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Screening for Atypical Cervical Transformations from October 1 to 31, 2022: 646 Cases in Port-Gentil

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Abstract

Objective: To describe the atypical transformations of the cervix observed during the "October Rose 2022" screening campaign in Port-Gentil and identify the associated factors. **Patients and method:** This was a cross-sectional analytical study conducted from October 1 to 31, 2022, in four screening centers in Port-Gentil. The final sample included 646 women who voluntarily consulted for cervical screening by Visual Inspection with Acetic Acid (IVA) and Lugol (IVL). Sociodemographic and clinical data were collected by standardized questionnaire. A step-by-step descending multivariate logistic regression was carried out. The significance threshold was set at 5%. **Results:** Out of 1,022 women screened, 646 files were selected. The average age was 40.2 (± 12.8) years. Almost half of the participants had a low socioeconomic level (44.9%). Professional status was dominated by employees or workers (59.6%), while the level of education indicated participants were mostly at the secondary level (62.8%). The average gravidity was 4.0 (± 3.1) and ranged from 0 to 15. Multigravid and grand-multigravid women accounted for 23.5% and 27.9% of the sample, respectively. The average parity was 2.6 (± 2.3), ranging from 0 to 11. The pauciparous represented 28.8% and the nulliparous 24.6%. The participants reported having had between 0 and 12 sexual partners, with an average age of first sexual intercourse at 17.6 years; 38.5% of them had had early intercourse. A history of Chlamydia infection was reported by 19.0% of women, and 0.6% reported being HIV-positive. Unprepared visual inspection revealed metrorrhagia in 5 women (0.8%) and an inflammatory cervix in 13 women (2%). The results of the IVA and IVL tests were positive in 0.5% and

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1.2% of women, respectively, *i.e.*, an overall prevalence of atypical transformations of 1.7% (95% CI: 1.0 - 3.0). In multivariate analysis, a low socio-economic level (ORa = 3.5; 95% CI: 1.2 - 10.1; p = 0.02), a history of Chlamydia infection (ORa = 2.9; 95% CI: 1.1 - 7.6, p = 0.03), and a high number of sexual partners (≥5; ORa = 4.2; 95% CI: 1.3 - 13.5; p = 0.02) were associated with atypical lesions. In the absence of lesions of advanced appearance, the management consisted mainly of psychosocial and drug support, followed by referral to a specialized gynecological consultation for monitoring. **Conclusion:** Cervical cancer remains one of the main female cancers in Gabon, ranking second after breast cancer in terms of incidence and mortality. However, it is a preventable cancer thanks to the prevention and early detection of cervical lesions. Our study conducted in Port-Gentil, the second city in the country, shows a low prevalence of atypical transformations of the cervix, lower than that reported in Libreville, the capital, but also in the sub-region. The Visual Inspection tests for Acetic Acid (IVA) and Lugol (IVL), used in this campaign, proved to be simple, inexpensive tools adapted for primary screening in a context of limited resources. The identified risk factors, including low socioeconomic level, history of Chlamydia infection, multiplicity of sexual partners, and early initiation of sexual activity, underline the need to strengthen prevention strategies for vulnerable populations.

Keywords

Atypical Transformations, Cervical Cancer, Screening, Port-Gentil

1. Introduction

Atypical cervical transformations (ACTs), defined in this study as visual positivity on Visual Inspection with Acetic Acid VIA) and/or Lugol's iodine (VILI), represent early detectable changes that may progress to cervical cancer if untreated. Cervical cancer is a major health problem worldwide, with about 570,000 new cases and 311,000 deaths in 2018. Of infectious origin, it represents the fourth most common cancer and the fourth leading cause of cancer death in women [1]. In Africa, however, this cancer remains the leading cause of death from female cancer. Its incidence remains high, with an increasing mortality rate [2]. Primary prevention, including vaccination against Human Papilloma Virus (HPV), and secondary prevention screening, are essential levers to significantly reduce the incidence and mortality related to this disease. While HPV Vaccination has been introduced in Gabon, national coverage remains low due logistical, sociocultural, and awareness barriers [3]. In this context, low-cost screening methods such as VIA and VILI remain crucial. Cervical screening is recognized as a major intervention in public health, effective in reducing both prevalence and mortality [4]. This study aimed to evaluate the outcomes of the October 2022 cervical screening campaign in Port-Gentil, characterize the detected atypical transformations and identify associated risk factors.

