



The Knowledge of Human Papillomavirus Infections and Association with Oro-Pharyngeal Cancers among Tertiary Students in Ghana

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Abstract

Background: Studies have shown sufficient evidence to associate a subtype of Human papillomavirus (HPV) 16 with oro-pharyngeal cancers and these organisms are typically transmitted through sexual contact making HPV the world's most common sexually transmitted infection. Fortunately, quadrivalent and bivalent vaccines for HPV infections have shown some evidence of effectiveness in reducing the incidence of oro-pharyngeal cancers (OPC). The knowledge level of people concerning HPV infection, related cancers and vaccines can influence the incidence and prevalence of the infection and its consequences.

Aim: The study aims to assess the knowledge level of university students concerning HPV infections, related cancers and vaccines.

Methods: A cross-sectional survey was conducted in April, 2017, in the University of Health and Allied Sciences (UHAS). A total of 399 respondents aged 16 to 30 years were interviewed using semi-structured questionnaire. SPSS Windows version 22.0 was used for data analysis.

Results: Of the 399 respondents, 278(69.7%) were females while 121(30.3%) were males. Most (93.2%) were aged 18- 24 years; 87.7% had heard of HPV mostly during a lecture at UHAS (80.7%). Findings showed that only 8% and none of the respondents correctly associated HPV with OPC and cancer of the head and neck region respectively. Additionally, 59.4% of the respondents were not aware of vaccination as a preventive tool; with yet 60.7% being unaware of its availability in Ghana. Also, none of the respondents were vaccinated against HPV; and the main reasons for non-vaccination included: unaware of vaccines availability in Ghana and lack of knowledge on males' vaccination.

Conclusion: The majority of respondents were aware of HPV, but general knowledge about HPV infections and vaccinations were low. The study highlights the need for education on HPV infections; and the availability of vaccines for HPV prevention in Ghana for both males and females.

Keywords: Oro-pharyngeal cancer; Cervical cancer; Human papilloma virus; Vaccination

Introduction

Human papillomavirus (HPV) are part of a diverse family of viruses capable of causing epithelial tumors in humans; including

cervical cancers which is the second most frequent cancer in women worldwide and a variable proportion of certain non-cervical malignancies, including vulvar, vaginal, penile, anal, and oro-pharyn-

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geal cancers (OPC).^{1,2} With over 150 different subtypes of HPV that have been identified worldwide, types 16 and 18 are associated with the onset of 70% of cervical cancers worldwide.³⁻⁵ In addition to HPV, smoking and alcohol are well known risk factors of OPC.⁶

The prevalence of HPV in women is most common before age 30, with a second incidence peak later on in life. In men, however, the prevalence is more stable across all ages. Most infections are asymptomatic with most women (75-80%) infected with HPV at some time during their life; but longitudinal studies have shown that 90% of infections are cleared within one to two years.

Human Papillomavirus transmission occurs primarily during sexual activity, oral HPV is mainly transmitted through oral sex or open-mouth kissing, whereas genital HPV is transmitted through skin-to-skin contact during sexual activity, and not the exchange of body fluids like in other (bacterial) STIs. This means that the use of condoms confers some extent of protection, but not completely. Other transmission routes known for HPV include vertical transmission from mother to infant, a risk which is greater after vaginal than caesarean birth.

Relationship to Oro-Pharyngeal Cancers

In 2012, the International Agency of Research of Cancer (IARC) declared that there was sufficient evidence to associate a subtype of HPV 16 with oral cancers.⁷ Additionally, these HPV-related oral cancers differ from HPV-negative tumors or cancers in their clinical response and overall survival rates.^{8,9}

A total of 99% of HPV infections in oro-pharyngeal carcinoma (OPC) are related to highrisk types 16, 18, 31, or 3310, with HPV 16 as the most common subtype and HPV 33 accounting for up to 10% of cases.^{10,11}

Current changes in sexual practices, including first sexual experience at an earlier age, high number of sexual partners, and high probability of oral sex, may be associated with the increasing prevalence of HPV infection¹² and thus OPC.

