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ORIGINAL ARTICLE

Knowledge and Awareness of HPV Infection and Vaccination Among Urban Adolescents in India: A Cross-Sectional Study

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Abstract

Aim of the Study To assess the level of awareness and knowledge of HPV infection and vaccination among 1,000 adolescent girls from secondary schools and colleges in five metro cities of India—Ahmedabad, Cuttack, Lucknow, Gwalior, and Visakhapatnam. To evaluate participants own interest and barriers toward HPV vaccination for cervical cancer prevention.

Materials This cross-sectional study was conducted by Adolescent Health Committee of FOGSI from April 2009 to March 2010 under the project "protecting young girls." Girls of 13–19 years, with an average of 16 years are targeted.

Methods A written questionnaire with two parts has been applied. A preliminary written questionnaire included questions of knowledge on cancer cervix and HPV awareness. Then, health talk on HPV is given by the researcher and group discussions lasting for 20 min. Second questionnaire was then applied to evaluate effectiveness of the talk.

Results The study group participants are poorly aware about HPV infection and vaccination but are intensely willing to know about it and get vaccinated. 72 % of them did not know about cervical cancer or HPV. 77.2 % were not aware of the virus that causes cancer cervix. After the health talks. there is an overall significant positive improvement in both knowledge and awareness. 74.4 % of them agreed to get vaccinated.

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Conclusions This study brings out the unawareness about HPV infection and vaccination in urban adolescent girls in five metro cities in India. Results show a changing positive trend of acceptance toward HPV vaccination. Adolescent understanding of HPV is needed to have successful vaccination programs in India.

Keywords HPV Vaccination · Cancer cervix · HPV Awareness · Adolescents and HPV

Introduction

Human Papilloma Virus (HPV) infections are estimated to be the most common sexually transmitted infections in the world. HPV is so common that at least 50 % of sexually active men and women get it at some point in their lives, according to the CDC Prevention.

HPV is a well established causative factor for about 99 % of cervical cancers around the world [1]. HPV vaccine implementation is still facing challenges even though it seems to be a definitive intervention to control mortality from cervical cancer and has the potential to address challenges of screening in India. Implementation faces barriers of vaccine cost, acceptance and lack of awareness [2].

The success of HPV vaccination programs will require awareness regarding HPV associated diseases and the benefits of vaccination for adolescents [3]. To prevent HPV-related cancer deaths annually, HPV vaccination programs for adolescent girls have been approved since 2006 [4].

Researchers from west found out that adolescents have high knowledge levels about HPV and cervical cancer and their acceptance of vaccine is also high [5].

In contrast, limited data is available on Indian adolescent's awareness and knowledge on HPV infections and vaccination since the approval of vaccination by the Indian Government [6]. Therefore this study provides insight into awareness and knowledge among adolescent girls on HPV.

Objectives

- The level of awareness and knowledge of HPV infection and vaccination among 1,000 adolescent girls from secondary high schools and colleges in major cities like Ahmadabad, Cuttack, Gwalior, Lucknow and Visakhapatnam in India.
- To evaluate participants own interest and barriers toward HPV Vaccination for cervical cancer prevention.

Methods and Measures

The setting was a cross-sectional quantitative study analysis carried out from April 2009 to March 2010 conducted by Adolescent Health Committee of the FOGSI in 2009 under the project "protecting young girls" The method of selection of adolescent girls and sampling units (colleges and high schools) was chosen randomly.

