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Population-Based Study on Adherence to Cervical Cancer Screening: Frequency and Determinants in Two Low-Income Neighborhoods of Franceville, Gabon

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Abstract

Background

With 570,000 new cases and 311,000 deaths annually, cervical cancer is the 4th most common cancer among women, predominantly affecting sub-Saharan Africa (84% of cases). This study evaluates adherence to screening and its determinants in two disadvantaged neighborhoods of Franceville, Gabon.

Materials and Methods

This prospective and cross-sectional study was conducted from August to October 2025. It utilized weighted population data from demographic and health surveys. Information on sociodemographic, economic, behavioral, and medical factors, as well as knowledge about cervical cancer screening, was collected. After descriptive statistical analysis of the data, bivariate and multivariate analyses were performed using R software. Results were considered significant at a p-value of ≤ 0.05 within a 95% confidence interval.

Results

The study included 400 women aged 18 to 65 living in low-income neighborhoods, among whom 120 had previously participated in cervical cancer screening, resulting in a screening adherence prevalence of 30% (95% CI: [0.26–0.35]). This prevalence varied by neighborhood, with 34.5% in Ombélé (95% CI: [0.28–0.42]) and 25.5% in Ongouénié (95% CI: [0.2–0.32]). Multivariate analysis revealed several factors influencing screening adherence: women in Ongouénié had a lower likelihood of being screened (OR = 0.62) compared to those in Ombélé. Women aged 35 to 44 and those who were married or in stable unions had higher screening rates (adjusted OR = 1.78 and adjusted OR = 3.21, respectively), while widows had a lower likelihood (adjusted OR = 0.29). Education was a key factor, with women having secondary and higher education being 1.65 and 4.89 times more likely to be screened, respectively. Additionally, women working in the formal sector had a higher probability of participating in screening (adjusted OR = 3.15), while those with five or more children had a significantly lower probability (adjusted OR = 0.28).

Conclusion

The results of this study confirm insufficient adherence to cervical cancer screening programs in two low-income neighborhoods of Franceville. They also identify key socioeconomic, behavioral, and medical determinants influencing this practice, providing insights for improving local prevention and management strategies.

Keywords: Cervical Cancer, Women, Low-Income Neighborhoods, Franceville, Gabon

1. Introduction

Cervical cancer (CCU) remains one of the leading causes of morbidity and mortality among women in sub-Saharan Africa, particularly in resource-limited countries [1]. This disease, primarily caused by persistent infection with certain high-risk types of human papillomavirus (HPV), is largely preventable through early screening and HPV vaccination [2]. However, in many regions of Africa, low adherence to screening programs undermines efforts to reduce its incidence [3]. Gabon, a Central African country with approximately 2.5 million inhabitants in 2021, nearly 90% of whom live in urban areas [4], faces persistent public health challenges despite significant progress in healthcare. Among these challenges, cervical cancer remains a critical priority, representing one of the most common and deadly cancers among Gabonese women [1]. This disease, although largely

preventable through early screening (e.g., via Pap smears or acetic acid/lactic acid tests) and HPV vaccination, continues to disproportionately affect vulnerable populations, particularly those residing in low-income neighborhoods [5]. In cities like Franceville, where socioeconomic inequalities are pronounced, women face multiple risk factors: economic hardship, limited access to healthcare services, and a severe lack of information on reproductive health. A study conducted in 2022 by Moukassa *et al*. revealed that less than 30% of women of childbearing age in disadvantaged urban areas had undergone cervical cancer screening in the past five years [6]. This low coverage rate is attributed to multiple barriers, including the cost of screening services, lack of awareness of the risks associated with HPV infection, and cultural perceptions that downplay the importance of regular screening. Furthermore, a national survey conducted in 2021 by the Gabonese Ministry of Health highlighted that only 15% of girls aged 9 to 14 had received at least one dose of the HPV vaccine, even though this vaccine is available for free in some regions through international partnerships [7]. These data underscore the urgent need for targeted interventions to raise awareness and improve access to preventive services in marginalized communities. While efforts have been made to reduce the incidence of cervical cancer, geographic and socioeconomic disparities persist, exacerbating the burden of this disease in areas like the low-income neighborhoods of Franceville. Appropriate public policies and increased involvement from local stakeholders are necessary to reverse this trend and ensure better equity in reproductive health. In this context, this study was conducted to assess the frequency of cervical cancer screening and identify its determinants in low-income neighborhoods of Franceville, with the aim of proposing tailored recommendations to strengthen prevention programs.

