



Research

Human Papilloma Virus, Risk Factors and Sequelae: How much do Female Adolescents in Port Harcourt Metropolis know?

¹MA Alex-Wele, ²IL Oboro, ³DS Ogaji

¹Department of Medical Microbiology and Parasitology, University of Port Harcourt Teaching Hospital, Alakabia

²Department of Medical Microbiology, Rivers State University Teaching Hospital, Port Harcourt, Rivers State

³Department of Preventive and Social Medicine, University of Port Harcourt, Choba

Corresponding Author: Mary Adanma Alex-Wele, Department of Medical Microbiology and Parasitology, University of Port Harcourt Teaching Hospital; onlyadawele@yahoo.com; +2348090599963

Article history: Received 12 January 2023, Reviewed 16 January 2023, Accepted for publication 17 February 2023, Published 07 March 2023

Abstract

Background: Human Papilloma virus (HPV) infection is the most common viral infection of the genital tract; is sexually transmitted with the highest rates observed in young women. This study assessed the level of knowledge of HPV and cervical cancer among adolescent girls in Port Harcourt metropolis, Nigeria.

Methodology: A cross-sectional survey among 328 in-school female secondary school students aged 9 - 19 years, selected via multi-stage sampling. Information on socio-demographics, knowledge of HPV and cervical cancer and sexual history were collected using a self-administered, semi-structured questionnaire. Data was analyzed using SPSS version 23 and Chi square test was used to establish associations.

Results: Only 38.2% and 30% had heard of cervical cancer and HPV respectively; the media being the most common source. Knowledge of transmission, risk factors, sequelae and prevention of infection was poor (75%). About 20.2% were aware of the causal association between HPV infection and cervical cancer. Some (3.1%) were sexually exposed and practiced unprotected sexual intercourse. Median age at sexual debut was 11 years. Older and private school students (15-19 years) had better knowledge

Conclusion: The level of knowledge of HPV, cervical cancer, their association and risk factors, among adolescent girls in Port Harcourt metropolis is poor. Some adolescents engage in sexual practices that put them at risk for HPV infection. Social media and upper primary and secondary school-based approach to HPV health promotion should be explored to provide detailed adolescent-friendly information to guide in prevention of HPV infection and cervical cancer

Key words: Human Papillomavirus, cervical cancer, adolescents, Port Harcourt

Introduction

Human Papilloma virus (HPV) is a double stranded epitheliotropic DNA virus of the Papillomaviridae family¹ with over 200 types having cutaneous or mucosal predilection identified. Mucosal types are classified as low or high oncogenic risk types.² HPV infection is the most common viral infection of the genital tract (World Health Organization, 2019). Globally, the highest incidence rates have been recorded in Africa with age-standardized rates ranging from 33.8% to 75.3 per 100,000,^{3,1} particularly in sub-Saharan Africa.² In Nigeria, prevalence ranges from 14% to 49%¹ while in Port Harcourt, the prevalence of HPV infection was reported to be 10% in a facility-based study carried out in 2016.⁴

Risk factors include young age, early menarche, sexual intercourse (vaginal, anal or oral intercourse), sexual debut at or before (\leq) 15 years of age, multiple sexual partners, unprotected intercourse, multiparity, immunosuppression, family history, Smoking, other sexually transmitted. Sexual intercourse is a major risk factor for transmission of HPV, and it is often acquired within months after the first sexual intercourse.^{5,6,7} Almost 30% of young women became HPV-positive within one year of sexual debut.⁸

Most HPV infections (about 90%) are asymptomatic and are cleared by the host immune system within two years before disease occurs;⁴ but could become chronic and progress to invasive cervical cancer.⁹ Symptomatic HPV infections present as cutaneous and/ or mucosal tumors. Benign tumors include warts and papillomas while the malignant tumors are mainly squamous cell



carcinomas of the cervix, vulva, vagina, penis, anus or oropharynx.^{10,11} About 99% of cervical cancer cases have been linked to persistent genital infection with high-risk HPV (HrHPV).^{1,12,13} HPV types 16 and 18 contribute to 20% and 50% of cervical cancers, respectively.⁸ Type 16 is responsible for the largest number of cervical intra-epithelial lesions type 3, while types 16 and 18 together account for 70% of cervical cancer cases.^{14,15} Oral contraceptive use and higher parity increase risk for cervical cancer.³ Cervical cancer ranks fourth most common cancer in women worldwide,¹⁶ with incidence of more than half a million.¹⁷ In Nigeria, it is more common between 15 and 44 years; 12,075 women were diagnosed and 7,968 died from cervical cancer in 2020 and at any given time, 3.5% of women harbour HPV types 16 and 18 in their cervix.¹⁸ There is no effective anti-viral chemotherapeutic agent against HPV.⁹