Recent development has produced two prototypes of prophylactic vaccines against HPV infections namely: a quadrivalent vaccine (Gardasil) and a bivalent vaccine (Cervarix), that both protect against the two most common cancer-causing HPV types (HPV-16 and HPV-18). Gardasil additionally confers immunity to HPV-6 and HPV-11, the virus types most responsible for ano-genital warts (condyloma)

To date, there is little information in the scientific journal regarding Ghanaian men and women's knowledge and attitudes about HPV infection, cervical cancer and the roles that they may play in the development of cervical cancer and other HPV associated cancers. Thus, this work aims to determine the knowledge of

Human Papillomavirus infections, related cancers and vaccines in male and female tertiary university students.

Main Objective

To determine the knowledge level of human papillomavirus infections and vaccines in male and female undergraduate students of UHAS.

Specific Objectives

1. To assess the knowledge level of HPV infection, related cancers and mode of transmission.
2. To assess the knowledge level of HPV infection prevention, vaccines and HPV vaccine uptake.

Methodology

A cross-sectional survey was carried out among students of the University of Health and Allied Sciences on the Trafalgar and Sokode campuses. The sampling frame for all levels 100 and 200 students were obtained from the school records for all the five schools represented at the Sokode and Trafalgar campuses; and using a simple random sampling method, random numbers were generated with the aid of a computer and selected students were given self-administered questionnaires to fill after consenting to participate in the study.

Well-structured questionnaire was used to collect demographic information and assess the knowledge level of the study population on HPV infections, related cancers and vaccines.

Data was analyzed with the Statistical Package for Social Sciences (SPSS) version 22.0 for windows software.

Results

Socio-demographic Characteristics of Respondents

In all majority (93.2%) of the respondents were aged between 18-24 years; and 5.5% aged above 24 years while 1.3% were aged below 18 years. This pre-suggests that majority of the respondent are within their reproductive ages and therefore may be sexually active. With respect to sex, 69.7% of the respondents were females and 30.3% were males. Also 71.4% of the respondents were in level 100 and 28.6% in level 200.

With respect to religion, 93.7% were Christians, 5.3% Moslems, 0.5% traditionalists and 0.5% Buddhists.

Analysis of marital status showed that 96.5% of the respondents were single, 2.3% married, 0.8% cohabiting and 0.5% widowed.

With respect to age at first sexual intercourse, 67.7% had never had sex, 15.3% had sex at age above 18 years, 8.8% had sex be-

tween 13-18 years, 6.6% could not remember the time of sex, 1.8% had intercourse below 9 years and 0.5% had first intercourse between 10-12years Table 1.

Table 1: Socio-demographic characteristics of respondents.

Variable	Frequency (N=399)	Percentage (%)
Age		
Below 18 years	5	1.3
18-24 years	372	93.2
Above 24 years	22	5.5
Gender		
Male	121	30.3
Female	278	69.7
University level		
100	285	71.4
200	114	28.6
Marital status		
Single	385	96.5
Married	9	2.3
Cohabiting	3	0.8
Widowed	2	0.5
Age at first sexual intercourse		
9 years and below	7	1.8
Between 10-12 years	2	0.5
Between 13-18 years	35	8.8
Above 18 years	61	15.3
Never had intercourse	270	67.7
I do not remember	24	6

Knowledge about HPV Infections

It is noteworthy that 87.7% of respondents have ever heard of human papilloma virus infections before, while 12.3% had not; information on HPV infections were mainly received: during a lecture at UHAS (80.7%), on television (8.5%), through the internet (19.3%) and from health professionals (10%) Table 2.

Enquiries on knowledge of health conditions that can be caused by or associated with HPV infections, showed that 56.6% of respondents correctly associated HPV with cervical cancer and 49.4% with genital warts. But only 7.5% of respondents correctly associated HPV with OPC Table 3.

Knowledge about HPV Transmission Routes

On enquiries on the mode of transmission of HPV: 52.6% said transmission occurs through unprotected sex, vertical transmission -21%, open-mouth kissing- 25.6%, genital -to-genital contact -24.6% and skin-to-skin contact during sexual activity-16.8%.

Table 2: Respondents' source of information about HPV.

Information source	Response Frequency (Percentage%)	
	Yes	No
During a lecture at UHAS	322 (80.7)	77 (19.3)
Friend(s)	14 (3.5)	385 (96.5)
Television	34 (8.5)	365 (91.5)
Radio	3 (0.8)	396 (99.2)
Internet	77 (19.3)	322 (80.7)
Parents/family	0 (0)	399 (100)
Magazine	2 (0.5)	397 (99.5)
Health professionals	40 (10)	359 (90)
Newspaper	2 (0.5)	397 (99.5)
Brochure	0 (0)	399 (100)
Poster	3 (0.8)	396 (99.2)
Public education	22 (5.5)	377 (94.5)

Table 3: Health conditions caused by HPV.