2. Materials and Methods

2.1 Context and Study Population

2.1.1 Overview of the Low-Income Neighborhoods of Franceville

Geographical Location of the Ombélé and Ongouénié Neighborhoods in Franceville [8].

Franceville, the third largest city in Gabon after Libreville and Port-Gentil, is located in the southeast of the country, in the Haut-Ogooué province. It plays a strategic role as an economic, industrial, and academic center of the region. The Ombélé and Ongouénié neighborhoods are two residential areas that reflect the socio-economic and geographical characteristics of urban neighborhoods in Franceville.

2.1.1.1 Location of the Neighborhoods

Ombélé

Geographical Position: The Ombélé neighborhood is located relatively close to the city center of Franceville. It is often considered an intermediate area between the central neighborhoods and the outskirts.

Geographical Characteristics: Proximity to major healthcare centers, markets, and public infrastructure.

Relatively better accessibility due to passable roads and available public transportation.

Situated in an area where housing is predominantly semi-modern or informal, with a moderate population density.

Ongouénié

Geographical Position: The Ongouénié neighborhood is located on the outskirts of Franceville, at a greater distance from the city center compared to Ombélé.

Geographical Characteristics: Remoteness from essential services (hospitals, screening centers, schools).

Less developed road infrastructure, making access more difficult, especially during the rainy season.

Population primarily living in precarious conditions, with informal housing and high population density.

2.1.1.2 Comparison of the Two Neighborhoods

Table 1: Qualitative Comparison of the Study Neighborhoods

Critères	Ombélé	Ongouénié
Proximity to t the city center	Relatively close	On the outskirts, farther away
Accessibility	Passable roads, public transportation	Less developed roads, limited access
Healthcare infrastructure	Closer to health centers	Far from healthcare services
Socio-economic level	Slightly better conditions	Precarious conditions, lower incomes
Population density	Moderate	High, predominantly informal housing

2.1.1.3 Impact of Geographic Location on Screening [7].

The geographic location of the two neighborhoods directly influences their access to cervical cancer screening services:

Ombélé:

The proximity to health centers and awareness campaigns facilitates access to screening.

Women in this neighborhood also benefit from better visibility of public health messages disseminated in central areas.

Result: Higher adherence rate (35%) compared to Ongouénié.

Ongouénié:

The remoteness from health services and inadequate road infrastructure pose major barriers.

Transportation costs and the time required to reach a screening center deter some women.

Result: Lower adherence rate (25%) compared to Ombélé.

2.1.1.4 Importance of Geographic Distribution in the Analysis [1].

The geographic distribution of the neighborhoods highlights inequalities in access to healthcare, which is a key determinant of screening adherence. These disparities demonstrate the need for differentiated interventions:

In Ombélé: Strengthen existing awareness campaigns to meet global coverage goals.

In Ongouénié: Deploy mobile screening units and improve road infrastructure to reduce geographic barriers.

2.1.2 Profile of Women Included in the Study

The target population included all women aged 18 to 65 residing in the selected low-income neighborhoods. These women were potentially exposed to an increased risk of cervical cancer due to limited access to screening programs.

2.2 Study Design

2.2.1 Type of Study

This is a descriptive and analytical cross-sectional population study aimed at assessing the frequency of cervical cancer screening and identifying its determinants in two low-income neighborhoods of Franceville.

2.2.2 Study Period

The study was conducted over a two-month period (from

March to June 2025), covering a representative timeframe for seasonal and behavioral variations.

