

ORIGINAL ARTICLE

Health Disparity in Human Papilloma Virus Related Infections

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In spite of the volume of information of Human Papilloma Virus (HPV) and the HPV vaccines, there are racial and gender differences in the knowledge and awareness of HPV among Guyanese. The study aimed to assess the knowledge and attitude towards HPV infection, cervical cancer and HPV vaccines. The study was conducted among 198 students studying at University of Guyana. Semi-structured questionnaires were administered to evaluate students' knowledge, attitude and information of HPV, HPV associated diseases and vaccines. In all, 36.4% males and 63.6% females participated in the study of which 38.9%, 45.9% and 15.2% were Afro-Guyanese, Indo-Guyanese other racial groups respectively. By gender, 18.2% had heard of HPV, 41.9% had little knowledge of HPV and 39.9% had no knowledge of HPV. Regarding knowledge on HPV vaccine and genital warts, 54.5 % of the participants neither agreed nor disagreed with the fact that, these vaccines can protect the individual from genital warts, 19.2% agreed but 26.2% disagreed. Racially, only 1.0% agreed that males spread HPV, 16.7% says females, 29.8% says both and 52.5% had no knowledge of the spread of HPV. Again, 59.6% of these racial groups had no knowledge of the link between HPV and cervical cancer, 31.8% true whereas 8.6% answered false. Among these participants who have heard about the HPV, 19.2% had the information from health education programs whereas 17.2% had it from friends/acquaintances. HPV infection is asymptomatic and both males and females are at high risk of contracting HPV related diseases. Although some participants had heard of HPV, their knowledge was limited. Therefore, health-care providers in Guyana should focus on providing information and education to the populace rather than the diagnosis and treatment of HPV infections and its associate cancers.

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INTRODUCTION

Human Papilloma Virus (HPV) is the most common sexually transmitted virus (STV) with a high prevalence among young adults (Braaten & Laufer, 2008; Muñoz *et al.*, 2010). Studies in the United State have shown that, about 80.0% of women contracted HPV infection before age 50 years (Braaten & Laufer, 2008). Although HPV infection is generally associated with women, some studies have found high incidence of HPV among men (Crosby *et al.*, 2008; Dunne *et al.*, 2006). Dunne *et al.*, (2006) reported a HPV prevalence of 1.3-72.9% in men, and according to WHO (2010), approximately 73.0% of healthy men were infected with HPV.

HPV, considered the second most cancer-causing virus (Galani & Christodoulou, 2009; Kightlinger *et al.*, 2010; Mariani *et al.*, 2010; Sowjanya *et al.*, 2005) and a contributing factor in the development and genital warts (Brewer *et al.*, 2010; CDC, 2011), is rapidly increasing in prevalence, particularly among teenagers and young adults (Dunne *et al.*, 2007). This virus can be found in the head and neck, oropharyngeal, penile, and anal cancer tissues (Dunne *et al.*, 2007; Fakhry & Gillison, 2006). In Guyana, cervical cancer is the most common form of cancer for women between the ages of 15-44 years and it is the leading cause of morbidity and mortality (CDC, 2011). Each year, 161 Guyanese women are diagnosed with cervical cancer and 74 women die from the disease (WHO, 2010). Kightlinger *et al.*, (2010) found 16 genotypes of HPV in a group of 2,250 Guyanese Amerindian women with cervical cancer. In another study, Frances *et al.*, (2009)

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found that Guyanese Amerindian high school teenagers engaged in risky behaviors that put them at risk for sexually transmitted infection and more especially HPV infection. Lack of knowledge of HPV infection, unprotected sexual activities (Borges *et al.*, 2010), age of initial sexual contact, and lack of symptoms for some STI/Ds such as the human papilloma virus (Weinstock *et al.*, 2004) are the factors associated with HPV infection.