2. Patients and Methods

2.1. Framework and Study Period

The analytical cross-sectional study was carried out from October 1 to 31, 2022, during the annual "October Rose" campaign in four screening centers in the municipality of Port-Gentil, the economic capital of Gabon, namely the Port-Gentil Regional Hospital, the Bendje Departmental Hospital, the PMI (Maternal and Child Protection) of the Social Center, and the Ndougou dispensary.

2.2. Population and Sampling

Of the 1 022 women screened, 646 were included in the final analysis; 373 were excluded due to incomplete records. Inclusion criteria were women aged ≥ 16 years who consented to VIA/VILI screening. Exclusion criteria included pregnancy, postpartum period, menstruation at the time of screening, and refusal of examination.

2.3. Variables and Data Collection

A standardized questionnaire collected sociodemographic data (age, occupation, and level of education). Socioeconomic status was classified based on a composite index combining education level, occupation, and self-reported household income, adapted from Demographic and Health Survey methodology. Levels were defined as Low, Medium, or High. Reproductive data (parity, gravidity) and history of sexually transmitted infection (STI) were also reported. Informed verbal consent was obtained before each test, in accordance with the ethical approval of the local committee.

2.4. Statistical Analysis

Collected data entered Epi info 7.2. Qualitative variables were expressed as percentages, quantitative variables as means +/− standard deviations (SD). Variable initially entered into the multivariate logistic regression included: age group, socioeconomic level, occupation, education, parity, age at first sexual intercourse, number of sexual partners, and history of sexually transmitted infections. Stepwise, backward elimination was applied. Significance was set at $p < 0.05$.

3. Results

A total of 646 women aged 16 to 89 participated in the study. The mean age was 40.2 years (±12.8). The most represented age group was 30 - 44 years, with 280 women (43.3%). Most women (96.5%) came from Port-Gentil, while 23 (3.5%) came from the village of Ndougou. Socioeconomically, nearly half (49.4%) were categorized into a low-status group. Most women were employed (385 cases; 59.6%). The highest level of education for the majority of participants was secondary school (n = 406; 62.8%). In contrast, 120 (18.6%) had pursued higher education, and only a minority (n = 26; 4.0%) had not received any formal instruction (Table 1).

Table 1. Sociodemographic characteristics of the participants (n = 646).

Variable	Staff (n)	%
Age		
Average age	40.2 (±12.8)	
16 - 29	137	21.2
30 - 44	280	43.3
45 - 59	176	27.2
60 et +	53	8.2
Origin		
Port-Gentil	623	96.5
Ndougou village	23	3.5
Social level		
Low	319	49.4
Average	290	44.9
High	37	5.7
Occupation		
Employees/Workers	385	59.6
Student	73	11.3
Retired	159	24.6
Unemployed person	29	4.5
Level of education		
Primary	94	14.6
Secondary	406	62.8
Superior	120	18.6
None	26	4.0

Participants' mean gravidity was 4.0 ± 3.1 and the number of pregnancies ranged from 0 to 15. Grand multigravid (≥ 6 pregnancies) represented 27.9% (180 women), while multigravid (4 - 5 pregnancies) were 152 (23.5%). The average parity was 2.6 children (±2.3), ranging from 0 to 11 children. The pauciparous (2 - 3 children) represented 186 women (28.8%), and the nulliparous constituted 159 women (24.6%). In terms of sexual behavior, the participants reported having had an average of 3.8 (±1.7) sexual partners ranging from 0 to 12. The average age of first sexual intercourse was 17.6 years, with extremes of 9 and 35 years. An early onset of sexual intercourse (before age 17) was found in 249 women, representing 38.5% of the sample (Table 2).