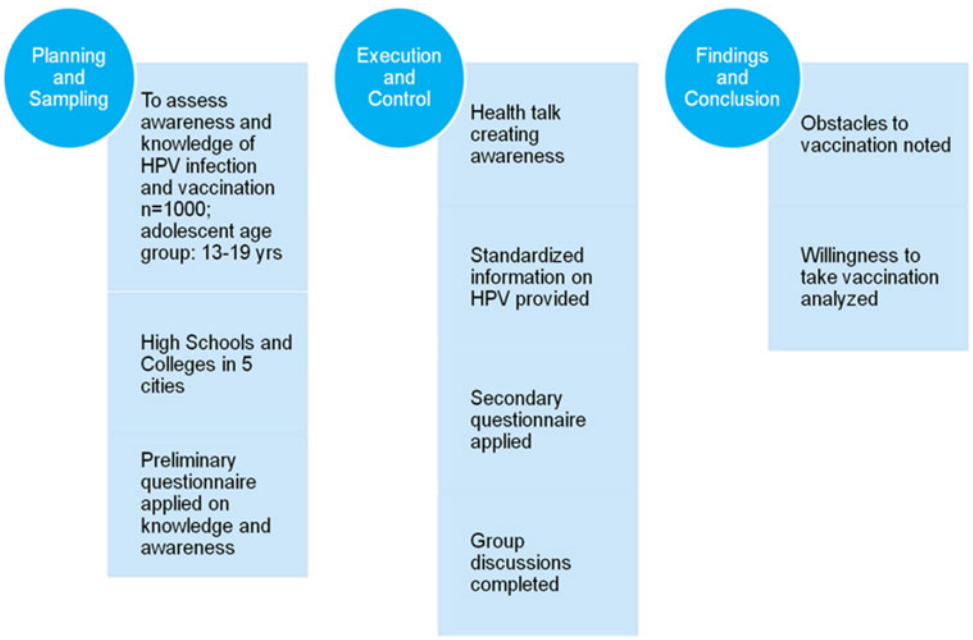

Fig. 1 The study flow chart

Data Collection

The sample was asked to complete a consent form and two questionnaires. The research personnel emphasized that participation was voluntary, anonymous, and without incentive for both questionnaire completion.

The questionnaire consisted of two parts; a preliminary written questionnaire (in English) included questions concerning sociodemographic profile, literacy status of the parents, attendance to health educational programs followed by knowledge on cancer cervix and HPV awareness.

Then a proper health talk on HPV is given by the researcher, group discussions were encouraged with the study staff for 20 min and at the end, the participants were given second questionnaire.

This included whether the participants understood the terms used in the health talk, discussions were relevant or not, information given on HPV infection and vaccine created adequate awareness or not. With the awareness created, we evaluated for further willingness to take the vaccine or not.

The study mainly focused on two parts: the first explored knowledge and awareness on HPV infection and cervical cancer and the second, how well these adolescents retained their knowledge and their willingness to receive the vaccine. The flow chart of the study is depicted in Fig. 1.

Results and Statistical Analysis

In this cross-sectional study, simple descriptive statistics were used. The study questions were organized into four demographic, five knowledge based, five awareness based, which included benefits and barriers, and one question on willingness to take the vaccination.

Knowledge-based questions were answered in "yes or no" items. Those with answers "yes" = 1 point and "no" = 0 points. Correct answers received one point, and incorrect responses received no point. All scores were summed at the end to calculate an overall knowledge score. They were scored on likert-type scale ranging from 1 to 5.

Table 1 shows the demographic characteristics of the study population.

The study targeted 1,000 adolescent girls of the ages between 13 and 19 years, with mean age group being 16 years. The rationale of sample size and sampling in this study is to see if there are any visible gaps between the level of awareness and knowledge in different cities on HPV vaccine.

Of the study population, 53.7 % ($n = 537$) adolescents are from colleges and 46.3 % ($n = 463$) are from high schools. A significant number of the adolescents belonged to Visakhapatnam 29.5 % ($n = 295$). Gwalior represented next in the order 26 % ($n = 260$), Lucknow 16.2 % ($n = 162$), Ahmadabad 15.8 % ($n = 158$), and Cuttack represented 12.5 ($n = 125$). Over 80 % belonged to Hindu religion (81.6 %, $n = 816$). Muslims constituted 12.8 % ($n = 128$), and Christians 5.6 % ($n = 56$).