Adolescent girls (10-19 years) are a key population that are affected as young women below 25 years of age, have been observed to have the highest rates of HPV infection.^{19,20} In 2021, 15.6% of adolescent girls reported having had sexual intercourse before age 15 years.¹⁸ The risk of transmission of STI in Port Harcourt is high due to the social environment that encourages indiscriminate sexual tendencies and adolescents are not spared.^{21,22} Over the years, public enlightenment activities have occurred, with expectant increased awareness among young women, adolescents, their parents or care givers and the public. Sadly however, adolescents have been widely reported to have very poor awareness of HPV transmission dynamics, its sequelae and prevention strategies.^{16,23,24,25} It is also expected that those in senior secondary schools in urban settings such as Port Harcourt metropolis should more likely be aware than their rural counterparts. This study was conducted to assess the knowledge of HPV, its transmission, and sequelae to identify gaps and thus guide future interventions against cervical cancer in Port Harcourt, Nigeria.

Method

A cross-sectional descriptive study carried out in Port Harcourt Metropolis, the predominantly urban portion of Rivers State, among in-school female secondary school students in Port Harcourt metropolis aged between 9 and 19 years. Public schools are government-funded, tend to be over-crowded, with students usually from the lower socio-economic class while private schools are moderately populated, better funded with students from middle to upper class families and

believed to have access to better educational content and opportunities.

Three hundred and twenty-eight (328) students were recruited via multistage sampling from six randomly selected schools: three public and three private owned. This followed the categorization of all secondary schools in Port Harcourt metropolis based on their proprietorship into two, as either public or private-owned. Thereafter, by simple random sampling, students were selected from junior secondary class 1 through senior secondary class 3 of selected schools. Information on socio-demographic data of participants including their age, class, father's and mother's occupation and level of education, their sexual history, knowledge of cervical cancer, HPV, risk factors for HPV transmission and its association with cervical cancer were collected using a self-administered, semi-structured questionnaire which was filled by each participant in private. Before applied to our study sites, the questionnaire was pretested on thirty-six female students at a secondary school in Etche local government area of Rivers State (outside Port Harcourt metropolis) and was found to be clearly understood. Chi-square test was used to determine the associations between socio-demographic and sexual characteristics/ awareness of HPV and differences between their knowledge of HPV and sexual characteristics based on school type. Significance was set at $p < 5\%$.

Ethical approval was obtained from the ethical review board of the University of Port Harcourt (UPH/CEREMAD/REC/MM74/057) and permission obtained from the Rivers state ministry of education and school authorities. Written assent was obtained from each student, after informed consent had been obtained from their parent or legal guardian. No personal identifiers were collected to ensure confidentiality.

Results

Table 1 shows the socio-demographic characteristics of the participants including age, school type, class, religion, father's education, and occupation as well as their mother's education and occupation. The mean age of the study participants was 13.8 ± 0.1 years. Majority 63(19.2%) were 13 years old, and this was closely followed by those who were 15 years old 140(39.7%). The majority of the study participants' fathers 144(43.9%) and mothers 186(56.7%) were businessmen or businesswomen /traders and 218(66.5%) fathers and 207(63.1%) mothers had tertiary education. Most participants 355(98.6%) were Christians.



Table 1: Socio-demographic characteristics of participants (N=328)

Variables	n (%)
Age (years)	
9	1 (0.3)
10	14 (4.3)
11	23 (7.0)
12	40 (12.2)
13	63 (19.2)
14	58 (17.7)
15	60 (18.3)
16	46 (14.0)
17	16 (4.9)
18	2 (0.6)
19	5 (1.5)
Religion	
Christian	321 (97.9)
Muslim	7 (2.1)
Class	
JSS1	35 (10.7)
JSS2	40 (12.2)
JSS3	98 (29.9)
SS1	46 (14.0)
SS2	66 (20.1)
SS3	43 (13.1)

SSS = Senior secondary school.

