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Awareness, Knowledge and concern about HPV and HPV Vaccine among School Teachers in Shimla, India

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India has one of the highest burdens of Human Papillomavirus (HPV) related cancer. It is the second leading cause of cancer related deaths in women in India. Although HPV vaccine has been determined to be effective in preventing cervical cancer, speculations around its effectiveness have prevented its integration into India's Universal Immunization Program (UIP). Furthermore, due to lack of awareness, people's attitude, behavior, skepticism and societal issues associated with HPV, no successful immunization program could gain any momentum in India. Since HPV vaccine is administered to adolescents before initiation of sexual activity, teachers can play an important role in spreading awareness. A mixed method cross-sectional study was conducted to assess the level of awareness, knowledge and concerns among school teachers of Government and Private schools in Shimla. Additionally, focus groups were carried out to identify factors that facilitate or act as barriers to raise awareness and knowledge in this regard. Private school teachers reported significantly higher level of awareness about HPV (df=118, CR=2.39, p<. 05), knowledge about HPV (df=118, t=3.47, P<.01), HPV testing df=118, t=2.57,) and HPV vaccination (df=118, t=2.11, p<.05) than their Government school counterparts.However, the level of knowledge on these issues is extremely low irrespective of institution to augment a successful prevention programme. Focus groups further ascertained factors that facilitate awareness and knowledge about HPV and promote vaccine uptake and also identified issues that act as barriers in successful campaigns. The findings indicate there is ample opportunity to increase HPV awareness among teachers, who can play an effective role in augmenting a successful prevention program and contribute to uptake of HPV vaccine in India's UIP.

Keywords: Human Papillomavirus, Human Papillomavirus Vaccine, India, Teacher, HPV Awareness, HPV knowledge, Sexually Transmitted Infections....

Human papillomavirus (HPV), a common sexually transmitted infection, has a very high incidence rate with more than 300 million women being infected with it (World Health Organization, 2022). It is a major cause of cancer, causing almost 610000 cases around the world, which includes 86.9% cases of cervical cancer (Forman et al., 2012) and cancers in other anogenital regions along with cancers of neck and head region and genital warts. By the beginning of 20th century cervical cancer was second common cause of cancer among women, having fifty percent mortality rate (Parkin et al., 2001). Developing nations are more vulnerable to this disease than the developed nations, owing to the better diagnosis and treatment management in later (Boutayeb, 2010; Catarino et al., 2015). Cervical cancer is the third largest cause of cancer mortality in India, accounting for nearly 10% of cancer related deaths (Sharma et. al., 2017). 25.4% of the global cervical cancer cases and 26.5% of the global deaths due to it are reported in India (Saxena, Sauvaget & Sankarnarayan, 2012). It is also the second leading cause of female cancer deaths in India with approximately 122,000 new cervical cancer cases being diagnosed and about 67,477 deaths occurring annually because of it (estimations for 2012) (Bruni et al., 2017). Researchers have opined that if the trend continues, by the year 2050 over one million women would be newly diagnosed with cervical cancer. Of these, over 80% of women would be from developing countries, where women have minimum access to screening and treatment,

and hardly any exposure to prevention programs (Varughese & Richman, 2010).

HPV is currently incurable, making adolescents the target group for vaccination prior to initiation of sexual activity, to reduce cervical cancer rates (CDC HPV Vaccines, 2021). Adolescent vaccination can be best covered through school-based vaccination programs since most of the children in this age group attend schools. Such programs have been successful in countries like UK and Australia (Brabin et. al., 2008; Reeve, et. al. 2008; Brotherton, et. al. 2008).

Considering the high prevalence of HPV, a preventive approach involving creating awareness related to its causes, symptoms, associated diseases and preventive measures is the need of the hour, especially in developing nations. However, most of the studies point towards a low or moderate level of awareness and knowledge related to HPV (Khan et. al., 2016; Chawla, Chawla & Chaudhary, 2016; Ramavath & Olyai, 2013; Remes et. al., 2012; Masika et. al., 2015; Songthap et. al., 2012). Imparting general education related to HPV will increase awareness among people about the risks associated with the infection and may lead to reduced related risk behavior (Ragin, et. al. 2009).

