Scientific Research Publishing

Open Journal of Obstetrics and Gynecology, 2023, 13, 792-801
https://www.scirp.org/journal/ojog
ISSN Online: 2160-8806
ISSN Print: 2160-8792

Screen-and-Treat Approach in Secondary Prevention of Cervical Cancer among HIV-Infected Women in Faith Alive Hospital, Jos Nigeria

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How to cite this paper: Onyeji, J., Isichei, M.W., Anyaka, C.U., Osayi, E., Ogunsola, O.O., Ademuyiwa, O., Olafare, A., Ajayi, O., Isichei, C.O., Sagay, S.A. and Christopher, P.C. (2023) Screen-and-Treat Approach in Secondary Prevention of Cervical Cancer among HIV-Infected Women in Faith Alive Hospital, Jos Nigeria. *Open Journal of Obstetrics and Gynecology*, **13**, 792-801.
https://doi.org/10.4236/ojog.2023.134068

Received: March 20, 2023
Accepted: April 25, 2023
Published: April 28, 2023

Abstract

Background: Cervical cancer is the fourth most common cancer among women globally, the second most common cancer in Nigeria and the most common cause of cancer-related death in Africa. In 2020, World Health Organization in its updated guidelines recommended cervical cancer screening using HPV DNA, HPV mRNA tests and subsequent treatment as appropriate. However, in resource-poor settings, Visual Inspections with Acetic Acid (VIA), Lugol's Iodine (VILI) and subsequent treatment of precancerous lesions with thermal ablation remain the practical approaches. **Objectives:** To determine the prevalence of precancerous cervical lesions and associated risk factors among Women Living with HIV (WLHIV). **Methods:** A retrospective study on sexually active WLHIV aged 16 - 55 years screened for cervical cancer using VIA and VILI within 16 months period in Faith Alive Hospital Jos. Data were analyzed using IBM-SPSS 26. Sociodemographic characteristics of the study participants and the screening results were presented in frequency tables, and logistic regression was performed to determine risk factors of pre-cancerous lesions. **Results**: 1113 women were screened for cervical cancer using VIA/VILI. 994 (89.3%) were negative, 101 (9.1%) were positive for precancerous lesions, and 18 (1.6%) were suspicious of cervical cancer. The mean age of clients with pre-cancerous lesions was 41.32 ± 9.89 years. A

higher positivity yield (69.4%) was found in ages between 36 and ≥55 years while a less positivity yield (30.6%) was found in age's ≤ 35 years. History of STI had 1.64 fold risk association with precancerous lesions. **Conclusion:** Our study demonstrated a high prevalence of precancerous cervical lesions among WLHIV; bimodal age distribution for cancer-suspicious lesions and risk associated with STI. Thus, a "screen-and-treat" approach to cervical cancer prevention by VIA and thermal ablation in resource-poor settings should be undertaken until widespread HPV testing to triage clients is feasible.

Keywords

Faith Alive, Women Living with HIV, VIA, Screen-and-Treat

1. Introduction

Among several risk factors that have been identified for cervical cancer, undeniably the most important is infection with the high-risk Human Papilloma Virus (HPV) [1] [2]. HPV is a common infection of the genital tract, and it is believed that most sexually active people will acquire this infection at some point in their lives, which will be subsequently cleared by the immune system. However, in some individuals, the infection may become persistent and chronic, leading to the formation of precancerous lesions and cancer if untreated [2]. Immunosuppression, as in HIV infection, increases the risk of chronic HPV infection and reduces the ability of the immune system to clear precancerous lesions; as such, women living with HIV (WLHIV) are at an increased risk of developing cervical cancer. Although there is a widespread use of antiretroviral therapy (ART) among WLHIV, leading to increased life expectancy and reduced risk of opportunistic infections, this does not appear to lower the risk of HPV infection or the cumulative incidence of cervical cancer among them [3] [4] [5] [6] [7]. On the contrary, this increased survival in a moderately immune-compromised state seems to increase the risk of persistent HPV infection and the development of high-grade cervical intraepithelial neoplasia (CIN 2 and 3) and cervical cancer [8] [9].

Over the past years, developed countries have established and strengthened cervical cancer prevention programs that provide HPV vaccination and periodic screening and treatment of precancerous lesions, thereby reducing its incidence. In low-income countries, however, screening programs remain suboptimal due to low uptake, and as such, the incidence of cervical cancer remains disproportionately high in these regions [10] [11] [12] [13] [14]. In November 2020, during the 73rd World Health Assembly, WHO launched a global strategy to accelerate the elimination of cervical cancer, with some of the key objectives being 70% screening coverage and 90% access to treatment for precancerous and cancerous lesions by 2030 [15]. Although WHO strongly recommends the HPV test

as the backbone for screening, a series of seminal studies have proven the safety, acceptability, and effectiveness of the screen-and-treat approach for cervical cancer prevention in low-income countries [16] [17]. In this screen-and-treat approach, women are tested through visual inspection of the cervix with acetic acid (VIA) and Lugol's iodine (VILI) and receive immediate treatment for pre-cancerous lesions using thermal ablation if they screen positive. This approach is a simple and affordable alternative, allowing nurses, midwives, and other non-physician healthcare workers to become trained providers, potentially improving access to cervical cancer prevention services [18] [19] [20] [21].