JSS = Junior secondary school.

Table 2 shows the distribution of the participants' awareness of HPV and cervical cancer and the sources of their information. Few participants reported to have ever heard of cervical cancer 131(39.8%) and of this

proportion, majority 47(35.9%) heard through social media. Few participants 90(27.4%) reported to have ever heard of HPV with the majority 33(36.7%) having heard at school.

Table 2: Awareness of HPV and cervical cancer among participants (N=328)

Variables	n (%)
Ever Heard of Cervical Cancer?	
Yes	131 (39.9)
No	197 (60.1)
I heard about it through	
Parents	22 (16.8)
Friends	11 (8.4)
School	33 (25.2)
Television	22 (16.8)
Social Media	47 (35.9)
Radio	14 (10.7)
#Others	4 (3)
Ever Heard of HPV?	
Yes	90 (27.4)
No	238 (72.6)
I heard about it through	
Parents	12 (13.3)
Friends	6 (6.7)
School	33 (36.7)
Television	12 (13.3)
Radio	8 (8.9)
Social Media	17 (18.9)
#Others	8 (8.9)

#Church, Hospital, Siblings, Music, Book, Newspaper

Table 3: Knowledge of HPV infection (transmission, risk factors, sequelae and prevention) among participants (N=328)

Questions	Yes n (%)	No n (%)	I don't Know n (%)
HPV can be passed on during sexual intercourse	164(50)	4(1.2)	160(48.8)
Having sex at an early age increases the risk of getting HPV	175(53.4)	4(1.2)	149(45.4)
Having many sexual partners increases the risk of getting HPV	165(50.3)	3(0.9)	160(48.8)
Using condoms reduces the risk of getting HPV	106(32.3)	27(8.2)	195(59.5)
A person could have HPV for many years without knowing it	118(36)	11(3.4)	199(60.7)
HPV can cause cervical cancer	132(40.2)	6(1.8)	190(57.9)
There is a vaccine to protect one from HPV	99(30.2)	12(3.7)	217(66.2)
The HPV vaccine can protect one from most cervical cancers	71(21.6)	25(7.6)	232(70.7)
HPV vaccines are most effective if given to people who have never had sex	26(7.9)	10(3.2)	292(89)
The HPV vaccine requires two three doses	106(32.3)	27(8.2)	195(59.5)
The HPV vaccine is available in Nigeria	118(36)	11(3.4)	199(60.7)

Table 3 shows the distribution of participants' responses to knowledge questions on HPV infection i.e., transmission, risk factors, sequelae and prevention. A total of eleven questions were used to measure

knowledge. Participants were given "Yes," "No," or "I do not know" response options. A correct (yes) response was assigned 1 point, while a no/I don't know response was assigned 0 points. The mean knowledge

score for participants was 3.8 ± 3.2 (mean \pm SD, range 0–11). The overall level of knowledge of participants was categorized using modified Bloom’s cut off point, as good if the knowledge score was 8.8 - 11 (80-100%), moderate if the score was 5.5 - 8.7 (50-79%) and as poor if the score was less than < 5.4 ($< 50\%$). Correct answers are indicated in bold. It also reveals that only about two-fifths 132(40.2%) of participants were aware that HPV has a casual association with cervical cancer as the majority 196(59.7%) of participants were unaware of this association.

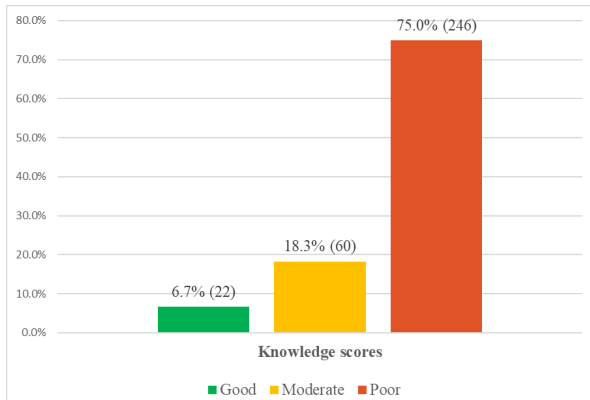


Figure 1: Knowledge of HPV among Participants

Table 4 shows participants’ sexual history. Few participants 3(0.9%) reported having ever had sex and only 1(33.3%) of these used a condom at the last intercourse. The mean (\pm SD) age at sexual debut was 11 ± 1 years and the mean (\pm SD) number of lifetime sexual partners was 1 ± 1 .