Except for genital warts, the HPV infections are asymptomatic (Winer et al., 2006; Ferenczy & Franco, 2001). The prevention and control, hence, primarily depend on awareness about the disease, screening procedure and the preventive measures e.g., vaccination and safe behavioral practices. Although HPV vaccine can make a breakthrough in controlling the high disease load in India, the level of knowledge and attitude towards the disease influences vaccine uptake (Ou and Youngstedt, 2020). In this context studies also opined to improve the quality and access to HPV information to the target population and tailor the knowledge campaign specific to various groups (Schwendener et.al., 2022). Since the target group for HPV vaccines is adolescents, parents are the key decision makers for vaccination. However, school staff members also have an important role (McRee, Reiter & Brewer, 2010). Role of teachers in a school-based vaccination includes giving permission for use of school premises, educating parents and children about HPV and its vaccine and organizing the vaccination drives in schools. Also, the success of school-based HPV vaccination programs has been shown to be significantly affected by teachers' knowledge towards the vaccine (Lindley et. al., 2008).

The present study intends to explore level of awareness and knowledge related to HPV, its screening and vaccination among schoolteachers from Government and Private schools in Shimla, Himachal Pradesh. Through qualitative analysis the study further aims to probe teachers' understanding of HPV, HPV vaccination and its uptake and other sexually transmitted infections (STIs).

Method

Study Design

A mixed-methods approach was used for data collection. Quantitatively data was collected using survey method. To gain additional information and understand school teachers' perspective on HPV and HPV vaccination the qualitative method of focus group discussion (FGD) was used. First the participants were asked to fill the questionnaires, after which the focus group discussions were conducted. The study was conducted in Shimla city and its suburb located in the Northwestern Himalayas.

Sample

The participants were selected from eight government and five private schools of Shimla and its suburb. Out of the total strength, 216 teachers from government and 143 teachers from private schools consented to participate in the study. Firstly, these teachers were assessed on their awareness about HPV by a single question, "Before today had you ever heard of human Papillomavirus (HPV)". There were three responses to this question- yes, no and don't know. Those who responded with 'yes' to this question were assessed for knowledge. Teachers were also asked about their awareness about HPV testing and vaccination. Seventy-six teachers from government schools and 81 teachers from private schools responded positively for having heard about HPV and

Table 1: Demographic details of the participants in Survey

Variables	Government school teachers (N = 60)	Private school teachers (N = 60)
Age Mean SD Age Range	M = 43.66 years SD = ±6.33 (25 - 57years)	M = 36.98 years SD = ±6.51 (21-49years)
Gender Male Female	n = 13(21.66%) n = 47(78.34%)	n = 2 (3.33%) n = 58 (96.67%)
Residential Background Rural Urban	n = 10 (16.66%) n = 50 (83.34%)	n = 5 (8.33%) n = 55(91.67%)

were considered for the study. The standard instructions and assurance of confidentiality was given to all respondents.

A purposive sample of 60 teachers each from both the school type was finally selected randomly for the present study. The detailed characteristics of the participants are given in table 1

Tool used

Quantitative

HPV Knowledge Measure by Waller, et. al. (2012), was used to measure the awareness and knowledge related to HPV. It is designed to assess awareness and knowledge about HPV, HPV testing and HPV vaccination, through 35 items and is suitable for use across different countries. The 16 general HPV knowledge items, 6 HPV testing knowledge items and 7 HPV vaccination knowledge items were used. The scores for all the three sections were added separately to get individual scores for HPV knowledge, HPV testing and HPV vaccination. HPV awareness was assessed by a single question, “Before today had you ever heard of human papilloma virus (HPV)?” with yes, no or don’t know answer options.

Qualitative

In FGDs, the moderator guided the discussions using a list of questions that remained uniform across all FGDs. The questions addressed key areas on awareness and knowledge related to HPV, HPV testing and HPV vaccination and other STIs, and dynamics of augmenting a successful campaign towards awareness, knowledge about HPV and HPV vaccination. The FGD also included issues on role of institutional support in vaccination and recommendation of vaccine for students.