2.3 Selection Criteria

2.3.1 Inclusion Criteria

Be a woman aged between 18 and 65 years, reside in the two low-income neighborhoods of Ombélé or Ongouénié (Franceville) for at least 6 months prior to the start of the study, and have signed an informed consent form.

2.3.2 Exclusion Criteria

Women lacking sufficient data on their medical history or screening practices, Women who refused to participate in the study or did not sign the informed consent.

2.4 Sample Size

For this cross-sectional study, the minimum required sample size was determined using the statistical formula:

$$[Z^2 x\ P\ x\ (1-P)]/d^2$$

Where:

Z = (critical value for a 95% confidence level).

P = 0.25 (estimated prevalence of cervical cancer screening adherence in African countries [9]. d=0.05 (acceptable margin of error).

Calculation: $n= [(1.96)2 \cdot 0.25 \cdot (1-0.25)]/ (0.05)^2 =288$

To compensate for missing data or refusals to participate, the final sample size was increased by 10%, resulting in a total of 317 participants. To ensure a homogeneous distribution, a quota of 200 women per neighborhood was set. Thus, the final sample size was increased to 400 women included in the study.

2.5 Data Collection

2.5.1 Studied Variables

Sociodemographic characteristics: Age, education level, marital status, occupation, family income, residence (specific neighborhood), parity. Lifestyle habits (smoking, alcohol consumption).

2.5.2 Data Collection Tools

Standardized questionnaire: A structured questionnaire was administered directly to participants to collect sociodemographic, economic, and behavioral information.

2.6 Statistical Analysis

The data collected for this study were entered into an Excel 16 spreadsheet and then analyzed using R statistical software version 4.4.2. Descriptive analysis was performed to obtain frequencies and percentages of qualitative variables, as well as means and standard deviations of quantitative variables. A univariate analysis was then conducted to compare sociodemographic characteristics between groups that had or had not undergone screening, using Fisher's exact test for categorical variables. Finally, a multiple logistic regression was conducted to identify independent factors associated with screening adherence, calculating adjusted Odds Ratios (aOR) and their 95% confidence intervals.

2.7 Research Ethics

The study received approval from the Regional Health Directorate of the Southeast in Franceville, under reference number 0345/PHO/SG/DRSSE/SGP/D, in collaboration with the Faculty of Sciences of USTM. An internship agreement was established and issued by the Dean of the Faculty of Sciences to allow the study to be conducted in the selected neighborhoods. Written informed consent was obtained from each participant after a clear and detailed explanation of the study's objectives and procedures. Data confidentiality was rigorously maintained, in accordance with the ethical and deontological principles in force in the medical field.

3. Results

3.1 Overall Prevalence of Adherence to Cervical Cancer Screening in This Study

A total of 400 women aged 18 to 65 residing in the selected low-income neighborhoods were included in this study. Among them, 120 had previously participated in cervical cancer screening, indicating an overall prevalence of screening adherence estimated at 30% (95% CI: [0.26–0.35]), with variations between the neighborhoods: Ombélé (34.5%, 95% CI: [0.28–0.42]) and Ongouénié (25.5%, 95% CI: [0.2–0.32]).

3.2 Overall Prevalence of Adherence to Cervical Cancer Screening Based on Sociodemographic Characteristics of Study Participants (N=400)

The univariate analysis did not show a significant difference between the two Neighborhoods (crude OR = 0.65, 95% CI [0.41 - 1.02], p = 0.063). However, women aged 35 to 44 years (40%), with a crude OR of 1.85 (95% CI [1.13 - 3.04], p = 0.013), those who were married or in a stable union (OR = 3.54, 95% CI [2.2 - 5.8], p ≤ 0.001), those with secondary education (OR = 1.79, 95% CI [1.14 - 2.83], p = 0.010), or higher education (OR = 5.93, 95% CI [2.82 - 13.08], p ≤ 0.001), those working in the formal sector (OR = 3.62, 95% CI [2.18 - 6.04], p ≤ 0.001), and those with 1 to 2 children (OR = 1.59, 95% CI [0.97 - 2.59], p = 0.006) showed higher adherence to cervical cancer screening. (See Table 2).

