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Predictors and screening of cervical cancer among HIV positive transactional female sex workers in Nigeria

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Abstract

Introduction: In middle and low income regions of the world, there are approximately 90% of cervical cancer deaths. Factors contributing to the striking disproportionate cancer burden in the developing countries as opposed to the developed countries may include lack of effective large scale preventive interventions such as Cytology based screening programs, Visual Inspection with acetic acid (VIA) that emphasize patient education, accessible diagnostic treatment centres and established vaccination programs especially among Most at risk populations like female sex workers (FSWs).

Methodology: The study was conducted in Calabar, South-Southern Nigeria. Calabar is a port city near the Cameroon border. This is a cross sectional retrospective study among 124 Human Immune Virus (HIV)Positive female sex workers receiving ART services, in which secondary data was obtained from the Clinic Data repository for a periodspanning from October 2018- October 2019. Data analysis was done using Statistical Package for Social Sciences (SPSS) version 22.

Result: 36.30% of the respondents are between the ages of 21-30 years, 78.20% had 0-4 sexual partners, and 76.60% of the respondents use condom. 89.50% were virally suppressed while 3.20% of the study population tested positive to cervical cancer. In the regression analysis, there were non-significant negative correlation linking Age, Parity groups and viral suppression to cervical cancer, and a positive non-significant correlation linking sex partners, smoking, previous STI and educational status to cervical cancer**.** However, a positive significant correlation was noted between family planning method and risk of cervical cancer.

Conclusion: HIV-positive Nigerian FSWs are at marginally increased risk for cervical pre-cancer and cancer. The 'screen and treat approach' using VIA had been shown to be effective for the detection of cervical pre-cancer and cancer, and has shown to reduce loss to follow-up. This should be rapidly incorporated into HIV-treatment programs in resource-constraint settings.

Keywords: Cervical cancer; HIV; VIA and Cytology; Predictors; Female sex workers; Screening

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1. Introduction

Cervical cancer is a malignant neoplasm of the cervix uteri. It is considered the third leading cause of cancer related death among women worldwide, and regarded as the second most diagnosed cancer among women who live in developing countries, which data has shown contribute approximately 80% of cervical cancer deaths[1] [2]. Globally there are recorded cases of 1.5 Million clinically recognized cervical cancers [3]. According to a recent study, yearly records of 400,000 cases are diagnosed globally comprising approximately 12% of the most common cancers found in women[4]. In middle and low income regions of the world, such as the Sub-Saharan Africa, Latin America, and the Caribbean, there are approximately 90% of cervical cancer deaths [5]. Factors contributing to the striking disproportionate cancer burden in the developing countries as opposed to the developed countries may include lack of effective large scale preventive interventions such as Cytology based screening programs, Visual Inspection with acetic acid (VIA) that emphasize patient education, accessible diagnostic treatment centres and established vaccination programs especially among Most at risk populations like female sex workers (FSWs) [6].

In Nigeria, an estimated 47.2 Million women who are 15 years and above are at the risk of cervical cancer [7]. An approximate of 14,000 women in Nigeria are newly diagnosed while 8,000 die annually from the disease [8]. A report of the national incidence of cervical cancer which was based on data retrieved from population based cancer registries covering a period of 2012-2013 showed that cervical cancer is the second most common cancer occurring among Nigerian women. 290 cases were reported in that study with age standardized incidence rate of 31.2/100,000[9].

Cervical cancer is largely a preventable disease. It is preceded by a detectable pre invasive phase of usually a period of 10-15 years [10]. The long transition time from a pre-malignant lesion to a frank cancer of the cervix affords ample time for early detection and almost a complete cure [11]. In the developed countries, large scale screening intervention programs backed with effective treatment of pre-invasive lesions have significantly brought about a decline in the incidence of cervical cancer. In Nigeria however, cervical cancer screening is majorly opportunistic and such opportunistic screening interventions usually tend to reach groups at low risk while leaving out the high risk groups [12]. Most cervical cancers are caused by the human papilloma virus (HPV) which is sexually transmitted [13]. HPV 16 and HPV 18 are the commonest strains known to be responsible for nearly 70% of all cervical cancer cases and are usually asymptomatic [13]. In addition to HPV, other factors impact progression of cervical cancer from persistent HPV Infection to cervical pre-cancerous lesions to an invasive cancer. These include smoking, parity, education, diet, physical inactivity, sexual behaviour and the use of oral contraceptives [14] [15].