In this study, we aimed to determine the prevalence of cervical precancerous lesions and associated risk factors among WLHIV.

2. Methods

A retrospective data review of sexually active WLHIV who met the criteria for visual inspection (obvious transformation zone, not extending into endocervical canal), aged 16 - 55 years screened for cervical cancer using VIA and VILI at Faith Alive Foundation Hospital Jos, Nigeria; between September 2020 and December 2021 (16 months period) was carried out. Precancerous lesions were identified as dense aceto-white changes close to or abutting the squamo-columnar junction (SCJ) in the transformation zone, occupying less than 75% of the cervix, not extending into the cervical canal, and confirmed using Lugol's iodine. Confirmed precancerous lesions were treated with thermal ablation and monitored for 2 - 6 weeks after treatment. Women with cancerous suspicious lesions were referred to Jos University Teaching Hospital for colposcopy and biopsy to confirm cervical cancer, which was subsequently treated with radiotherapy and an extended hysterectomy plus chemotherapy for women who could not afford the former. Clients with negative screening results were counseled to repeat screening annually. Data was extracted from care cards and service registers and analyzed using IBM-SPSS 26. Frequency tables were generated to show the socio-demographic characteristics of the study participants (age, parity, history of multiple sexual partners, STI, age at first sexual intercourse, marital status and level of education) and the screening results. Chi-square test was used to determine association between risk factors and cervical pre-cancerous lesions and logistic regression was performed to determine risk factors of cervical pre-cancerous lesions. Ethical approval was obtained from ethical review committee of Faith Alive Foundation Hospital, Jos.

3. Discussion

Findings from this study showed a prevalence of 9.1% of precancerous cervical lesions and 1.6% of suspicious cancer among WLHIV who had cervical cancer screening by VIA/VILI. History of sexually transmitted infection (STI) in the past was a strong predictor of precancerous lesion (OR = 1.634, 95% CI, p = 0.026). This high prevalence rate of cervical precancerous lesions could be due to

Table 1. Socio-demographic characteristics of sexually active women aged 16 to 55 years.

Demographic characteristics	Frequency (n = 1113)	Percentage
Age classification (Years)		
16 - 25	29	2.6
26 - 35	254	22.8
36 - 45	452	40.6
46 - 55	274	24.6
>55	104	9.3
Marital status		
Married	713	64.1
Single	247	22.2
Widowed	101	9.1
Others	52	4.7
Level of education		
Non-formal	26	2.3
Primary	328	29.5
Secondary	492	44.2
Tertiary	267	24.0
Parity		
Nullipara	157	14.1
1 - 2 para	381	34.2
≥3 para	575	51.7
Multiple sexual partners		
0 - 1 (Single)	343	30.8
≥ 2 (Multiple)	770	69.2
Coitarche		
<18	485	43.6
≥18	628	56.4
STI		
Yes	606	54.4
No	507	45.6

1113 WLHIV had cervical cancer screening by VIA/VILI within the period under review. Mean age of clients 40.06 ± 10.27 years. Majority of the clients were of age band 36 - 45 years (40.6%), married (64.1%), had secondary level of education (44.2%), parity ≥ 3 (51.7%), had multiple sexual partners (69.2%) and had STI (54.4%). About half of the clients had coitarche < 18 years (Table 1).

Table 2. Prevalence of pre-cancerous lesions and suspected cancer.

	Frequency	Percentage
Positive	101	9.1
Negative	994	89.3
Suspected Cancer	18	1.6
Total	1113	100.0

101 (9.1%) of the clients had cervical precancerous lesions, 18 (1.6%) had cervical lesions suspicious of cancer (Table 2).

Table 3. Association between independent variables and occurrence of cervical precancerous lesions.

Variables	Occurrence of precancerous lesion		χ^2	p-value
	Positive	Negative		
Age classification (Years)				
16 - 25	2 (6.9)	27 (93.1)	7.288	0.121*
26 - 35	29 (11.7)	218 (88.3)		
36 - 45	43 (9.7)	402 (90.3)		
46 - 55	15 (5.5)	256 (94.5)		
>55	12 (11.7)	91 (88.3)		
Marital status				
Married	63 (9.0)	637 (91.0)	0.546	0.909
Single	23 (9.5)	219 (90.5)		
Widowed	11 (10.9)	90 (89.1)		
Others	4 (7.7)	48 (92.3)		
Level of education				
Non-formal	3 (11.5)	23 (88.5)	1.405	0.704
Primary	34 (10.6)	288 (89.4)		
Secondary	40 (8.2)	445 (91.8)		
Tertiary	24 (9.2)	238 (90.8)		
Parity				
Nulliparous	14 (9.0)	141 (91.0)	1.284	0.526
Para 1 - 2	49 (8.4)	533 (91.6)		
Para ≥3	38 (10.6)	320 (89.4)		
Multiple sexual partner				
1	23 (6.8)	313 (93.2)	3.275	0.070*
≥2	78 (10.3)	681 (87.1)		

Continued

Coitarche				
<18	47 (9.9)	430 (90.1)	0.400	0.527
≥18	54 (8.7)	564 (91.3)		
STI				
Yes	66 (11.1)	531 (88.9)	5.259	0.022*
No	35 (7.0)	463 (93.0)		

STI: Sexually Transmitted Infection, *significant at p-value of 0.25, risk factors associated with cervical precancerous lesions: STI, Multiple sexual partners and age 36 - 45 years (Table 3).

