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Study of Precancerous Cervical Lesions and Associated Factors among Women Aged between 18 and 65 Years in Koumpentoum (Senegal)

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Abstract

Introduction: Cervical cancer can be prevented by papillomavirus vaccination and screening for precancerous lesions. Initiated in the district in 2018, screening has never been studied. The objective of this research was to investigate the frequency of precancerous lesions and associated factors. **Methods:** This was a descriptive and analytical cross-sectional study. Data were collected from screening registers. Sociodemographic characteristics, medical history, macroscopic data and therapeutic aspects were explored. Logistic regression was used in the multivariate analysis. **Results:** A total of 385 women aged between 18 and 65 years were included. Almost all (95.58%) were married. The majority (79.48%) had no formal education. Almost all (91.17%) had no income-generating activity. The average age was (30 ± 9.68) years. The median age was 30 years. The frequency of sexually transmitted infections was (29.35%; 95% CI: 25.02 - 34.09) and that of precancerous lesions was (5.45%; 95% CI: 3.59 - 8.19). Factors significantly associated with the presence of precancerous cervical lesions were: age ≥ 40 years (ORa = 17.52 (4.51 - 67.14); $p < 0.001$) and the history of sexually transmitted infections (ORa = 10.15 (3.46 - 29.85); $p < 0.001$). **Conclusion:** Early detection and routine treatment of sexually transmitted infections combined with screening for precancerous cervical lesions in sexually active women can reduce the incidence of cervical cancer.

Subject Areas

Gynecology & Obstetrics, Women's Health

Keywords

Cervix, Cancer, Screening, Koumpentoum, Senegal

1. Introduction

Cervical cancer is caused by chronic infection with the oncogenic human papillomaviruses (HPV) [1]. With an estimated 604,000 new cases, it is the fourth most common cancer in women. In developing countries, which account for 85% of new cases and 90% of deaths worldwide, it is the second most common female cancer. Cervical cancer caused 320,000 deaths [2] [3] worldwide in 2020.

In Senegal, in the same year, cervical cancer ranked first for all cancers and all sexes combined, with 1,937 new cases, which represents 17.1% of all cancers. With 1,312 deaths in the same year, cervical cancer mortality represents 16.6% of all cancer mortality. Cervical cancer is the leading cancer in women with 26.8% of all cancers, followed by breast cancer with 25.1% [4]. The average delay in consultation is 8.2 months and 82% of patients present clinical signs at the time of diagnosis. Factors associated with cervical cancer are: age of first menstruation, age of first sexual intercourse and number of sexual partners [4]. Invasive cervical cancer is a serious disease with a one-year survival of 30% and a five-year survival of less than 1% [5].

A comparative predictive model predicts a 97% reduction in cervical cancers by combining HPV vaccination coverage with screening for precancerous cervical lesions (PCL) at least twice in life [6]. Pathology biopsy after colposcopy is the gold standard diagnosis for cervical cancer [7]. Experts recommend HPV testing in combination with cytology and colposcopy as routine screening for PCLs [8]. However, these tests require a technical platform and skilled human resources, and are inaccessible and expensive in developing countries. Visual inspection with acetic acid (VIAA) and/or lugol (VIL) is a low-cost and easy-to-perform screening method and is an alternative in developing countries without access to HPV testing, cytology and colposcopy [9] [10]. Catarino R. et *al.* in a meta-analysis of 26 studies report a sensitivity of 80% and specificity of 92% in women aged 25 and 60 years. Study region, screener capacity and population size did not affect the accuracy of VIAA screening [11]. The global strategy for the elimination of cervical cancer sets targets of vaccinating 90% of girls against HPVs by age 15, screening 70% of women by age 35 with an effective test and again by age 45, and treating 90% of women with LBC and invasive cervical cancers [12]. In Senegal, screening is recommended every 3 years in women aged between 30 and 69 years [13]. Screening for LPC has been practiced in all points of service in the health district of Koumpentoum since 2018, but has never been studied. The objective of this research is to determine the frequency of PCL as well as its associated factors in women aged between 18 and 69 years in Koumpentoum health district.

