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Incidence of Cervical Cancer among women in Edo North, Nigeria.

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Abstract

Cervical cancer, linked to certain types of human papillomavirus (HPV) remains a global health concern. This study investigated the incidence of cervical cancer among women in Edo North, Nigeria. A cross-sectional analytical study design was utilized for this research. Cervical specimens were obtained from 113 women and smears made for Papanicolaou staining technique. Polymerase chain reaction for HPV-DNA detection was further performed on the positive samples. Of the 113 participants, 98.2% (111) had normal cytology, while 1.8% (2) revealed HSIL, both abnormal cytology cases also tested positive for HPV-16. The age range was 46 to 55 years. These findings show incidence rate of cervical cancer development, therefore, the importance of comprehensive prevention strategies.

Keywords: Cervical cancer, HPV, PCR, HSIL

Introduction

Cervical cancer is a significant global public health challenge, with approximately 570,000 new cases and 311,000 deaths reported globally each year (WHO, 2022). Even though it's one of the most avoidable and treatable forms of cancer, it nevertheless remains a major source of morbidity and death for women, especially in areas where access to medical treatment is limited (Zhao *et al.,* 2021). High-risk variants of the human papilloma virus (HPV) are the main causes of cervical cancer, making it a good candidate for early identification and prophylactic interventions (Kessler, 2017). The incidence and mortality rates of cervical cancer have decreased in the developed countries because of the regular screening programs (CDC, 2023). The incorporation of HPV testing into cervical cancer screening programs has raised questions about its potential to enhance early detection and risk stratification, as well as its relative effectiveness when compared to the Pap test alone (CDC, 2023). Pap testing and HPV testing are two independent screening methods and each with their own set of benefits and limitations (Kang *et al.,* 2020). This cross-sectional study endeavors to understand the burden of cervical cancer within the study population.

Methodology

A cross-sectional analytical study design was utilized for this study and 113 women that met the inclusion criteria and gave their consent participated in the study. This investigation spanned 16 weeks, running from November 6th, 2023, to February 24th, 2024, and took place at the Edo State University Teaching Hospital (EDSUTH) and Zee Royal Medical Laboratories, both situated in Edo North, Edo State. Participants included women aged 25-65, attending outpatient services at the aforementioned healthcare facilities, as well as women from surrounding communities. Prior to participation, informed consent was obtained from each participant.

Inclusion Criteria

Women between the ages of 25 to 65 years who gave their consent to take part in the study.

Exclusion Criteria
Women over 65 years or under 25 years or who did not give consent to take part in the study.
Women who have had total abdominal hysterectomy and women who were not physically and mentally able to undergo an interview and pelvic examination were also excluded from the study.

Sample Size Determination
Cochran's formula (1977) was utilized for sample size calculation. By leveraging prevalence data from a previous study (Kolawole *et al.,* 2016), the minimum sample size required was determined to be 103. A 10% non-response rate was added in order to increase the accuracy of the study.

Ethical Approval
Ethical approval was obtained from Research Ethics Committee, Edo State University Uzairue, Edo State Nigeria on the 08 November, 2023 with reference number EDSUREC23/0076.

Sample Collection and Analysis
Smears were collected as the first step following the procedure from a previous study Kamal (2022), fixed smears were stained using the Papanicolaou staining technique and the slides were viewed to check for any form of cervical abnormality. The positive samples were sent for HPV testing using molecular analyses (PCR).

Data analysis
Data was statistically analyzed using the International Business Machines Corporation (IBM) SPSS version 29.0.

Results
A higher proportion of respondents 111 (98.2%) had normal cervical smear cytology, while 2 (1.8%) had HSIL. These were confirmed with PCR to be positive for HPV-16 infection as shown in Table 1.

Table 1: Incidence of Cervical Cancer and HPV characterization among the Study Participants.

Test	Negative n (%)	Positive n (%)
Pap Smear	111(98.2)	2(1.8)
HPV-DNA	-	2(1.8)
HPV type		HPV-16

In this study, 113 women with an average age of 33.35 ± 6.55 were involved. Most participants fell within the 25-35 age range, followed by 45 individuals aged 36-45, and 14.2% were in the 46-55 bracket. Only a solitary participant was in the 56-65 age category. Predominantly, the participants possessed a tertiary education level, with 43 working as civil servants and 35 as artisans. Students, the unemployed, and medical practitioners constituted the minority. Additionally, the majority of participants were married, with 40.7% reporting being single or divorced. The respondents who tested positive for cervical cancer were aged 46-55 years. There is a statistically significant association between age and prevalence. Among subjects who had tertiary education, the prevalence of cervical cancer was 1.8%. The association, however, was not significant. Both positive respondents were married, but the association between marital status and prevalence was not statistically significant (Table 2).

Table 2: Incidence of Cervical Cancer in relation to Demographic Characteristics of the Study

Characteristic	n=113 n(%)	Prevalence(%)	χ^2 P-value
Age group (years)			
25-35	51(45.1)		
36-45	45(39.8)		12.343, 0.006*
46-55	16(14.2)	2(1.8)	
56-65	1(0.9)		
Education			
Primary	0(0.0)		0.916, 0.989
Secondary	4(3.5)		
Tertiary	109(96.5)	2 (1.8)	
Occupation			
Civil servant	43(38.1)		
Student	18(15.9)		
Unemployed	10(8.8)		
Artisan	35(31.0)	2 (1.8)	4.537, 0.338
Medical Personnel	7(6.2)		
Marital Status			
Single	39(34.5)		
Married	67(59.3)	2 (1.8)	1.398, 0.845
Divorced	7(6.2)		
Religion			
Islam	60(53.1)	1 (0.9)	0.08, 0.929
Christianity	53(46.9)	1 (0.9)	
Ethnicity			
Etsako	51 (45.1)	1 (0.9)	3.885, 0.973
Esan	12 (10.6)	1 (0.9)	
Benin	26 (23.0)		
Owan	6 (5.3)		
Yoruba	5 (4.4)		
Hausa	3 (2.7)		
Igbo	7 (6.2)		
Others	3 (2.7)		

The study found that 56.6% of respondents had their first sexual experience between 15-21, with 1.8% of cases being from this age group. The number of children was also a significant risk factor for cervical cancer. However, only 0.9% of respondents were on a contraceptive method, and the association between contraceptive use and HPV positivity was not statistically significant (Table 3).