Table 2: Univariate Analysis of the Overall Prevalence of Adherence to Cervical Cancer Screening Based on Sociodemographic Characteristics of Study Participants (n=400)

Variables	Total Number of Study Participants *N* (%)	Overall Prevalence of Adherence to Cervical Cancer Screening |		Bivariate analysis	
		Positive N (%)	Negative N (%)	Crude OR 95% CI	p-value
Neighborhoods					
Ombélé	200 (50%)	69 (34.5%)	131 (65.5%)	Reference	-
Ongouénié	200 (50%)	51 (25.5%)	149 (74.5%)	0.65 [0.41 – 1.02]	0.063
Age groups (years)					
18–24	70 (17.5)	15 (21.43)	55 (78.57)	Reference	-
25–34	123(30,75)	38 (30,89)	85 (69.11)	1.06 [0,64 – 1.72]	0.81
35–44	105 (26,25)	42 (40,0)	63 (60,0)	1,85 [1,13 - 3,04]	**0.013***
45–54	63 (15,75)	17 (26.98)	46 (73.02)	0.86 [0.44 – 1.62]	0,76
55–65	39 (9,75)	8 (20.51)	31 (79.49)	0.55 [0.21 – 1.26]	0.14
Marital Status					
Single	98 (24.5)	16 (16.33)	82 (93.67)	Reference	-
Married/Cohabiting	195 (48.75)	84 (43,08)	111 (56,92)	3,54 [2,2 -5,8]	**≤0,001***
Divorced/Separated	67(16,75)	15 (22.39)	52(77.61)	0.63 [0.31 -1.94]	0.15
Widowed	40(10)	5(12.5)	35(87.5)	0.31 [0.09 -0.81]	0.010
Education level					
Primary or less	203 (50.75)	34 (16.75)	169 (83.25)	Référence	-
Secondary	157 (39.25)	59(37.58)	98 (62.42)	1.79 [1.14 – 2.83]	**0.010***
Higher	40(10)	27 (67.5)	13 (32.25)	5.93 [2.82- 13.08]	**≤0.001***
Occupational Status					
Unemployed	98(24.5)	11 (11.22)	87 (88.78)	Référence	-
Merchant/Self-Employed	143(35.75)	42 (29.37)	101 (70.63)	0.95 [0.59 – 1.53]	0.91
Employee (Formal Sector)	96 (24)	50 (52.09)	46 (47.91)	3.62 [2.18- 6.04]	**≤0.001***
Others (Agriculture, etc.)	63 (15.75)	17 (26.98)	46 (73.02)	0.84 [0.43- 1.58]	0.84
Parity					
No Children	42 (10.5)	23 (54.76)	19 (45.24)	Reference	-
1-2 Children	110 (27.5)	41 (37.28)	69 (62.72)	1.59 [0.97- 2.59]	**0.006**
3-4 Children	160 (40)	44(27.5)	116 (72.5)	0.82 [0.51 -1.3]	**0.002***
5 or more Children	88 (22)	12 (13.64)	76 (86.36)	0.3 [0.14 -0.58]	**0.000**

OR = Odds Ratio; CI = Confidence Interval; * = Significant Test

3.3 Multivariate Logistic Regression: Analysis of Factors Associated with Adherence to Cervical Cancer Screening

The multivariate analysis identified several factors influencing adherence to cervical cancer screening. Women living in Ongouénié had a lower likelihood of being screened (OR = 0.62) compared to those in Ombélé. Women aged 35 to 44 and those who were married or in stable unions had higher screening rates (adjusted OR = 1.78 and adjusted OR = 3.21, respectively), while widows had a lower likelihood (OR = 0.29). Education plays a crucial role, with women having secondary and higher education being 1.65 and 4.89 times more likely to be screened, respectively. Women employed in the formal sector also had a higher probability (OR = 3.15) of participating in screening. In contrast, those with five or more children had a significantly lower likelihood (OR = 0.28). (see Table 3)