Since the onset of HIV epidemic, the United States Centre for Disease Control has classified cervical cancer, Kaposi sarcoma, and non-Hodgkin's lymphoma as AIDS defining conditions largely because of their close association with HIV infection [16]. However, unlike the latter two types of cancers, the risk of cervical cancer is only marginally elevated at best among HIV infected women [17] - [21]. Furthermore, compared with other AIDS defining cancers, the incidence of cervical cancer has not decreased substantially with increased use of anti-retroviral therapy therefore suggesting that the role of immunosuppression in the progression to invasive cancer may be marginal [17] [22] - [26].

Studies have demonstrated that multiple sex partners, increases the risk of HPV infection [27]. A study of transactional female sex workers in Hungary revealed that a majority (82.4%) harboured detectable levels of HPV DNA as compared with 46.2% of the general female population ($P<0.05$) [28]. Hence, there may be greater risk of HPV infection among female sex workers as compared to general female population [29]. This can be related to inconsistent use of personal barriers and protection (e.g. condoms). Other associated risk factors for HPV among FSWs will include multiple sex partners, HIV infection [30]. Younger age, and number of years of performing sex works have also been associated as risk factors for HPV [30]. The general aim of this present study was to ascertain the predictors of cervical cancer among transactional female sex workers in South-south Geo-political zone Nigeria. However, the specific objectives was to determine the predictors of cervical cancer among transactional female sex workers in South-south Geopolitical zone, Nigeria, to screen the study population for cervical cancer using the Visual Inspection with Acetic acid method (VIA) and to assay viral load and ascertain viral suppression rate among the study population.

2. Methodology

2.1. Study Area

The study was conducted in Calabar, South South Nigeria. Calabar is a port city in southern Nigeria, near the Cameroon border. The capital of cross river state, it sits on a hill near the Calabar River and cross river delta. Calabar is often

described as the tourism capital of Nigeria. The location of Calabar features a tropical monsoon climate with lengthy wet season spanning ten months and a short dry season covering the remaining two months[31].

2.2. Study Population.

The study population was HIV positive female sex workers in Calabar, South South, and Nigeria.

2.3. Inclusion criteria

All HIV positive female sex workers in Calabar, South South, Nigeria.

2.4. Exclusion criteria

All HIV negative female sex workers in Calabar, South South, Nigeria.

2.5. Study design

A cross sectional retrospective study among HIV Positive female sex workers receiving ART services from Heartland Alliance KP One stop-shop in Calabar, South–south Geopolitical zone, Nigeria in which secondary data was obtained from the Clinic Data repository for a periodspanning from October 2018- October 2019.

2.6. Sample size

124 participants were involved in this study.

2.7. Data collection and analysis

The data for this study was collected through cervical cancer screening registry from Heartland Alliance KP one stop-shop Calabar. Data analysis was done using Statistical Package for Social Sciences (SPSS) version 22.

2.8. Ethical considerations

Confidentiality, privacy and anonymity of the information provided were assured. Necessary steps such as avoiding names and secured storage source of data was taken.

3. Results

Table 1 Socio-demographic characteristics of respondents

Socio-demographic characteristics	Frequency	Percentage
Age of respondents		
16-22	19	15.30
23-29	36	29.00
30-36	45	36.30
37 and above	23	18.50
No response	1	0.80
Total	124	100
Parity groups		
0-4	114	91.90
5 and above	7	5.60
No response	3	2.40
Total	124	100
Sex partners		
0-4	97	78.20

5 and above	11	8.90
No response	16	12.90
Total	124	100
Do you smoke?		
Yes	1	0.81
No	123	99.19
Total	124	100
Previous STI		
Yes	4	3.23
No	91	73.39
No response	29	23.39
Total	124	100
Educational status		
Primary	20	16.10
Secondary	62	50.00
Tertiary	41	33.10
No response	1	0.80
Total	124	100
Result of screening		
Negative	119	96.00
Positive	4	3.20
No response	1	0.80
Total	124	100
Referral		
Yes	4	3.23
No	120	96.77
Total	124	100
Family planning		
Condom	95	76.60
Oral Contraceptives	8	6.50
Injectible/implantable hormone	10	8.10
Intrauterine services	2	1.60
Condom and oral contraceptives	2	1.60
Condom, oral contraceptives and injectible/implantable hormone	1	0.80
Condom and diaphragm/surgical cap	1	0.80
None	5	4.00
Total	124	100

Viral suppression		
Viral suppressed	111	89.50
Not viral suppressed	5	4.00
No response	8	6.50
Total	124	100

The result of the socio demographic characteristics of respondents is presented in Table 1.

