4515 | 3.123 | 69,17 | 67,81-70,50 | - |

Note. CI: confidence Interval; STD: sexually-transmitted disease; p: valor p.

ning among imprisoned women increases with age, specially for women over 50 years old¹⁵. However this is not observed in Peruvian prisons, where although the prevalence increases until 50 it then slowly decreases: probably due to this group's features: their educational level, beliefs and interest on their health with an increased difficulty to accessing quality healthcare, where information on cancer prevention be provided, when compared with younger women¹⁵.

Prisoners with children are more likely to having undergone cytological screening of cervical cancer. Even though this is not so among prisoners in other countries such as Canada¹⁵, it has also been observed in other countries in Latin America such as Peru or Mexico¹⁸⁻²⁰. This probably has to do with family planning services which are encouraged in high-income countries such as Canada. The opposite can be found in Latin America, where having children can make the difference between women who probably accessed these services and received information on the importance of cytological screening for the prevention of cervical cancer in comparison with women who did not have children or were never pregnant^{18,19}.

As expected, a previous history of cancer is associated with a higher prevalence rate of cytological screening²¹. In this sense, education from physicians who make the diagnosis or prescribe treatment is essential. Women should receive information on healthier lifestyles, risk factors such as alcohol or smoking and cancer prevention and follow-up²²⁻²⁴.

Limitations and strengths

The questionnaire had not been specifically designed to evaluate cervical cancer screening in correctional institutions. Therefore, some variables such as time of detention, location of screening (inside or outside prison), initiation of sexual relations, number of sexual partners and previous hysterectomy¹⁵ were not addressed.

The fact of it depending on prisoners' reports can overestimate the prevalence of the preventive behaviour among women who know what the Papanicolaou test is and whether or not they have actually undergone the test.

CONCLUSIONS

We can conclude that the prevalence of cytological screening of cervical cancer in the imprisoned population in Peru is more common among women with health insurance, those aware of their health, with children or a previous history of cancer. Further research on the impact of prevention measures for this condition among imprisoned women compared with the general population are needed.

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Table 3. Features associated to cervical cancer cytological cancer in the imprisoned population of Peru 2016.

| Factors/Variables | Papanicolaou cervical cancer screening | |
|---|--|------------------|
| | Crude Model | Adjusted Model* |
| | cPR (95%CI) | aPR (95%CI) |
| Predisposing sociodemographic factors | | |
| Age | | |
| 18-29 | 1 | 1 |
| 30-39 | 1,17 (1,10-1,24) | 1,11 (1,05-1,17) |
| 40-49 | 1,23 (1,16-1,30) | 1,16 (1,09-1,23) |
| 50 or older | 1,17 (1,10-1,25) | 1,08 (1,01-1,16) |
| Number of children | | |
| None | 1 | 1 |
| 1 to 2 | 1,27 (1,17-1,37) | 1,19 (1,09-1,28) |
| 3 to 4 | 1,30 (1,21-1,41) | 1,18 (1,09-1,28) |
| 5 or more | 1,37 (1,26-1,49) | 1,23 (1,12-1,35) |
| Facilitators | | |
| Health insurance | | |
| None | 1 | 1 |
| Public | 1,34 (1,26-1,42) | 1,28 (1,21-1,36) |
| Private | 1,30 (1,11-1,52) | 1,32 (1,13-1,54) |
| Pursues consultation in prison | | |
| No | 1 | 1 |
| Yes | 1,26 (1,19-1,32) | 1,18 (1,12-1,24) |
| Engages Sporting activities in prison | | |
| No | 1 | 1 |
| Yes | 1,06 (1,02-1,10) | 1,07 (1,02-1,11) |
| Type of prison | | |
| Mixed | 1 | 1 |
| Women-only | 1,12 (1,08-1,17) | 1,07 (1,03-1,11) |
| Generators of need for health services | | |
| History of cancer | | |
| No | 1 | 1 |
| Yes | 1,20 (1,07-1,33) | 1,14 (1,02-1,27) |

Note. *Adjusted for education and marital status.

CI: confidence interval. aPR: adjusted prevalence ratio. cPR: crude prevalence ratio.

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