In an attempt to reduce the incidences of HPV infection, genital warts, and cervical cancer, two HPV vaccines were developed and approved for use; HPV vaccine, which has been instrumental in preventing and reducing instances of cervical cancer in countries where it was implemented (Ghazal-Aswad, 2008), is now being implemented in Guyana after 2 years of preparation. The Gardasil vaccine developed by Merck & Co which is effective against HPV types 16, 18, 6, and 11, whereas Cervarix protects against HPV types 16 and 18, which cause 70.0% of cervical cancers (Rodríguez-Cerdeira & Alba, 2009).

Studies have showed that, there are racial disparities (Cates *et al.*, 2009) and gender differences (Medeiros & Ramada, 2010) in the knowledge and awareness of HPV among Guyanese despite the volume of information about HPV and the vaccines. As of January 17, 2012, the Minister of Health had implemented the HPV vaccine; however, to date, it is unclear if education preceded the vaccination. This study examined how gender and ethnicity influence participants' knowledge and understanding of HPV and the HPV vaccine. Given that in Guyana, the female population could be at risk for cervical cancer and men are part of the transmission of the virus, it was important to explore the differences in knowledge of HPV and the HPV vaccine among both males and female students.

MATERIALS AND METHODS

Study participants

A cross-sectional non-experimental design was conducted among 198 students from University of Guyana, located at Tain Village Corentyne, Berbice. The student body from which the students were recruited

was made up of Afro-Guyanese, Indo-Guyanese, and other racial groups. Study participants were chosen because they were part of the catch-up group for HPV vaccine; capable of completing the survey and were presumed to have a variety of life experiences. All Afro-Guyanese and Indo-Guyanese students enrolled at the university were eligible to participate in the study. Informed consent was obtained from participants after the study was explained to the students. Completion and return of the questionnaire implied consent. Ethical consideration for this study was sought from Walden University and the University of Guyana.

Sample size

A convenience sample of 198 male and female students who were at least 18 years of age from the student population at the Berbice campus of the University of Guyana was used in the study. The sample was composed of the three major ethnic groups at the university; Afro-Guyanese, Indo-Guyanese and other ethnic group. There were 694 students enrolled at the Berbice campus of the University of Guyana. With a confidence level of 95% and a margin of error of 5%, the sample size was determined to be 195.

Data Collection

Information was assessed using a self-reported survey instrument and a modified questionnaire developed by Yacobi *et al.*, (1999). This modified questionnaire from Yacobi *et al.*, (1999) evaluated the knowledge, attitudes, and behaviors of university students regarding HPV and compared the results with their knowledge of and attitudes towards other sexually transmitted diseases. The questionnaire was available both as a paper copy and electronic format on the university website; however, paper questionnaires were administered to the participants. The surveys were completed and returned in the self-addressed envelope.

Data Analysis

All analyses were performed using GraphPad version 6.0, San Diego California, USA. The data was presented as percentages. Chi square was used to assess the difference in knowledge of and attitude

toward HPV by gender and race. In all the statistical analysis, a value of $p < 0.05$ was considered significant.

RESULTS

A total of 198 participants were recruited for the study and out of this number, 72 (36.4%) were males and 126 (63.6%) were females. On gender comparison on knowledge of HPV, more than half of the males (51.4%) and one-quarter of the females (33.3%) have no idea (knew nothing), whereas 31.9% males and 47.6% females had little knowledge of HPV. This was significant ($p < 0.05$) as shown in Table 1. However, no significant difference ($p > 0.05$) was observed among males, (16.7%) and females, (19.0%) who had idea (knew a lot) of the Human Papilloma Virus. On attitude regarding HPV infection, although there was no statistical significance ($p > 0.05$), 37.5% of males and 37.3% of females were not worried, 13.9% males and 21.4%

females were a little worried, 12.5% males and 13.5% females were moderately worried, and 36.1% males and 27.8% females were very worried.