Health condition	Response Frequency (Percentage%)	
	Yes	No
Stomach cancer	12 (3)	387 (97)
Vaginal cancer	76 (19)	323 (81)
Breast cancer	14 (3.5)	385 (96.5)
Cervical cancer	226 (56.6)	173 (43.4)
Cancer of the anus	36 (9)	363 (91)
Penile cancer	13 (3.3)	386 (96.7)
Throat cancer	10 (2.5)	389 (97.5)
Oropharyngeal cancers	30 (7.5)	369 (92.5)
Head and neck cancers	0 (0)	399 (100)
Skin wart	25 (6.3)	374 (93.7)
Genital warts	197 (49.4)	202 (50.6)
None of the above	0 (0)	399 (100)
Do not know	59 (14.8)	340 (85.2)

HPV Infection Prevention

When asked if HPV infections can be prevented, majority (91.5%) of respondents said 'yes' while 8.5% said 'no'. however, questioned on ways of HPV prevention, only 36.8% of respondents identified vaccination as a means; 26.1% said condom usage will prevent infection; 19.3% were for 'monogamous relationship with non-infected partner' while the remaining 8.8% were for 'refraining from sexual contact' Figure 1.

Knowledge of HPV Vaccination and Vaccination Status

When subjects were asked if they had ever heard of HPV vaccination, 59.4% of respondents were not aware of vaccination, while 40.6% of respondents were aware. On vaccination status of respon-

dents against HPV infections, all the respondents had not been vaccinated as at the time of the study. Some of reasons given for non-vaccination included not aware of availability of HPV vaccination in Ghana and lack of knowledge on where to access such service and others didn't see themselves at risk of contracting HPV and some males didn't know that men could also be vaccinated against HPV Tables 5,6.

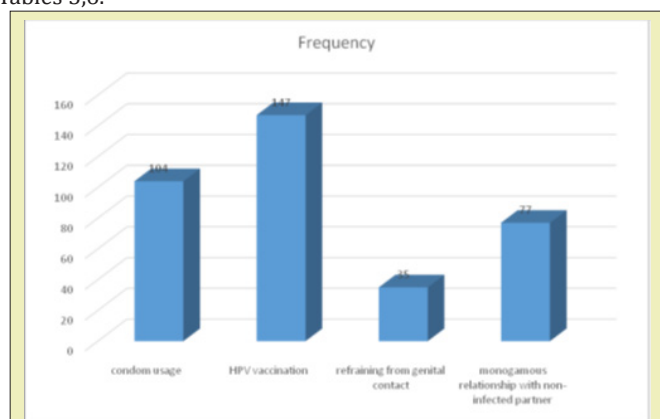


Figure 1: A bar chart showing respondents perceived ways of HPV infection prevention.

Table 4: Routes of HPV infection transmission.

Route of Transmission	Response Frequency (Percentage%)	
	Yes	No
Oro-faecal	19 (4)	380 (95.2)
Respiratory droplets	16 (4)	383 (96)
Skin-to-skin contact during sexual activity	67 (16.8)	332 (83.2)
Oral sex	56 (14)	343 (86)
Open-mouth kissing	102 (25.6)	297 (74.4)
Vertical transmission	85 (21)	314 (79)
Auto transmission	11 (2.8)	388 (97.2)
Genital-to-genital contact	98 (24.6)	301 (75.4)
Unprotected sex	210 (52.6)	189 (47.4)
Protected sex	0 (0)	399 (100)

Table 5: Knowledge about HPV vaccination.

Survey item	Response Frequency (Percentage%)		
	Yes	No	Don't know
Can a person get vaccinated against HPV in Ghana	132 (33.1)	25 (6.3)	242 (60.7)
Is HPV vaccination available for males	99 (24.8)	28 (7)	272 (68.2)
Is HPV vaccination available for females	156 (39.1)	10 (2.5)	233 (58.4)
HPV vaccination is beneficial to females	177 (44.4)	12 (3)	210 (52.6)
HPV vaccination is beneficial to males	110 (27.6)	37 (9.3)	252 (63.2)
There is no need for HPV vaccination in males	39 (9.8)	104 (26.1)	256 (64.2)

Table 6: Some reasons for not being vaccinated.