Table 4. Multiple logistic regression of factors associated with cervical pre-cancerous lesion.

Factors	AOR	95% C. I.	p-value
Age classification (Years)			
16 - 25	0.469	0.098 - 2.246	0.343
26 - 35	0.891	0.432 - 1.838	0.754
36 - 45	0.730	0.367 - 1.451	0.369
46 - 55	0.410	0.184 - 0.915	0.029
>55	1		
Multiple sexual partner			
1	0.622	0.381 - 1.014	0.057
≥2	1		
STI			
Yes	1.634	1.061 - 2.518	0.026
No	1		

AOR: Adjusted Odds Ratio, CI: Confidence Interval, STI has approximately 2 fold risk association with cervical precancerous lesions (Table 4).

the persistence of high-risk HPV among WLHIV. The mean age of clients with cervical precancerous lesions was 41.32 ± 9.89 years.

The 9.1% prevalence is comparable to Koris *et al.*'s 9.3% in North-West Ethiopia [22] and Gabaza *et al.*'s 13.6% in Harare City [23]. This finding can also be compared to prevalence by cytology of 12.2% and 7.7% among WLHIV in Jos [20] and Benue [24] respectively. However, the prevalence is lower than 22.9% established by Jolly *et al.* in Swaziland [19] and 20.2% prevalence reported by Limenih in north-west Ethiopia [4]. It is important to note that both studies (Jolly and Limenih *et al.*) were carried out among ART-naive clients. However, majority of clients in our study had been long on ART with viral suppression, this may account for their higher prevalence rate [4] [19]. Cervical precancerous

lesions yield across age bands were 2 (1.9%), 29 (28.7%), 43 (42.6%), 15 (14.9%) and 12 (11.9%) for 16 - 25 years, 26 - 35 years, 36 - 45 years, 46 - 55 years and ≥55 years respectively. The peak prevalence of cervical precancerous lesions was observed at 36 - 45 years and this is comparable to findings of other studies [18] [19]. A total of 63 (62.4%) clients with cervical precancerous lesions were married, 54 (53.5%) had a parity of ≥3, 47 (46.5%) reported coitarche at less than 18 years, and 78 (77.2%) had a history of multiple sexual partners.

The prevalence of suspected cervical cancer in this study was 1.6%, similar to 1.0% in Namibia [18], 0.9% in Malawi [21], and 2.1% in Harare City [23]; however, a lower prevalence of 0.56% was reported among HIV-negative women in rural South Indian women [25]. A bimodal age classification for suspected cancer was noted: 7 (38.9%) for ages 26 - 35 years and 36 - 45 years; this corresponds to the bimodal age distribution of cervical cancer, with a first peak at age 43 years and a relative rebound at age 61 years, taking into account a 5 - 15 year shift from precancerous to full-blown cervical cancer [26]. Suspected cervical cancer cases were referred to Jos University Teaching Hospital for examination under anaesthesia (EUA), clinical staging, and biopsy with subsequent radiotherapy, or an extended hysterectomy with chemotherapy for those who could not afford radiotherapy.

Multiple sexual partners, age 36 - 45 years, and sexually transmitted infections (STIs) were factors found to be associated with precancerous lesions, and these are at par with findings in other studies [18] [19] [21] [22]. After subjecting these factors to multiple logistic regression, STI was found to be a significant predictor of cervical precancerous lesion in this study (OR 1.634, 95% CI: 1.061 - 2.518, p-value 0.026). STIs, including Chlamydia trachomatis, Herpes simplex, and genital warts, increase the risk of a precancerous lesion by causing inflammation, which resultantly enables HPV tenacity.

4. Limitation

Cervical cancer screening by VIA/VILI is subject to observer bias, thus making quality control difficult. Also, Lugol's iodine test has a high false-positive rate among postmenopausal women and women with vaginal candidiasis. There were no secondary triage procedures like HPV testing, Pap smears, and colposcopies prior to the "screen and treat" in our facility due to low resource constraints. The low specificity associated with VIA/VILI may also lead to overtreatment. The CD4 count and viral loads of client were not considered in the study.

5. Conclusion

This study discovered a high prevalence of precancerous cervical lesions in WLHIV, with a bimodal distribution among those with suspected cervical cancer. Precancerous lesions are significantly associated with STI. We, therefore, recommend a scale-up in the "screen-and-treat" approach for the secondary pre-

vention of cervical cancer until widespread HPV testing to triage clients is feasible.

Acknowledgements

The authors are indebted to the staff and management of Faith Alive Hospital Jos and APIN public health Initiatives Jos; and also to all the WLHIV who came for cervical cancer screening.

Conflicts of Interest

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

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