Regarding the knowledge of the students about the HPV vaccine and Genital Warts, the data revealed no significant relationship in the knowledge of the vaccine. Majority of students were neutral on many of the questions. They neither agreed nor disagreed with statements such as; “HPV vaccine would protect females against cervical cancer”, “HPV vaccine can protect females against genital warts”, and “HPV vaccine is dangerous”. On the source of information about HPV, the data revealed that approximately one-third (32.3%) had not heard of HPV. Among the participants who have heard about the HPV, 25.0% of males and 15.9% females had the information from health education programs, followed by friends and acquaintances; 13.9% males and 19.0% females, their doctor;

Table 1: Knowledge, attitude and information on Human Papilloma Virus (HPV) by gender of study participants

Variables	Total (n = 198)	Male (n = 72)	Female (n = 126)	P-value
Knowledge of HPV				
Know nothing	79(39.9%)	37(51.4%)	42(33.3%)	0.0126
Know little	83(41.9%)	23(31.9%)	60(47.6%)	0.0315
Know a lot	36(18.2%)	12(16.7%)	24(19.0%)	0.6761
Attitude regarding HPV				
Not worried	74(37.4%)	27(37.5%)	47(37.3%)	0.9779
A little worried	37(18.7%)	10(13.9%)	27(21.4%)	0.1904
Moderately worried	26(13.1%)	9(12.5%)	17(13.5%)	0.8424
Very worried	61(30.8%)	26(36.1%)	35(27.8%)	0.2218
Knowledge on HPV vaccine and GW				
Strongly agreed	18(9.1%)	5(6.9%)	13(10.3%)	0.4271
Agreed	20(10.1%)	7(9.7%)	13(10.3%)	0.8936
Neither agreed nor disagreed	108(54.5%)	37(51.4%)	71(56.3%)	0.5001
Disagreed	28(14.1%)	13(18.1%)	15(11.9%)	0.2321
Strongly disagreed	24(12.1%)	10(13.9%)	14(11.1%)	0.5645
HPV Information Source				
Doctor	24(12.1%)	9(12.5%)	15(11.9%)	0.9017
Friends/acquaintances	34(17.2%)	10(13.9%)	24(19.0%)	0.3545
Health education programs	38(19.2%)	18(25.0%)	20(15.9%)	0.1167
Magazines, Newspapers and others	15(7.6%)	4(5.6%)	11(8.7%)	0.4786
Radio or TV	23(11.6%)	6(8.3%)	17(13.5%)	0.2758
Never heard of HPV until today	64(32.3%)	25(34.7%)	39(30.9%)	0.5853

(12.5%) males and (11.9%) females, radio and TV; (8.3%) males and (13.5%) females, and magazines, newspapers and other publications; (5.6%) males and (8.7%) females respectively (Table 1).

The study also included 77(38.9%) Afro-Guyanese, 91(45.9%) Indo-Guyanese and 30(15.2%) other ethnic groups of students. On knowledge of HPV, there was significant difference ($p < 0.05$) among the three ethnic groups who did not know anything (have no idea) about HPV. Knowledge (little or more) however did not show significance ($p > 0.05$) although 49.4% Afro-Guyanese, 39.6% Indo-Guyanese and 30.0% Other race know little whereas 22.1% Afro-Guyanese, 12.1% Indo-Guyanese and 26.7% Other race know a lot. Again, on whether HPV is spread by male, females or both, although it reached statistical significance ($p < 0.05$), majority of the study participants; 45.5% Afro-Guyanese, 64.8% Indo-Guyanese and 33.3% of Other ethnic group in Guyana had no idea. Regarding whether HPV causes HIV/AIDS, 7.6% answered true, 42.9% false and

49.5% participants had no idea. Similarly, knowledge on whether HPV causes Cervical Cancer in women, 59.6% participants had no idea, 31.8% answered true and 8.6% answered false (Table 2).