Table 3: Risk factors of Cervical Cancer Associated with HPV

	n=113			
Risk factors	**n(%)**	**Positivity(%)**	**χ^2**	**P-value**
Early Sexual Contact				
15-21	64(56.6)	2(1.8)	5.953, 0.981	
22-27	34(30.0)			
28-34	5(4.4)			
No of Children				
0-2	64(56.6)		18.880, 0.009*	
3-5	45(39.8)	2(1.8)		
6-8	4(3.6)			
Use of Contraceptives				
Yes	33(29.2)	1(0.9)	0.426, 0.514	
No	80(70.8)	1(0.9)		

Discussion

One hundred and thirteen women between the ages of 25 – 65 years were the participants for this study. Majority of the respondents were in the 25 – 35 years age group. This is due to the fact that younger women were more willing to participate in the study. Only 1 person in the 56 - 65 years age group gave consent to participate in this study and this didn't give a good representation for women in that age group. This research presents findings regarding cervical cancer screening and HPV-DNA genotyping. Firstly, it's encouraging to note that a majority of the respondents (98.2%) had normal cervical smears, however, the identification of HSIL in 1.8% of the respondents accentuates the importance of continued vigilance in screening and early detection efforts. A fact sheet published by ICO/IARC, 2023, placed the prevalence rate of HPV-related cervical cancer among Nigeria women at 11.9% which is above the percentage obtained from this study. Factors like, sampling location play important role as most of the study done in Nigeria were from patients visiting hospital because of probably symptoms of cervical inflammation. Both cases of HSIL were associated with HPV-16 infection and this is particularly noteworthy. HPV-16 is one of the high-risk types of HPV, known to be strongly associated with cervical cancer. These findings highlight the critical role of HPV-DNA genotyping in identifying specific HPV types responsible for cervical cancer cases. Knowing the specific HPV types present in a community can inform targeted interventions such as HPV vaccination and more vigilant monitoring for individuals infected with high-risk HPV types. This is similar to a study (Okoeguale *et al*., 2022) on the prevalence and distribution of cervical high-risk human papillomavirus infection in Ugbegun rural community of Edo Central, Nigeria where although, six HPV serotypes were detected; types 16, 18, 35, 45, 52 and 58, HPV types 16 and 18 were most frequent, contributing 54.2%, and coinfection occurred in 29.2%. This research stresses the need for comprehensive cervical cancer prevention strategies that encompass both screening for abnormalities and targeted interventions for high-risk HPV infections. This may include not only vaccination against HPV but also continued surveillance and early intervention for individuals identified as being at higher risk based on genotyping results. The proportion of respondents positive for cervical cancer was highest within the age range of 46-55. This supports the finding that it takes a long period of time between HPV infections and the transformation of cell into microscopically noticeable cancer or precancerous lesion (Fehrmann *et al*., 2003). As a result, there might be a correlation between age and the likelihood of developing cervical cancer within a population. The statistical significance of this association ($p = 0.006$) further emphasizes the importance of considering age as a significant factor in assessing the risk of cervical cancer. Unfortunately, most women within this age

group and older did not give their consent to participate in this study, this may have contributed to the low prevalence (1.8%) recorded. The majority of respondents had their first sexual experience between the ages of 15-21 years. Interestingly, the cases of cervical cancer recorded were also from this group, albeit at a low percentage. However, the statistical analysis suggests that there is no significant association between early sexual contact and HPV positivity, which is a known risk factor for cervical cancer. This is similar to a previous study (Mekonnen and Mittiku, 2023) where in the subgroup analysis, there was no significant association between early sexual activity and cervical cancer. The combined results of 10 studies, or the total pooled study, did, however, show a correlation between early sexual debut and cervical cancer, meaning that women who started having sex before the age of 18 were more likely than adult women to get cervical cancer. This finding may challenge common assumptions and warrant further investigation into other contributing factors. This study finds a statistically significant association between the number of children and HPV positivity, with a higher percentage of positive cases among respondents who had 3-5 children. This aligns with existing research highlighting the link between multiparity and increased risk of cervical cancer.

Conclusion

The study highlights the need for scheduled community screening and influence of socio-demographic factors on cervical cancer incidence in Edo North, Nigeria. A comprehensive approach involving screening is needed to effectively mitigate cervical cancer burden.

Recommendations

Continued Vigilance in Screening: Although a majority of respondents had normal cervical smears, the identification of HSIL in 1.8% of cases underscores the importance of continued vigilance in screening and early detection efforts.

Role of HPV-DNA Genotyping: HPV-DNA genotyping is crucial for identifying specific HPV types, particularly high-risk types like HPV-16, associated with cervical cancer. This information informs targeted interventions such as HPV vaccination and vigilant monitoring for high-risk HPV infections.

Limitation

Age is statistically associated with the likelihood of developing cervical cancer, emphasizing the importance of considering age in assessing risk. However, low participation rates among older women may have contributed to under representation and a lower recorded incidence.

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