3.1.1. Age

Table 1 showed that majority (36.30%) of the respondents are between the ages of 21-30, 29.00% of them are between the ages of 23-29 years, 18.50% are between 37 and above years, 15.30% of the respondents are between 16-22years while 0.80% did not indicate their age.

3.1.2. Parity groups

Table 1 showed that majority (91.90%) of the respondents had 0-4 pregnancies while 5.60% of the respondents had 5 pregnancies and above.

3.1.3. Sex partners

Table 1 showed that majority (78.20%) of the respondents had 0-4 sex partners while 8.90% had 5 sex partners and above, 12.90% did not indicate their number of partners.

3.1.4. Smokers

Table 1 showed that majority (99.19%) of the respondents do not smoke while 0.81% of the respondents' smoke.

3.1.5. Previous STI

Table 1 showed that majority (73.39%) of the respondents had no previous STI while 3.23% had previous STI, 23.39% did not indicate whether they had previous STI or not.

3.1.6. Educational status

The table 1 showed that 16.10% of the respondents attained primary education, majority (50.00%) of the respondents attained secondary education level, while 33.10% of the respondents attained tertiary education level, 0.80% did not indicate their educational status.

3.1.7. Result of screening

Table 1 showed that majority (96.00%) of the respondents tested negative to cervical cancer while 3.20% tested positive to cervical cancer, 0.80% were not tested.

3.1.8. Cervical cancer suspects

Table 1 showed that majority (96.77%) of the respondents were not referred while 3.23% tested positive were referred.

3.1.9. Family planning

The table 1 showed that majority, 76.60% of the respondents use condom, 6.50% of the respondents use oral contraceptives, while 8.10% of the respondents use Injectible/implantable hormone, 1.60% use intrauterine services, 1.60% use condom and oral contraceptives, 0.80% use Condom, oral contraceptives and injectible/implantable hormone, 4.00% did not indicate method of family planning.

3.1.10. Viral suppression

Table 1 showed that majority (89.50%) of the respondents were virally suppressed while 4.00% were not virally suppressed, 6.50% had no record.

3.2. Test for Hypotheses

3.2.1. Hypothesis 1

Ho1: Socio demographic characteristics significantly predict the spread of cervical cancer in the study area.

Table 2 The ANOVA table for socio demographic characteristics significantly predict the spread of cervical cancer in the study area

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	1.205	8	0.151	1.519	0.16
Residual	11.400	115	0.099		
Total	12.605	123			

The ANOVA table is used to test the overall significance of the model. From table 2, the F-statistics is 1.519 with the probability value (P_{value}) of 0.16, because this is above 5% level of significance, the study accepts the null hypothesis and rejects the alternative hypothesis and concludes that socio demographic characteristics does not significantly predict the spread of cervical cancer in the study area.

Table 3 The co-efficient table for socio-demographic characteristics significantly predict the spread of cervical cancer in the study area

Coefficients [a]					
	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	0.852	0.672		1.268	0.207
Age of respondents	-0.033	0.029	-0.101	-1.127	0.262
Parity groups	-0.046	0.076	-0.055	-0.613	0.541
Sex partners	0.020	0.041	0.044	0.492	0.624
Smoking	0.096	0.318	0.027	0.303	0.763
Previous STI	0.013	0.063	0.020	0.216	0.830
Educational status	0.023	0.042	0.051	0.562	0.575
Family planning	0.046	0.015	0.277	3.056	0.003
Viral suppression	-0.035	0.055	-0.057	-0.636	0.526

a. Dependent Variable: Cervical cancer

From Table 3, the following regression equation was generated.

Cervical cancer (Y) = 0.852-0.033X1 -0.046X2 + 0.020X3+ 0.096X4 +0.013X5 +0.023X6 + 0.046X7-0.035X8**+** μ

Where, Y =Cervical cancer,X_1 = Age of respondent (years), X_2 =Parity groups of respondents, X_3 =Sex partners, X_4 =Smoking, X_5 =Previous STI, X_6 =Educational status, X_7=Family planningμ =Error term

The coefficients result on table 3 indicates non-significant negative correlation linking Age, Parity groups and viral suppression to cervical cancer. The tables further indicate that there is a non-significant correlation linking sex partners, smoking, previous STI and educational status except family planning to cervical cancer**.**

4. Discussion

4.1. Socio-demographic features and predictors of cervical cancer risks among HIV-positive FSWs

The socio-demographic information from this study indicates that the participants were within the age range suitable for the utilization of cervical screening services, as recommended by the American Cancer Society.[32] Hence, from this study, it can inferred that all the FSWs should be involved and participate actively in the utilization of cervical cancer screening services. Most had a secondary school education and above, which is in tandem with a study done in Abuja among HIV-infected women and in a similar study in Dominican Republic among FSWs [27] [33].