2. Methodology

2.1. Study Framework

The health district of Koumpentoum is located in the region of Tambacounda. In 2021, the population was 170,418 inhabitants on a surface area of 7652 Km^2, or a density of 22.27 inhabitants/Km^2. The district had 23 health care and service delivery points, including 1 reference health centre and 22 health posts. A little more than half, *i.e.* 51% of the population lived less than 5 km from a health facility, 35% between 5 and 15 km and 14% more than 15 km away.

2.2. Study Type and Period

This was a retrospective, descriptive and analytical study based on a database collected between 1st January 2020 and 31th December 2021 in all health care delivery points in the health district.

2.3. Study Population

The study population consisted of women aged between 18 and 69 years targeted for screening at the district health centre or 22 health posts. The target population for screening was women aged between 30 and 69 years, 25,667 of whom 1907 were in urban areas and 23,760 in rural areas. The target for women aged between 18 and 69 was 37,870, of which 2813 were in urban areas and 35,057 in rural areas. The economic and social situation of the department is characterized by a low standard of living and a high rate of early marriage linked to socio-cultural realities; this justifies the practice of LPC screening from the age of 18 years [14].

2.4. Inclusion and Non-Inclusion Criteria

All women aged between 18 and 65 years who were screened for cervical cancer at the centre and at the (22) district health posts and whose data were correctly and completely recorded were included.

Women screened whose data were not complete and correctly recorded were not included. Four women aged between 18 and 65 years with metastatic invasive cervical cancer at the time of screening were not included.

2.5. Sampling

We conducted a comprehensive recruitment of women screened by VIAA/VIL from 1st January 2020 to 31th December 2021 and meeting the selection criteria. A total of 385 women aged between 18 and 65 years were included.

2.6. Study Variables

The dependent variable was the presence of PCLs at VIAA/VIL. The independent variables were socio-demographic data, medical history, macroscopic data after VIA/VILI and therapeutic aspects.

2.7. Data Collection

We used the LPC screening register to feed the electronic data recording platform.

2.8. Data Management and Analysis

The data were collected with the Excel workbook 97-2003. They were analyzed with Epi Info 7.2.5.0, SPSS 20 and R 4.0.5 softwares. In the descriptive part, the quantitative variables were described with the extremes, the means and their standard deviations while the qualitative variables were described with their frequencies surrounded by their confidence intervals (IC 95%). In the bivariate analysis, the Pearson's chi2 statistical test and Fisher's test under the conditions of applicability were used to verify the existence of a statistically significant relationship. All independent variables with a $p < (0.25)$ in the bivariate analysis and those for which the literature review revealed a link with the dependent variable. The bottom-up stepwise approach allowed us to retain the independent variables with a statistically significant association with the presence of PCLs ($p < 5\%$). The independent variables were then removed after a nested model comparison by the Aikake information criterion (AIC) [15] until no improvement was found by the maximum likelihood test. The Hosmer-Lemoshow test [16] was used to check the conformity of the final model. The strength of the relationship between the independent and dependent variables was assessed using the crude OR and the adjusted OR with their 95% CIs.

2.9. Ethical Considerations

The research protocol had been submitted to the health authorities. The survey was explained in the local language and for each participant the free and informed consent was obtained. The data collected was kept anonymous and in compliance with medical secrecy.

3. Results

3.1. Description of the Study Population

In this study, 385 women aged between 18 and 65 years were interviewed. The minimum age was 18 years and the maximum age was 65 years. The average age was 30.07 ± 9.68 years and 89.8% were living in a couple. More than one third of the women (33.77%) were screened in urban areas and 73.25% of them were under 40 years old. Only 8.83% of the women were engaged in an income-generating activity (IGA) and 20.52% of them had attended school in French (**Table 1**).

3.2. Practice of Cervical Precancer Screening

The proportion of women aged between 30 and 69 years screened was 0.92% and varied according to their place of residence. In fact, it was 3.93% in urban areas

Table 1. Distribution of women screened by VIA/VILI by socio-demographic characteristics, Koumpentoum, 2020-2022.