Table 2. Distribution of patients according to reproductive profile.

Variable	Staff (n)	%
Management		
Average (ET)	4.0 (±3.1)	
Nulligravidity (0)	97	15.0
Primigravidity (1)	75	11.6
Paucigravidity (2 - 3)	142	22.0
Multigravidity (4 - 5)	152	23.5
Large multigravidity (≥6)	180	27.9
Parity		
Average (ET)	2.6 (±2.3)	
Nulliparous	159	24.6
Primiparous	95	14.7
Pauciparous (2 - 3)	186	28.8
Multiparous (4 - 5)	134	20.7
Large multiparity (^{3}6)	72	11.2
Age at 1st sexual intercourse		
Average (ET)	17.6 (±2.9)	
<17 ans	249	38.5
17 ans	397	61.5

Of the women included in the study, 123 (19.0%) had a history of Chlamydia infection. Four women (0.6%) were HIV-positive, while three women (0.5%) reported having a gonococcal infection. A history of vaginal candidiasis was rare, with only one woman concerned (0.2%). Finally, one woman (0.2%) had a history of syphilis (Table 3).

Table 3. Distribution of women by STI history.

IST	Staff (n)	%
Short	514	79.6
Chlamydia	123	19.0
HIV-positive person	4	0.6
Gonorrhea	3	0.5
Chlamydia et Syphilis	1	0.2
Vaginal candidiasis	1	0.2

The unprepared visual examination revealed metrorrhagia in 5 women (0.8%) and an inflammatory aspect of the cervix in 13 women (2.0%). The results of the visual acetic acid inspection tests (IVA) were positive in 3 women (0.5%), while

those of the Lugol application test (IVL) were positive in 8 women (1.2%). Thus, the overall prevalence of atypical cervical transformations detected by combined IVA and IVL was 1.7%, or 11 cases out of 646 women examined (95% CI: 1.0% - 3.0%).

Multivariate analysis has identified several factors significantly associated with atypical transformations of the cervix. A low socioeconomic level increased the risk of atypical lesions with an adjusted Odds Ratio (ORa) of 3.5 (95% CI: 1.2 - 10.1; p = 0.02). Similarly, a history of Chlamydia infection multiplied the risk by 3 (ORa = 2.9; 95% CI: 1.1 - 7.6; p = 0.03). Finally, women who had five or more sexual partners were four times more likely to have atypical cervical lesions (ORa = 4.2; 95% CI: 1.3 - 13.5; p = 0.02) (Table 4).

Table 4. Multivariate analysis (logistic regression).

Risk factor	OR adjusted	IC95%	p-value
Low socio-economic level	3.5	[1.2 - 10.1]	0.02
History of chlamydia infection	2.9	[1.1 - 7.6]	0.03
≥5 sexual partners	4.2	[1.3 - 13.5]	0.02

4. Discussion

This study aimed to evaluate the atypical transformations of the cervix in Port-Gentil as part of the "October Rose" 2022 campaign. The observed prevalence of atypical transformations (positive IVA and IVL) was 1.7% (11 cases out of 646), indicating a low prevalence in this region. This result is significantly lower than those observed in Libreville by Ambounda *et al.* [5], where 5.9% of women were positive for IVA and 12.6% for IVL. This discrepancy may be due to regional differences in sociodemographic profiles, screening access, and health-seeking behaviors:

1) Sociodemographic differences: For instance, Libreville has a more diverse population, which likely includes a wider range of risk profiles compared to Port-Gentil.

2) Screening access: distinct recruitment approaches also played a role. Port Gentil's data come from a one-off campaign, whereas Libreville implemented more targeted and organized screening across several areas, potentially reaching different segments of the population.