Procedure

The teachers were approached in the school staff rooms were appraised about the study. Having obtained the verbal consent, teachers were then given the awareness form. After completing the awareness form and its subsequent evaluation, only those teachers who were aware of HPV were given the knowledge questionnaire. Although several earlier studies have combined knowledge and awareness (Yacobi et al., 1999; Dell et al., 2001, Pitts et al., 2002), we preferred to assess knowledge of those respondents who were aware of HPV. This provides more valid assessment of accuracy of the knowledge.

Focus group discussion (FGD) was carried out with teachers who filled questionnaire. None of the male teachers consented to participate in the FGD; hence it was all female groups. Four FGDs, two each in government and private schools were conducted. Six female participants participated in each FGD. It was not possible to conduct more FGDs in view of workload of the teachers and the limited time they were permitted to spare for this activity. All the teachers volunteered and gave oral consent to participate in FGDs. The researcher had a brief session with the participants after every meeting to remove misconceptions about HPV and answered to their queries. Detailed

demographic characteristics of the participants are given in Table no- 2.

Data Analysis

For data analysis, the significance of difference between government and private school teachers in terms of percentage of level of awareness related to HPV, HPV testing and HPV vaccination was calculated. The t-test was applied to compare the difference between government and private school teachers in terms of knowledge about HPV, its testing and vaccination.

All the Focus Group Discussion sessions were audio recorded and transcribed verbatim. Thematic qualitative analysis was carried out to identify the key themes.

Results

Socio-Demographic Characteristics

For Survey:

Table 1 compares the demographic details of government and private school teachers including age, gender and residential background for survey participation.

Table 1 indicates that the average age of government schoolteachers (43.66 years) was significantly higher (t=5.70, p<.01) than that of the private school teachers (36.98 years). There were significant gender differences based on the school type with only 3.33% male teachers in private schools as compared to 21.66% in government schools. In terms of residential background, 16.66% government schoolteachers were from rural areas as compared to 8.33% private schoolteachers.

For Focus Group Discussions:

Table 2 compares the demographic details of government and private school teachers including average age, residential background and marital status for FGD participation.

Table 2 indicates that for FGDs, the average age of government school teachers (M= 46 years) was significantly higher than teachers from private school (M=37years), (t=4.14, p<.01). None of the teachers participating in FGDs in private schools were from rural background. All FGD participants from government schools were married, while two participants from private schools were not married.

HPV Awareness

The result revealed that there was a highly significant difference between government and private school teachers in terms of percentage level of awareness related to HPV (df=357, CR=4.02, p<0.01).The higher percentage of level of awareness of private school teachers (p=56.64%) than government schoolteachers (p=35.18%) implies that more teachers from private schools had heard about HPV or had prior knowledge of it before participating in the research as compared to their government school counterparts. Private school teachers also reported statistically significant difference in percentage level of awareness about HPV testing (df=357, CR=2.38, p<0.05), indicating that more private school teachers (31.46%) had heard about HPV testing as compared to their government school counterparts (20. 37%). Although the private school teachers reported higher frequency of occurrence in terms of HPV

Table 2: Demographic details of the participants in FGD

Variables	Government school teachers	Private school teachers
Age Mean age SD Age range	 M=46 years SD=±3.24 39-52 years	 M=37 years SD=±6.75 25-47 years
Residential background Rural Urban	 n=2 (16.67%) n=10 (83.33%)	 n=0 (0%) n=12(100%)
Marital Status Married Not married	 n=12(100%) n=0 (0%)	 n=10 (83.33%) n=2 (16.67%)

Table 3: Comparative Study in terms of Awareness and Knowledge of HPV, HPV Testing and Vaccination among Government and Private School Teachers

Variables	Awareness of HPV, Testing and Vaccination			Variables	Knowledge of HPV, Testing and Vaccination		
	Government Schools (n = 216)	Private Schools (n = 143)	CR Value		Government Schools (n=60)	Private Schools (n=60)	t-Value
HPV Awareness	(76) P=35.18%	(81) P=56.64%	4.02**	Knowledge about HPV	Mean= 2.83 SD= 4.07	Mean= 6.00 SD= 5.75	3.47**
HPV testing Awareness	(44) P=20.37%	(45) P=31.46%	2.38*	Knowledge about HPV testing	Mean= 0.35 SD= 0.89	Mean= 0.98 SD= 1.68	2.57*
HPV vaccination Awareness	(68) P=31.48%	(59) P=41.25%	1.90	Knowledge about HPV Vaccination	Mean= 1.10 SD= 1.69	Mean= 1.88 SD= 2.30	2.11*

**p<.01 *p<.05

vaccination awareness, but this difference did not reach statistical significance level.