When questioned whether care will be taken spreading HPV to partner, 25.9% Afro-Guyanese, 34.1% Indo-Guyanese and 20.0% other race answered yes but 43.4% of the study participants answered no whereas 27.8% did not know. On knowledge of HPV vaccine and Genital Warts, 32.3% of all the participants strongly agreed to some of the questions that; “HPV vaccine would protect females against cervical cancer”, “HPV vaccine can protect females against genital warts”, and “HPV vaccine is dangerous”, whereas (21.2%), (25.3%), (10.6%) and (10.6%) agreed, neither agreed nor disagreed, disagreed and strongly disagreed respectively. For source of information on HPV base on race, one quarter (32.3%) of the study participants had never heard of HPV which

Table 2: Knowledge, attitude and information on Human Papilloma Virus (HPV) by race of study participants

Variables	Total (n = 198)	Afro-Guyanese (n=77)	Indo-Guyanese (n=91)	Other (n=30)	P-value
Knowledge on HPV					
Know nothing	79(39.9%)	22(28.6%)	44(48.4%)	13(43.3%)	0.0305
Know little	83(41.9%)	38(49.4%)	36(39.6%)	9(30.0%)	0.1568
Know a lot	36(18.2%)	17(22.1%)	11(12.1%)	8(26.7%)	0.1049
Knowledge on spread of HPV					
Male	2(1.0%)	2(2.6%)	0(0.0%)	0(0.0%)	0.2044
Female	33(16.7%)	13(16.9%)	12(13.2%)	8(26.7%)	0.2281
Male and female	59(29.8%)	27(35.1%)	20(21.9%)	12(40.0%)	0.0752
Don't know	104(52.5%)	35(45.5%)	59(64.8%)	10(33.3%)	0.0032
HPV cause HIV/AIDS					
True	15(7.6%)	6(7.8%)	7(7.7%)	2(6.7%)	0.9791
False	85(42.9%)	41(53.2%)	30(32.9%)	14(46.7%)	0.0273
Don't know	98(49.5%)	30(38.9%)	54(59.3%)	14(46.7%)	0.0296
HPV cause Cervical Cancer					
True	63(31.8%)	32(41.6%)	22(24.2%)	9(30.0%)	0.0533
False	17(8.6%)	8(10.4%)	7(7.7%)	2(6.7%)	0.7586
Don't know	118(59.6%)	37(48.1%)	62(68.1%)	19(63.3%)	0.0275
Attitude regarding HPV					
Not worried	74(37.4%)	24(31.2%)	42(46.2%)	8(26.7%)	0.0569
A little worried	37(18.7%)	16(20.8%)	12(13.2%)	9(30.0%)	0.1023
Moderately worried	26(13.1%)	10(12.9%)	13(14.3%)	3(10.0%)	0.8329
Very worried	61(30.8%)	27(35.1%)	24(26.4%)	10(33.3%)	0.4530

was significant ($p < 0.05$). 20.8% of Afro-Guyanese, 18.7% Indo-Guyanese and 16.7% of other race had the information from health education programs whereas the least were from magazines, newspapers and other publications (Table 3).

DISCUSSION

The study addressed the knowledge and attitude of HPV and the difference in knowledge by gender and race. The data revealed that approximately half of the males and one-third of the females of the study participants had not heard of HPV prior to participation in the study. This result is consistent with earlier reports by Dursun *et al.*, (2009), who reported that 50.0% men and 33.0% women were unaware of HPV. The assumption is that, the results from this current study remains low despite the volume of HPV information and awareness of the virus among university students.

Majority of participants were unaware that both men and women can be infected with HPV and also whether a link exist between HPV and genital warts

or HPV and cervical cancer. These lack of knowledge could ultimately affect especially women ability to assess their risks for contracting HPV and developing HPV-related cancers. Having the ability to assess risks for infection is important especially for women of African descent since they are more often diagnosed with cervical cancer (Plummer *et al.*, 2009). Cates *et al.*, (2009) found that African American women have a 50.0% greater chance of having cervical cancer than Caucasian women. Plummer *et al.*, (2009) found that 39.0% of Afro-Guyanese women are more likely to be diagnosed with cervical cancer. Based on this fact, it is important that women equip themselves with knowledge of HPV and the benefits of the HPV vaccine. The Centre for Disease Control (CDC), (2011) and several other studies have documented information on HPV, link between HPV, genital warts and cervical cancer (Low *et al.*, 2010; Muñoz *et al.*, 2008).