3) A use of private structures for screening, sometimes with smear or colposcopy, in the best-equipped areas, which could underestimate the public figures of Port-Gentil. Health seeking behaviors: The reliance on private healthcare facilities in Port-Gentil's best equipped areas, where methods like smears or colposcopy are common, represents a potential limitation of the current data is an area that warrants further investigation.

Kabibou *et al.* [6] in Benin observed a higher prevalence than in Port-Gentil (6.2%), reflecting increased exposure to risk factors in this country, with an aver-

age age of 32.6 ± 9.0 years and a preponderance among the 22 - 34-year-olds. In Mali, Keita *et al.* [7] reported an average age of participants like ours (38.4 ± 11.9 compared to 40.2 years in our study) but with a higher proportion of lesions screened, or 5.8% of women tested positive to visual tests for suspected precancerous lesions. The 31-and 45-year-olds were the most representative.

Low socioeconomic status emerged as a strong risk factor (ORa: 3.5), aligning with literature linking limited resources to delayed diagnosis and lower screening uptake. Keita *et al.* [7] in Mali and Diarra *et al.* [8] also underlined strong association between socioeconomic disadvantage and cervical precancerous lesions. History of Chlamydia trachomatis infection was significantly associated with atypical cervical transformations (ORa: 3.5 and ORa: 2.9, respectively). Mpiga E *et al.* [9] found 35% of women who reported a history of Chlamydia trachomatis infection, an even higher rate than ours: 19% (123 women out of 646).

The multiplicity of sexual partners (≥5) was also associated with an increased risk (ORa = 4.2), which is biologically consistent with the mode of transmission of the human papilloma virus (HPV), the main etiological agent of cervical cancer as shown by the study by Liu *et al.* [10], and which agrees with the data of Zhang *et al.* [11] about the increased risk of cervical damage with multiple active sex life. The participants in our study said they had an average of 3.8 ± 1.7 sexual partners, to be compared to Belglaiaa *et al.* [12], who mention an average of 3 partners.

Early age at the beginning of sexual activity characterized 38.5% of the participants in our study reported having first intercourse before the age of 17. This result is like that found by Tebeu *et al.* [13] in Cameroon (average age of 17.9 years) and slightly higher than that reported by Milogo *et al.* [14] in Burkina Faso (16.7 years). In Côte d'Ivoire, Boni *et al.* [15] observed a much higher proportion of early reports (77.2%). However, our multivariate analysis did not show a significant link between early age of sexuality and the occurrence of atypical transformations ($p = 0.16$). It is likely that the low overall prevalence and sample size limit the detection power of this association. On the biological level, early-started sexual activity exposes a still immature cervical mucosa to persistent HPV infection, which remains a possible mechanism of carcinogenesis, as shown by Louie *et al.* [16] in his series. Early sexual debut and multiple sexual partners increase HPV exposures, while Chlamydia infection may contribute to cervical carcinogenesis via chronic inflammation, disruption of epithelial barriers, and facilitation of HPV persistence [17] [18]. Studies from Tanzania [19] and Nigeria [20] have confirmed higher odds of cervical neoplasia among women with past Chlamydia infection.

5. Conclusion

Cervical cancer remains one of the main female cancers in Gabon, ranking second after breast cancer in terms of incidence and mortality. However, it is a preventable cancer thanks to the prevention and early detection of cervical lesions. Our study conducted in Port-Gentil, the second city in the country, shows a low prev-

alence of atypical transformations of the cervix, lower than that reported in Libreville, the capital, but also in the sub-region. The Visual Inspection tests with Acetic Acid (IVA) and Lugol (IVL), used in this campaign, proved to be simple, inexpensive tools adapted for primary screening in a context of limited resources. The identified risk factors, including low socioeconomic level, history of Chlamydia infection, multiplicity of sexual partners, and early initiation of sexual activity, underline the need to strengthen prevention strategies for vulnerable populations.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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