HPV Knowledge

A comparative study of government and private school teachers in terms of knowledge of HPV, HPV testing and HPV vaccination (Table 3) revealed that private school teachers reported significantly higher knowledge about HPV (df=118, t=3.47, p<. 01), HPV testing (df=118, t=2.57, p<.05) and HPV vaccination (df= 118, t=2.11, p<.05). The findings indicate that the group of private school teachers had more information i.e., domain specific knowledge related to HPV, for e.g., its cause, symptoms and prevention. These teachers were better informed about HPV test, its types, purpose and the procedures involved in testing, as compared to their government school counterparts. Additionally, they had supplementary information about HPV vaccines, their doses, the diseases they protect against and the best time for vaccination than the government school teachers.

Findings of Focus Group Discussions

Further, Focus Group Discussions were also concluded to explore specific psycho-social issues associated with HPV, HPV testing and vaccination. In addition, Focus Groups also identified factors that can target communication and identify factors that facilitate or act as based on to vaccine uptake. As seen in Table 2, the average age of government schoolteachers (46 years) was higher than that of the private school teachers (37 years). All government school participants were married while in private school 83.33% teachers were married. Majority of the participants from both government (n=11) and private schools (n=11) had a post graduate degree. Most of them also had Bachelors of Education (B.Ed.)- a professional degree. All the participants could read, write and speak in Hindi and English.

Three similar themes emerged from the focus groups conducted with both type of schools: limited information about HPV, cervical cancer and HPV vaccination. Lack of Institutional Support in terms of governmental involvement emerged a significant factor across all school types. institutional support in prevention and perception about HPV vaccine, its awareness and education among government and private school teachers. The participants mentioned lack of awareness and poor knowledge related to HPV and other STI's in general and also expressed desire for government's support in vaccination in this regard.

Emergent themes from the focus group data are presented. Relevant quotes were also selected to explain each theme.

a. Limited information about HPV, Cervical cancer and HPV vaccination

One of the most profound themes was that there was limited information about HPV, its consequences, prevention and control. Many

of the participants from government and private schools indicated that they had barely heard of HPV and HPV vaccine before participating in the study. A few private school teachers admitted having come across the term HPV in text-books while teaching biology to students but did not know much about it except that it is a STI. Two participants from private and one from government school, who had daughters around the age of 12-13 years, indicated that their private pediatrician had suggested, "You should get your daughter vaccinated against cervical cancer".

Notably, Participants who were even aware of Pap smear test, cervical cancer and vaccine available to prevent it did not know HPV was a major cause of it. On being probed about their knowledge of any other sexually transmitted infection (STI), most of the teachers mentioned HIV/AIDS.

A participant from government school stated, "I had heard about HIV/AIDS and its symptoms but had not heard about HPV. Only after having filled the questionnaire I came to know more about HPV". None of the teachers knew the rate at which cervical cancer is growing.

They also listed print, electronic (internet) and social media as the desired platforms for gaining information about HPV. Some teachers mentioned they would like to get more information on the subject from an expert of close associate, who has knowledge of the same.

b. Role of institutional support

Most of the participants suggested that if the government provides the vaccines and authentic information in this regard. more children would be vaccinated as compared to when vaccine is available in private hospitals. The reasons cited were that any initiative by the government leads to more awareness among the masses and also that the vaccine would be more credible, as a participant said, "People trust government". A teacher, giving example of Rubella vaccine, said, "More children had opted for it when it was provided free of cost at school as compared to a higher cost in private hospitals. Parents were engaged and made aware by the schools. Government also publicized it through media. All campaigns by the government in the past like Polio and Rubella have been effective as all three-stake holders were working together. So it should be through government". Another recommended that, "HPV vaccine should be added in immunization programs like DPT and others". Some Participants recommended development of a culturally appropriate HPV educational curriculum for students. An important step they suggested towards this was that school should convene meetings with parents and health professionals from the government from time to time.

c. Perception about HPV vaccine, its awareness and education

The two subthemes related to vaccine acceptability that emerged are the need for awareness and removal of negative perception about the vaccine and its side effects.