Table 3: Multivariate Analysis of the Overall Prevalence of Adherence to Cervical Cancer Screening Based on Sociodemographic Characteristics of Study Participants (n=400)

Variable	Ajusted OR (95% CI)	p-value
Neighborhood		
Ombélé	1	Ref
Ongouénié	0.62 [0.38 – 1.00]	0.049*
Age Group		
18–24 years	1	Ref
35–44 years	1.78 [1.02 – 3.10]	0.042*
45–54 years	0.84 [0.41 – 1.72]	0.63
55–65 years	0.51 [0.19 – 1.34]	0.17
Marital Status		
Single	1	Ref
Married/Cohabiting	3.21 [1.92 – 5.37]	≤0.001*
Widowed	0.29 [0.10 – 0.81]	0.019*
Education level		
Primary or less	1	Ref
Secondary	1.65 [1.01 – 2.70]	0.046*
Higher	4.89 [2.32 – 10.31]	≤0.001*
Occupational Status		
Unemployed	1	Ref
Employed (formal sector)	3.15 [1.82 – 5.45]	≤0.001*

Parity		
No children		Ref
1–2 children	1.51 [0.89 – 2.55]	0.12
3–4 children	0.79 [0.46 – 1.35]	0,38
5 or more children	0.28 [0.13 – 0.60]	0.001*

Legend: OR = Odds Ratio**, CI =** Confidence Interval**, Ref =** Reference category**,** *Indicates statistically significant **p-values (**$p < 0.05$**)**

4. Discussion

Cervical cancer remains a major public health burden in sub-Saharan Africa, where screening rates remain low despite international efforts to promote its elimination by 2030. In this context, understanding the determinants of screening adherence is essential for designing targeted and effective interventions. In this study, an overall prevalence of 30% was observed. This result is not only below the global elimination targets set by the WHO (70% by 2030) but also lower than those found in Rwanda (45%) [10], urban areas in Kenya (38%) [11], and South Africa (40%) [12]. However, it is higher than those from other African studies, such as in the Democratic Republic of the Congo (DRC) (12%) [9], rural areas of Tanzania (22%) [13], and Zambia (18%) [14], Conversely, it is similar to those observed in other studies conducted in Côte d'Ivoire (urban areas) (30%) [15], and Nigeria (urban areas) (28–30%) [16]. The variations in prevalence observed in these studies reflect differences in public health policies, healthcare infrastructure, and cultural perceptions. Countries that have implemented well-structured national programs show higher adherence rates compared to rural or economically disadvantaged areas. The results of this study (30%) illustrate a typical balance between awareness efforts and persistent barriers in low-income neighborhoods. A deeper analysis using multivariate regression of the univariate analysis results indicated that women living in Ombélé had a significantly higher likelihood of being screened than those in Ongouénié (adjusted OR = 0.62). This difference may be explained by several factors, such as access to health centers or screening campaigns, which may be better organized or more accessible in Ombélé. This was noted in a Rwandan study [10], which showed that proximity to health infrastructure was a major factor in adherence. Furthermore, Ombélé, benefiting from proximity to health centers and awareness campaigns, facilitates access to screening for its residents. This is consistent with many studies, such as that of Kouassi *et al*. conducted in Côte d'Ivoire [15], which highlighted that geographic variations were often due to differences in the quality of awareness campaigns. Unlike some studies that have shown that cervical cancer screening rates were higher among older women [17], in Hong Kong, where screening adherence rates of 60% were significantly higher among younger women [18], or a study conducted in Vietnam, where women aged 30 to 39 showed higher screening adherence rates than other women [19], this study noted an influence of age group, as women aged 35–44 showed significantly higher adherence rates (adjusted OR = 1.78). This result is consistent with a Tanzanian survey, which revealed that women aged 30–49 were more likely to participate in screening due to their central role in reproductive health prevention [13], and another study conducted in Brazil [20]. This phenomenon can be explained by a combination of factors, including the central role of women in this age group in reproductive health prevention, their active participation in prenatal or gynecological consultations, and their increased exposure to awareness programs. These results underscore the importance of specifically targeting this age group in public health interventions to maximize the impact of screening programs. In this study, married women or those in stable unions showed significantly higher adherence rates (adjusted OR = 3.21) than single women. This result aligns not only with a Rwandan study [10], which showed that family support and prenatal consultations played a key role in adherence, but also with another study indicating that married women adhered more, likely due to greater exposure to reproductive health services [21]. Conversely, widows (OR = 0.29) may face socioeconomic barriers or social isolation, as documented in similar contexts [22]. Contrary to a systematic review that analyzed several studies and concluded that women with lower education levels often had higher cervical cancer screening adherence rates due to targeted awareness and public health initiatives [23], secondary education (OR = 1.65) and higher education (OR = 4.89) were also identified as determinants favoring adherence to cervical cancer screening in this study. These results are consistent with an Ethiopian study [24], which showed that women who received information about HPV and screening were three times more likely to participate in screening, highlighting the importance of education in understanding risks, confirming that educated women were 2.5 times more likely to participate in screening than those with low education levels. In the context of this study, this result can be justified by the annual organization of the "Pink October" event in universities and secondary schools across the country. Women employed in the formal sector (OR = 3.15) showed a significantly higher likelihood of being screened than those who were unemployed. This result is similar to that of a Ghanaian study [25], which showed that 65% of women did not participate in screening due to direct costs (consultations, tests) and indirect costs (transportation, loss of income), and can be explained by the fact that employed women often have better access to healthcare and increased awareness, as highlighted by a Zambian survey [14], Finally, similar to a Ugandan study [26], this study indicated that women with five or more children had a significantly lower likelihood of being screened (OR = 0.28) than those with no children. This can be justified by increased family responsibilities and economic constraints limiting the participation of women with high parity. Conversely, it was also indicated that women with no children or 1–2 children showed higher adherence rates, likely due to better awareness during prenatal consultations. This result is consistent with another previous study and can be justified by logistical constraints, resulting in reduced participation in cervical cancer screening among women with more children [27].