Variables	Modalities	Absolutes frequencies (n)	Relatives frequencies (%)
Location of screening	Urban	130	33.77
	Rural	255	62.23
Age group	≥40 years	103	26.75
	<40 years	282	73.25
Life in a couple	Yes	368	95.58
	No	17	4.42
School education	Yes	79	20.52
	No	306	79.48
Practicing an IGA	Yes	34	8.83
	No	351	91.17
Screening coverage among 30 to 69 year olds	Total	237	0.92
	Urban	75	3.93
	Rural	162	0.68
Screening coverage among 18 to 69 year olds	Total	385	1.01
	Urban	130	4.62
	Rural	255	0.72

compared to 0.68% in rural areas. The same applies to the proportion of women aged between 18 and 69 years screened in health facilities, which was 1.01% and also varied according to place of residence, with 4.62% in urban areas and 0.72% in rural areas (Table 1). Most half (50.13%) of the women screened had more than five children and 29.35% of them had sexually transmitted infections (STIs) on speculum examination. At the VIA/VILI test, 5.45% of the women had pre-cancerous cervical lesions. Of the women who tested positive, 90.48% received cryotherapy and 9.52% were referred for colposcopy and further management for suspected invasive cervical cancer (Table 2).

3.3. Associated with PCL Detection

In bivariate analysis, the factors statistically significantly associated with the presence of PCL were: age ≥40 years (OR = 7.84 (2.95 - 20.82); $p < 0.001$) and history of STI (OR = 8.8 (3.14 - 24.7); $p < 0.001$) (Table 3).

In multivariate analysis, the factors significantly associated with the presence of PCL were: age ≥40 years (ORa = 17.52 (4.51 - 67.14); $p < 0.001$) and history of STI (ORa = 10.15 (3.46 - 29.85); $p < 0.001$) (Table 4).

Table 2. Distribution of women according to medical, macroscopic after VIA/VILI and therapeutic aspects, Koumpentoum, 2020-2022.

Variables	Modalities	Absolutes frequencies (n)	Relatives frequencies (%)
Parity > 5	Yes	193	50.13
	No	192	49.87
History of STIs	Yes	113	29.35
	No	272	70.65
Precancerous cervical lesions	Yes	21	5.45
	No	364	94.55
Cryotherapy	Yes	19	90.48
	No	2	9.52

Table 3. Identification of factors associated with the presence of PCLs in bivariate analysis, Koumpentoum, 2020-2022.

Variables	Modalities	Respondents n = 385		p value	OR	IC 95%
		Yes	No			
Screening location	Urban	7	123	0.585	0.98	[0.38 - 2.49]
	Rural	14	241			
Age group	≥40	15	88	<0.001	7.84	[2.95 - 20.82]
	<40	6	276			
Life in a couple	Yes	19	347	0.277	0.46	[0.1 - 2.16]
	No	2	17			
Practicing an IGA	Yes	1	33	0.428	0.5	[0.06 - 3.85]
	No	20	331			
School education	Yes	6	73	0.245	1.59	[0.59 - 4.25]
	No	15	291			
Parity > 5	Yes	12	171	0.495	1.5	[0.61 - 3.87]
	No	9	193			
History of STIs	Yes	16	97	<0.001	8.8	[3.14 - 24.7]
	No	5	267			

Table 4. Identification of factors associated with the presence of PCLs in multivariate analysis, Koumpentoum, 2020-2022.

Variables and modalities	Adjusted OR	CI 95%	p
Screening location yes versus no	1.34	[0.43 - 4.18]	0.612
Life in a couple yes versus no	0.384	[0.15 - 1.96]	0.962

Continued

Age ≥ 40 years yes versus no	17.52	[4.51 - 67.14]	p < 0.001
School education yes versus no	1.85	[0.56 - 6.05]	0.306
Practicing an IGA yes versus no	0.674	[0.08 - 3.35]	0.457
Parity > 5 yes versus no	1.3	[0.61 - 3.87]	0.4951
History of STIs yes versus no	10.15	[3.46 - 29.85]	p < 0.001