The commonly expressed view of all teachers, barring a few, was in favor of administering the vaccine to their students. However, they said that they would first like to gain complete knowledge about HPV, its vaccine and the testing procedures involved. Then, if they were satisfied, they would talk to the parents and inform them. After taking parental consent, they will create awareness among the students. Some teachers stated, "We would not be comfortable discussing the topic with students. Getting professional help for it is a better option". One of the teachers who did not recommend vaccine opined that, "In our culture we teach our daughters abstinence from sex before marriage and I believe that vaccination might promote promiscuity".

Due to lack of knowledge, the teachers expressed concerns about side effects and effectiveness of vaccination also. Participants strongly believed that there should be some educational program to educate the community including teachers, on this public health issue. One teacher said, "I was not very sure about this when our pediatrician suggested the vaccine for my daughter. I was a bit apprehensive in the beginning. The more I read about it; more comfortable I felt and decided for vaccination. In my opinion, education clears doubt and helps decision making easy".

Discussion

The main emphasis of the study was on investigating awareness and knowledge related to HPV, HPV testing and HPV vaccination among government and private school teachers. To our knowledge, this is the first study to investigate awareness and knowledge related to HPV among teachers in school setting in Himachal Pradesh, using mixed-method technique. Findings by and large reflect that the percentage of those who are aware of HPV is not very high. Similar observations were made by other researchers in different population group in other parts of the world (Jradi & Bawazir, 2019; Keten et al., 2019). Teachers from private schools reported significantly higher level of awareness about HPV and its testing than their counterparts from government schools. Likewise, the private school teachers reported significantly higher knowledge on HPV, HPV testing and HPV vaccination. The finding of the study points to a pertinent fact that although both the groups differed significantly on both knowledge and awareness of HPV, HPV testing and HPV vaccination, the magnitude of the percentage and mean values are very low demonstrating an overall low awareness and knowledge level. We believe that such low percentage of awareness and level of knowledge about HPV and HPV vaccination is not substantial for augmenting an effective prevention campaign. The reason for this difference in level of awareness could be age and gender. Private school teachers are mostly younger than government schoolteachers. Having acquired education relatively recently than government school teachers, given their younger age, the private school teachers have more chances of coming across the recent health awareness programs that have become a part of the curriculum (Holcomb et al., 2004) found moderate level of HPV awareness among adults. The study linked higher education and lower age with higher knowledge about HPV infection. Supporting the findings of the present study (Manoel et al., 2017) reported high level of awareness related to HPV, its testing and vaccination among health agents. The study found lower age to be signifying factor in higher HPV awareness and knowledge. Similar finding was reported by (Alsous et al., 2021). A similar study on knowledge of HIV/AIDS, a sexually transmitted infection like HPV, among school teachers, revealed higher knowledge in private school teachers as compared to their public school counterparts, with private school teachers being younger in age than their public school counterparts (Ghosh et al., 2008). Furthermore, another basis for the higher knowledge about HPV could be the teacher's residential background. All the private school teachers (100%) had an urban residential background as compared to government schoolteachers (83.33%). Studies have indicated higher HPV knowledge among those living in urban (Mohammed, et al., 2018). Taken together, the findings of the present study indicate that knowledge and awareness about HPV, HPV testing and vaccination are demographically patterned. Parallel findings to this were also reported by other studies from low and middle income countries (Issa et al., 2022; Djuric et al., 2020; Raci, Raci & Hadri, 2021).