Table 4: Frequency Distribution of Sexual History of Participants (N=328)

Variables	n (%)
Ever had sexual intercourse?	
Yes	3(0.9)
No	325(99.1)
Total	328
Age at first sexual intercourse (Years)	
10	1 (33.3)
11	1 (33.3)
12	1 (33.3)
Total	3 (100)
Condom use at last sexual intercourse	
Yes	1(33.3)
No	2(66.7)
Total	3(100)

Tables 5 shows the association between participants’ socio-demographic characteristics and their awareness of HPV. Students at private schools ($X^2 = 8.820$, P-Value = 0.003) and those over 15 years of age ($X^2 = 18.547$, P-Value = 0.046) were more aware of HPV than those in the public schools and the younger ones.

Table 5: Association between socio-demographic characteristics and HPV awareness (N=328)

Variables	Yes n (%)	No n (%)	X ²	P-Value
Age (yrs)				
9	1(100)			
10	5(35.7)	9(64.3)		
11	4(17.4)	19(82.6)		
12	8(20)	32(80)	18.547	0.046*
13	18(28.6)	45(71.4)		
14	8(13.8)	50(86.2)		
15	23(38.3)	37(61.7)		
16	18(39.1)	28(60.9)		
17	4(25)	12(75)		
18	2(100)			
19	1(20)	4(80)		
School				
Public	57(34.8)	107(65.2)	8.820	0.003*
Private	33(20.1)	131(79.9)		
Religion				
Christian	89(27.7)	232(72.3)	0.622	5.430
Muslim	1(14.3)	6(85.7)		
Class				
JSS1	8(22.9)	27(77.1)	4.560	0.472
JSS2	11(27.5)	29(72.5)		
JSS3	24(24.5)	74(75.5)		
SS1	14(30.4)	32(69.6)		
SS2	24(36.4)	42(63.6)		
SS3	9(20.9)	34(79.1)		

* Significant at $p < 0.05$, X² Chi-square

There was no significant statistical association between participants’ socio-demographic characteristics and sexual history

Discussion

Only 131(39.9%) had heard of cervical cancer. This is higher than 14.8% reported from Benin²⁶ but like the report of 42.7% in Awka²⁷ and 59% among undergraduates in Port Harcourt, some of which were adolescents²⁸ which shows that young girls living in Nigeria are largely unaware of this all-important subject that directly relates to them. On a global scale, it is similar to 34% from Mozambique¹⁶ but much less than the rates of 50.1%, 52% and 95.9% reported recently



from Kenya,²⁹ India³⁰ and Hong Kong³¹ respectively. This difference may reflect the level of development of the study locations, implying better enlightenment in the more developed regions of the world.

About one-third (27.4%) of participants only, had heard of HPV, as previously reported in Port Harcourt (36.6%)²³ and Mozambique (33%);¹⁶ It is however, higher than 17.6% reported in Uganda²⁵ and 15% in India²⁴ but lower than 43.1% reported from Awka, Nigeria,²⁸ 89.9% from Spain³² and 41.6% in Turkey.³³ About one-third (30.2%) of our respondents only, were aware of the causal relationship between HPV infection and cervical cancer i.e., that HPV infection can lead to cervical cancer. This also varies widely among adolescent girls residing in various geographical locations worldwide; from low in Benin city, Nigeria, India and Turkey at 0/ 2.4%, 12% and 33% respectively^{27,31,34} to high (83.3%) in Ekiti state, Nigeria and Lublin (79.3%).³⁴ These wide variations may imply that the degree of exposure of young females to HPV and cervical cancer-related information, also varies widely, even within Nigeria. On other HPV knowledge questions, Gualano et al., reported that only 38% and 42.2% of vaccinated and unvaccinated girls respectively, knew that a person could be infected with HPV and be unaware of it³⁵ majority of our study participants (59.7%) were also ignorant. About half (53.4%) were aware that sexual intercourse is a risk factor for HPV infection, in contrast to 12.1% reported in an earlier study in a similar population;²⁹ one wonders if this implies improving sexual health education, though seemingly skewed.