A gender difference in knowledge of HPV has been reported in previous studies. Medeiros and Ramada

Table 3: Knowledge, attitude and information on Human Papilloma Virus (HPV) by race of study participants

Variables	Total (n=198)	Afro-Guyanese (n=77)	Indo-Guyanese (n=91)	Other (n=30)	P-value
Care about spreading HPV to partner					
Yes	57(28.8%)	20(25.9%)	31(34.1%)	6(20.0%)	0.2639
No	86(43.4%)	36(46.8%)	35(38.5%)	15(50.0%)	0.4091
Don't know	55(27.8%)	21(27.3%)	25(27.5%)	9(30.0%)	0.9570
Knowledge of HPV vaccine and Genital Warts					
Strongly agreed	64(32.3%)	27(35.1%)	24(26.4%)	13(43.3%)	0.1827
Agreed	42(21.2%)	11(14.3%)	24(26.4%)	7(23.3%)	0.1540
Neither agreed nor disagreed	50(25.3%)	19(24.7%)	24(26.4%)	7(23.3%)	0.9358
Disagreed	21(10.6%)	9(11.7%)	11(12.1%)	1(3.3%)	0.3717
Strongly disagreed	21(10.6%)	10(12.9%)	9(9.9%)	2(6.7%)	0.6063
HPV Information Source					
Doctor	24(12.1%)	10(12.9%)	8(8.8%)	6(20.0%)	0.2529
Friends/acquaintances	34(17.2%)	13(16.9%)	12(13.2%)	9(30.0%)	0.1058
Health education programs	38(19.2%)	16(20.8%)	17(18.7%)	5(16.7%)	0.8765
Magazines, Newspapers and other publications	15(7.6%)	10(12.9%)	4(4.4%)	1(3.3%)	0.0705
Radio or TV	23(11.6%)	11(14.3%)	12(13.2%)	0(0.0%)	0.0956
Never heard of HPV until today	64(32.3%)	17(22.1%)	38(41.8%)	9(30.0%)	0.0239

(2010) investigated the knowledge differences between male and female university students in Portugal and found that the female participants had more accurate knowledge about HPV than the male participants did. Another study among Korean adults revealed that men's knowledge was two times lower than that of women (Oh *et al.*, 2010). This Korean study indicated that only 7.5% of male participants compared to 19.0% of female participants were knowledgeable about HPV and the HPV vaccine (Oh *et al.*, 2010). This study also found lower knowledge of HPV in males than in females. A possible explanation was that; infection is asymptomatic and pathological effects of HPV infection manifest more in women than in men.

With regards to knowledge and awareness of HPV by race, Afro-Guyanese had more knowledge than Indo-Guyanese and other participants. This is in consistence with results from previous study that assessed ethnic differences in knowledge and awareness of HPV which indicated that, Whites had higher (42.0%) knowledge of HPV compared with Blacks (29.0%) (Cates *et al.*, 2009).

Although one-third of the study population had not heard of HPV until this study, the major source of information was from the Health Education Programs. Similar results were reported by Gerend and Barley (2009) who found that 58.0% of participants' primary source of information was health education classes, followed by television (47.0%) and a friend (33.0%). Based on the participants' identification of their information sources, it is clear that the Public Health Services, schools, and the Ministry of Health have not adequately use these sources more effectively to disseminate information about this virus (HPV), related diseases, and alongside with assessment programs to students and parents.

CONCLUSION

The findings indicated significant differences by gender and race with regard to knowledge of HPV and HPV vaccines. This study revealed that, despite students' report of knowledge of HPV, their level of knowledge was limited. Both men and women are at risk of serious illnesses from HPV infection, yet it is

clear that the participants in this study do not have the knowledge and a clear understanding of the virus. There is no cure for HPV infection and because it is asymptomatic, it is vital that educational institutions, health care facilities, and health policy makers make HPV education widespread. The target groups should be both men and women in the community and university in order to foster communication and cooperation with the aim to reduce the spread of HPV infection.

COMPETING INTERESTS

The authors declare that they have no competing interests.

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