4. Discussion

4.1. Practice of Screening for Cervical Precancer

The practice of screening among women aged 30 to 69 is 0.92% in our sample with variations according to place of residence with 3.93% in urban areas against 0.68% in rural areas. Thiam found a similar proportion of 2% in Kédougou [17]. However, higher proportions of screening were found in Kaffrine by Faye and *et al.* with 6.5% [18] and by Guéye and *et al.* in Joal with 23.2% [19]. In Tanzania, Cunningham and *al.* found a screening rate of 6% (n = 576) [20], while Adrianampy HA *et al.* [21] found a low proportion of women screened in Fianarantsoa, Madagascar (0.47%). Overall, screening is higher in urban than in rural areas, probably due to the financial and geographical accessibility of health facilities and services.

4.2. Frequency of Precancerous Cervical Lesions

The frequency of PCLs in our sample was 5.45%, which is in line with that found in Cameroon by Ngowa JDK and *et al.* with 6.4% (n = 421) [22], Tebeu PM and *et al.* with 5.1% (n = 2485) [23] and Ngekoum B *et al.* with 7.4% (n = 946) [24] and in Madagascar by Adrianampy HA *et al.* with 8.5% (n = 112) [21]. On the other hand, higher frequencies were observed in other African series, notably in that of Biaye B with 10.2% in Dakar (n = 899) [25], Makoussa D and *al.* in Pointe Noire with 15.36% (n = 1437) [26] and Keita M and *et al.* with 38.1% in Bamako (n = 3302) [27]. These differences could be explained by the experience of the provider, by the technical quality of the screening and by the different sample sizes.

4.3. Frequency of Sexually Transmitted Infections

In our sample, the frequency of STIs was 29.35% according to the physical examination with the speculum. This frequency is clearly higher than the national average obtained by survey 11.9% [28], but lower than the series by Ly *et al.* [29] with 37%. This high frequency of STIs could be explained by the syndromic approach used in primary health care, which is based on algorithms. Indeed, without the need for biological evidence, the syndromic approach makes it possible to make a presumptive diagnosis of an STI and to initiate antibiotic treatment [30]. This also illustrates a notable lack of awareness of STI prevention in the community.

4.4. Factors Associated with Precancerous Cervical Lesions

Factors significantly associated with the presence of PCLs were: age ≥40 years (ORa = 17.52 (4.51 - 67.14); p < 0.001) and STI history (ORa = 10.15 (3.46 - 29.85); p < 0.001). These results are consistent with the scientific literature. Indeed, the persistence of HPV infection is an almost indispensable condition in the genesis of precancerous cervical lesions [30].

We did not find any link between parity and the presence of PCLs (ORa = 0.16 (0.13 - 1.3); p = 0.427), contrary to the scientific literature where trauma to the cervix during childbirth is considered to be a risk factor for cervical cancer [31] [32] [33]. Indeed, if chronic HPV infection is considered as an essential element in the genesis of PCL, there are many promoter factors necessary for the persistence or even the evolution of cellular abnormalities, notably the precocity of sexual intercourse before 18 years due to the immaturity of the squamocolumnar junction (SCJ), multiple sexual partners, age of the first child multi parity due to the numerous traumas of the cervix during childbirth, poor genital hygiene, immunodeficiency due to HIV or immunosuppressants, smoking, co-infection with HIV, co-infection with another STI, in this case herpes simplex virus and chlamydia trachomatis, prolonged use of oral contraceptives, illiteracy and the low socio-economic level of women [31] [32] [33].

4.5. Study Limitations

Database was originally designed for administrative purposes only and did not include all relevant elements, including all risk factors for cervical cancers. This was a limitation in the comprehensive identification of factors associated with the presence of LPC.

5. Conclusion

The prevention of cervical cancer is essentially based on vaccination of young girls against HPV, and early detection and treatment of precancerous cervical lesions in sexually active women. The factors associated with the frequency of precancerous cervical lesions in the Koumpentoum health district are: age ≥40 and history of sexually transmitted infections. Cervical cancer prevention in the district could be significantly improved by systematic screening and treatment of sexually transmitted infections and the introduction of HPV testing.

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Conflicts of Interest

The authors declare no conflicts of interest.

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