The medium by which information is disseminated is important. It must be far-reaching, easily accessible, understandable, accurate and well targeted. The media (audio, visual, print and social media) is commonly reported as the source of information.^{35,27} More than one-third (63.4 % and 41.1%) of our respondents had heard of cervical cancer and HPV respectively via the media, with social media accounting for the highest proportions. The social media is a veritable communication channel for young people globally and so must be exploited for health promotion activities as well. Other significant sources were parents (16.8% and 13.3% respectively) and schools (25.2% and 36.7% respectively) thus the need to educate parents, schoolteachers, and administrators on important health subjects. It is also very important that information be age-appropriate for adolescents, to improve their understanding and memory. Youth-friendly approaches such as the use of catch phrases, role plays, short dramas,

music and dances are more likely to improve understanding better than the use of lectures only. The school health program must be strengthened in this regard. The use of peer educators is an innovative approach that has been shown to be highly efficient as adolescents tend to prefer information gathering from their peers particularly with regards to sensitive subjects as sexual and reproductive health issues.^{36,27,37} This is not just effective in terms of improving knowledge, attitudes towards their sexuality, but is more cost effective than having to train health educators to cover all upper primary and secondary schools.

Sánchez-Alemán et al. reported that having 2 or more sexual partners and inconsistent condom use, was associated with infection with HPHPV types (3.8 times).³⁸ Sexually exposed girls were 0.9% (3/328); two were 12 and one 16 years old. They had their first intercourse at age ten, eleven and twelve years respectively. All had only one sexual partner. At the last sexual intercourse, 66.7% (2/3) of these did not use a condom. This is in tandem with earlier reports of high rates of risky sexual behavior among Nigerian adolescents before age 15 years.^{21,22,18} Half (50%) of our participants did not know that HPV could be transmitted via sexual intercourse even though that is the major risk factor.

Interestingly, students at public schools had better knowledge of HPV and its association with cervical cancer [47 (28.7%)] compared to their counterparts in private schools [35 (21.3%)], probably due to enlightenment programs which more often occur in the former.

Study limitations

There are limited studies on this subject that had been previously carried out among a similar population as this study, i.e., female students at secondary schools/ adolescents. Most studies had been carried out among women, young adults, and female students at universities. This limited the information available to compare with. Due to the general state of apprehension being expressed by individuals concerning research in this era of COVID-19 vaccine development, some parents refused consent for their children/ wards to participate in the study even after they were given the relevant information. This led to substitution of such participants. The data collection method involved self-reporting from minors as regards their bio data, knowledge of the subject and retrieval of sensitive information as per their sexual history. The information



they provided may therefore not be completely accurate as these were not all verifiable. This study was carried out in six schools from two local governments out of twenty-three local government areas in Rivers State and so the findings may not represent the complete picture in Rivers State.

Implications of the study findings

A huge knowledge gap still exists among a key population, being the female adolescents, in terms of prevention of HPV infection and cervical cancer. Young, in-school, female secondary school students in Port Harcourt do have high risk sexual exposures that put them at risk for cervical cancer. It is therefore imperative that this gap be closed deliberately and urgently to enable us to achieve significant reduction in the incidence of HPV infections and cervical cancer in Nigeria.

Conclusion

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The level of knowledge of Human Papilloma virus, cervical cancer, and their association, among adolescent girls in Port Harcourt metropolis is quite poor. Adolescents in Port Harcourt metropolis engage in sexual practices which puts them at risk for HPV infection and thereby cervical cancer. Older and private school students had better knowledge. The media, particularly social media is a very useful channel for educating adolescents. Detailed information on HPV should be provided during health promotion activities for adolescents. This will equip them with appropriate information necessary to guide their choices, activities and practices towards the effective prevention of HPV infection and by extension, cervical cancer. An upper primary and secondary school-based approach to HPV health promotion activities will improve coverage as well as empower the adolescents to take the right decisions on their health. School health clubs can be established, peer educators trained, and role models appointed to encourage health promotion among the students.

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