Survey item	Response Frequency (Percentage%)	
	Yes	No
I am not aware of HPV vaccination in Ghana	306 (76.7)	93 (23.3)
I do not know where to go for HPV vaccination in Ghana	96 (24)	303 (76)
Cost of HPV vaccine is expensive	32 (8)	367 (92)
I do not see myself at risk of contracting HPV	77 (19.3)	322 (80.7)
I do not agree with vaccination	2 (0.5)	397 (99.5)
I am concerned about potential side effects of the HPV vaccine	13 (3.3)	386 (96.7)
HPV vaccination is available for only females	11 (2.8)	388 (97.2)
HPV vaccination is available for males	12 (3)	387 (97)

Discussion

Respondents' Knowledge about HPV Infections and Transmission

Results from the study showed that more than three quarter of the subjects (87.7%) were aware of HPV infections and related cancers. This high value of awareness can be attributed to the fact that, these subjects are within the university environment and have access to first hand and reputable sources of information including lectures, mass media, print media and the internet. The finding is similar to the 65% that was reported in Benin among health workers;¹³ another study of undergraduate students in Ibadan had found that 71% of the students were aware of HPV infections and cervical cancer.¹⁴ However very high levels of awareness have been reported in Accra, Ghana¹⁵ (90%) among female university staff.

The study's findings also showed that only 8% and none of the respondents correctly associated HPV with OPC and cancer of the head and neck region respectively; however, no studies have been carried out in Ghana yet to compare with.

In our study we found that 68.7% of the respondents were aware that HPV infections is transmissible; this is similar to reports by Agyakwa, (2015) in the University of Cape Coast where 74.2% of the respondents were aware that HPV infection is transmissible. However, there is a low level of knowledge about the routes of transmission of HPV, in this regard, only about half of the students (52.6%) were able to correctly associate HPV transmission with unprotected sex while 16.8%, 21% and 24.6% were able to associate transmission with skin-to-skin contact, vertical transmission and genital-genital contact respectively.

Respondents' Knowledge about HPV Infection Prevention and Vaccine Uptake

Solid evidence from randomized trials demonstrated that the two available HPV vaccines prevent cervical cancers^{16,17} and other non-cervical lesions and cancers including oro-pharyngeal cancers.¹⁸⁻²⁰ This study shows that majority (91.5%) of the students were aware that HPV infections can be prevented. However only 36.8% knew that HPV infections can be prevented by vaccination; others ascribed mode of prevention to condom usage (26.1%), monogamous relationship with non-infected partner (19.3%) and refraining from sexual contact with an infected person (8.8%).

With respect to knowledge of vaccine and uptake of vaccination we found that only 33.1% of the respondents knew that they could be vaccinated against HPV infections and that it is available in Ghana. The low knowledge of HPV vaccination could be due to the fact that knowledge about HPV does not necessarily correspond to a correct understanding of the disease and its prevention methods.

The value and importance of education and information are essential for prevention efforts to be effective and equally important for personal decision-making. Currently, there is a deficit in literacy as it pertains to health. Several studies have linked literacy as an important predictor of health behaviour.

Vaccination status further showed that none of the respondents were vaccinated against HPV infections. This is consistent with findings in Cape Coast where none of the respondents were vaccinated against HPV infection.²¹ Nonetheless, our study showed that respondents were not vaccinated because they were unaware (76.7%) of availability of such vaccination in Ghana. However, the two main HPV vaccines (Gardasil & Cervarix) are very much available; and children particularly girls, should be given the vaccine between the ages of 10 and 12 before they become sexually active; and young adolescent boys are not exempted from this exercise; as earlier studies (Kaba et al., in 2014), have found that males had a high index of HPV in a subset of head and neck cancer cases. Thus, men are equally at risk of developing malignant tumours by the high-risk HPV variants.

Conclusion

The findings of this research showed a high level of awareness of HPV infections but low knowledge level of HPV infections, related cancers and HPV transmission modes. Additional findings showed low knowledge levels of HPV infection prevention, vaccination and vaccine uptake among the study population.

Recommendations

The university should endeavour to concentrate on informing students more about HPV infections, its link to cervical cancer and

other cancers; transmission modes and strategies to prevent transmission, coupled with making vaccination available to them. Education on HPV vaccine should also include information about its safety and its benefit to prevent cervical and oro-pharyngeal cancers.

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Conflicts of Interest

Authors declare that there is no conflict of interest.

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