In addition, male-female ratio in terms of teaching staff is in favor of females in private schools. There is ample research evidence that show females are more aware about HPV and HPV vaccine as compared to their male counterparts (Schwendener et al. 2022; Keten et al. 2019; McBride & Singh, 2018). This may be because of higher prevalence and manifestation of HPV among females that it is identified as a female-specific disease and draws more attention among women. Moreover, this has resulted in feminization of HPV and HPV vaccination (Daley et al., 2017). Furthermore, our findings also suggest that having relatively higher awareness among private school teachers does not reflect substantially higher knowledge among them. In our opinion, to sensitize public about HPV, both awareness and knowledge about target program must be significant and should move in tandem. The low knowledge level among teachers might be due to absence of health education program applied actively by government among teachers. Furthermore, media coverage and public discourse on serious public health issues in India is quite insignificant (Dreze & Sen, 2013). Literature in this context is consistent with our findings that general

population, including teachers, has very low knowledge about HPV and HPV vaccination (Keten et al., 2019; Hanley et al., 2014; Dodd et al., 2014; Kepka et al., 2015).

The FGDs supported the above findings with lower awareness related to HPV. HIV is the only STI that most of the participants were aware of. This may be because the programs run by the government for HIV prevention and other sexually transmitted infections are the only program operated. Similar initiative is required to spread awareness related to HPV. The percentage of level of awareness for both the groups was not very substantial in terms of prevention. Keeping in view this low level of awareness, there is a need to target communication related to HPV and especially its testing and vaccination among teachers. The present finding indicates a close similarity to previous research findings. A study on teachers in Malaysia found that nearly half of participants had never heard of HPV before and reported gender differences, with female teachers being more aware of HPV vaccines than male staff (Ling et al., 2012).

FGDs also pointed out that although there is severe lack of knowledge and awareness about HPV and health consequences associated with it. However, the acceptability for vaccine was very high among the teachers. The teachers from both the school type were of the opinion that HPV vaccination should a part of the broader immunization program run by the government. They viewed that people trust government. Similar observations were made in a study by Remes et al. (2012), while investigating perception of safety of HPV vaccine. The study, reporting high vaccine acceptability in Northwest Tanzania, quoted a participant as saying; “Government cannot do something malicious to children”. Other investigators have reported that health care provider’s recommendation is key determining factor in the mother’s decision to vaccinate her children (Btoush et al., 2019; Glenn et al., 2015; Fernandez et al., 2014). The study also provided a new for information about teacher’s apprehension that vaccination for HPV as a consequence might promote promiscuity. Such worries on part of teachers might act as a barrier in vaccine uptake. Qualitative studies on HPV suggest there is an urgent need to address the barriers to HPV vaccination, through boosting awareness and knowledge as there is an uptake positive association between the two (Polonijo, Mahapatra & Brown, 2022; Thompson et al., 2020).

Teachers expressed a need to spread awareness to impart knowledge among teachers, students, parents and community member. Focus groups also revealed that some teachers do not feel comfortable in discussing issues related to sexually transmitted infection. Focus groups also provided important information that the participants had doubt about the vaccination boosting promiscuous behavior. They recommended that health professionals such as pediatrician, gynecologist and community health workers i.e., Accredited Social Health Activist (ASHA) workers should be involved in enhancing health literacy regarding HPV and HPV vaccination. It is important to point out that only female teachers consented to participate in the FGD. It may be because higher mortality and morbidity due to HPV among women draws more attention for them, or in other way it can be owing to the misconception among men that HPV is a women-specific infection. Furthermore, teachers also recommended that school based teenage education program and community-based outreach strategies will be more effective in making people aware of HPV and HPV vaccination and all the misconceptions about this. These interventions should be approached critically to combat social and gender disparity through a culturally suitable curriculum. The participants from both government and private schools strongly suggested parents should also be involved in such program.

In conclusion, the findings of our study support the need for multi-component interventions to address low HPV knowledge and vaccine uptake. The participants suggested development of culturally tailored curriculum for students and improved communications with community gatekeepers to increase their knowledge and motivate to adapt prevention strategies. However, the study believes that more research is needed to evaluate whether these strategies can be adapted to effectively

improve HPV knowledge and vaccination uptake among diverse population.

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