4.1 Study Limitations

Although this study provides important insights into the determinants of adherence to cervical cancer screening in the low-income neighborhoods of Ombélé and Ongouénié, it has several limitations to consider for an adequate

interpretation of the results. First, its cross-sectional design does not allow for establishing causal relationships, only associations, and the results may be affected by temporal biases. The sample of 400 women is limited to two disadvantaged neighborhoods in Franceville, restricting the generalization of the results to other regions of Gabon or to different socioeconomic contexts in sub-Saharan Africa. The data rely on self-reports from participants, which may introduce recall or social desirability biases. Additionally, some potential determinants, such as cultural beliefs and access to care, were not explored, leaving unaccounted confounding factors. The data collection period may not account for seasonal variations, and the mention of the year 2025 raises questions about the validity of the data, and the results are heavily influenced by the Gabonese context, limiting their applicability to other sub-Saharan African countries.

5. Conclusion

The results of this study align with trends observed in recent literature, highlighting the importance of socioeconomic, educational, and cultural factors in adherence to cervical cancer screening. They reveal moderate adherence to cervical cancer screening (30%) in two disadvantaged neighborhoods of Franceville, with notable disparities between areas (Ombélé: 34.5% vs. Ongouénié: 25.5%). The main determinants identified include sociodemographic, economic, and behavioral factors. Age (35-44 years), marital status (marriage/stable union), a secondary or higher education level, and employment in the formal sector promote participation in screening, while widowhood, residence in Ongouénié, and high parity (≥5 children) decrease this likelihood.

6. Implications

These results underscore the need to target vulnerable populations, particularly less educated women, those in economic hardship, or those with many children. Awareness campaigns tailored to local contexts, as well as improved access to healthcare services (such as mobile and free screening), could enhance adherence. Training healthcare professionals in preventive education and involving community leaders are also important leverage points.

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