Also, the participants in the current study had high CD4-cell counts as shown by their high viral suppression rate. This is similar to the Abuja study among HIV-infected women; however this is in contrast to other studies, where lower CD4-cell counts were reported [34] - [36]. This may be because these HIV-infected FSWs in this study have initiated ART treatment.

The coefficients result indicates non-significant negative correlation linking Age, Parity groups and viral suppression to cervical cancer, and a non-significant positive correlation linking sex partners, smoking, previous STI and educational status to cervical cancer. There is however a significant positive correlation between family planning and cervical cancer**.** This is probably because a large proportion of the study population indicated to use condom as a means of family planning and could explain the low prevalence of cervical cancer among them.

4.2. Screening for cervical cancer among HIV-Positive FSWs

The screening method used for cervical cancer screening among the study population was visual inspection with acetic acid (VIA). This is consistent with a previous study which reported that VIA was the most frequently used method of cervical cancer screening among FSWs, and VIA has been found to be more sensitive than cytology analyses in many studies conducted in developing regions [27] [37]. Although data varies regarding efficacy of VIA, a meta-analysis of 26 studies on VIA in low and middle income countries reported 80% pooled sensitivity, 92% specificity, and 99% positive predictive value [38]. This findings therefore implies that VIA is an appropriate cervical cancer screening method in FSWs, considering that it is an inexpensive test, can be performed by a wide range of healthcare professionals after a short period of training, does not require specialized laboratories or equipment, and does not require several visits by patients[18][39]-[41].

In this study, we found a 3.2% prevalence of abnormal screening result for of cervical pre-cancer/ cancer. This is almost similar with a previous study carried out in Abuja where they reported 6% prevalence, however our finding is inconsistent with reports from other sub-Saharan African countries where a higher prevalence of pre-cancer has been reported. These studies conducted in Rwanda, Kenya, South Africa, Uganda and Zambia reported prevalence of cervical pre-cancer/cancer among HIV-positive women of 24.3%, 26.7%, 66.3%, 73.0% and 76.0%, respectively [34] [35] [42]-[44]. The higher prevalence reported by some of those other studies may be partly explained by differences in the sexual practices of the women studied.

This study is also similar to other studies where the study populations were recruited through HIV and ART clinics [34] [35] [45].

The prevalence and incidence of cervical cancer has been shown to be only marginally affected by HIV/AIDS [16]. Despite the introduction of ARTs, the incidence of cervical cancer has not reduced substantially, unlike that of other AIDS-defining cancers such as Kaposi sarcoma and non-Hodgkin's lymphoma. This lack of reduction in the incidence of cervical cancer in this era of effective ART is supported by data from HIV/AIDS cohort studies carried out in the developed countries [26] [46]. This probably suggests that immunosuppression caused by HIV infection is only marginally associated with the progression to cervical cancer [23]-[25].

Limitation of the study

As this study was cross-sectional, it was not possible to explore cause and effect relationships. We did not perform HPV DNA testing or biopsies to confirm the result of the visual inspection with acetic acids, therefore visually-inapparent pre-cancerous lesions could have been missed. Also, since this study was conducted among HIV-infected FSWs on ARTs, the results may not be generalizable to uninfected women or infected non-FSWs.

5. Conclusion

In conclusion, HIV-positive Nigerian FSWs are at a marginally increased risk for cervical pre-cancer and cancer. The 'screen and treat approach' using VIA/VILI had been shown to be effective for the detection of cervical pre-cancer and cancer, and in this case those with abnormal results were referred for definitive diagnosis and treatment by a gynaecologist. These approach of screen and treat has shown to reduce loss to follow-up. This should be rapidly incorporated into HIV-treatment programs in resource-constraint settings.

Recommendation

- The Government and policymakers should include FSWs in various health programs focused on sexual reproductive health planning in to ensure that FSWs optimally utilize cervical cancer services, and thereby reduce the burden of cervical cancer in Nigeria.
- Considering the great morbidity and mortality associated with cervical cancer, health workers should actively engage in targeted awareness programs for this high-risk group by bringing these programs to the places where they live and work to enhance accessibility. This is because of the great risk factors associated with their line of work.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare that they have no competing interests.

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Statement of informed consent

The guidelines on research involving the use of human subjects according to Helsinki declaration was adhered to. Online consent was obtained from participants. Participants were allowed to leave the survey at any time they desired. Confidentiality of information was assured, and the survey was anonymous.

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