Table 1 Demographic characteristics of participants

	Population	Percentage (%)
Segmentation by area		
VSP	295	29.5
Gwalior	260	26.0
Lucknow	162	16.2
Calcutta	158	15.8
Cuttack	125	12.5
Segmentation by age group		
13	103	10.3
14	122	12.2
15	136	13.6
16	102	10.2
17	121	12.1
18–19	416	41.6
Segmentation by religion		
Hindu	816	81.6
Muslim	128	12.8
Christian	56	5.6
Segmentation by social class		
Upper	358	35.8
Middle	552	55.2
Lower	90	9.0

Social class was assessed using modified Kuppuswamy's Socioeconomic scale (modified for 2009). About one-third of the study group (35.8 %, $n = 358$) belonged to upper social class. Upper middle class (35.2 %, $n = 352$) and lower middle class (20 %, $n = 200$) together represented about two-thirds, and a minority of the group (9 %, $n = 90$) belonged to lower class. More than one-third of the study reported incomes of their parents of less than four minimum wages per month. Regarding literacy status, parents of 762 adolescents, (76.2 %) were literate, and the rest of them were uneducated (238, $n = 23.8$ %). Preliminary questionnaire assessed the initial knowledge and awareness in the study group.

To the research question # 1 regarding attendance of a health talk, 53 % ($n = 530$) of the study population responded that they have attended health talks. To the research question # 2 regarding which cancer has highest mortality among Indian women, only 23.8 % ($n = 238$) could correctly answer about cervical cancer. To the research question #3 on knowledge and awareness about HPV, only 28 % ($n = 280$) of the respondents knew about HPV, and more than half of the sample, 72 % ($n = 720$) were not aware of it. Interestingly, media played an

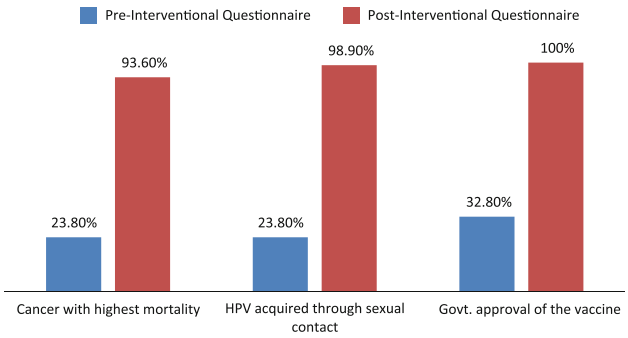

Fig. 2 L: Pre- and Post-interventional questionnaire

important role in the awareness of the group who responded positively (9.6 %, $n = 96$), next being parents (8 %, $n = 80$), family physicians (7.9 %, $n = 790$), and last from friends (2.5 %, $n = 25$ %).

To the research question # 4 about knowledge on acquisition of HPV through sexual contact, results indicated that 77.2 % of women in this study felt that there was no link between sexual contact and HPV infection. Only 23.8 % ($n = 238$) felt that there is a true link.

To the research question # 5 about knowledge and awareness of government's approval of the HPV vaccine, only 32.8 % respondents ($n = 328$) were aware of the approval.

The educational intervention with a health awareness talk was ensued immediately upon the return of all the questionnaires. A group discussion was then conducted and HPV-related information (Table 3) is provided. Figure 2 shows the differences in the knowledge and awareness by both pre-interventional and post interventional questionnarie.

We tried to evaluate the effectiveness of the health talks in terms of improvement in knowledge and awareness by the post test questionnaire. The results are as follows:

- Majority of the (97.6 %) respondents understood the talk.
- Around 50.2 % strongly agreed that HPV infection is a serious health issue in India 76.5 % of them opinioned that cervical cancer mortality in India is high, and its prevention should be aimed as top priority in women's health services.
- 74.4 % of the respondents agreed to take the vaccination.

To the research question # 9, regarding the obstacles (barriers) to HPV vaccination, more than half (56.7 %) of the study sample showed concerns of cost of the vaccine being the highest. Rest of them expressed (24.8 %) lack of awareness, fear of needle prick (2.9 %), and fears of side effects and safety (15.6 %).

Discussion and Review of Literature

To get the latest updates on this article and review literature, we had utilized Google search, Medscape, Pub med, and Science Direct. Many articles reviewed, showed that HPV vaccination acceptability is generally positive in young women: however, most of the studies had been conducted in the west, in countries like USA, UK, and Canada [7, 8].

Findings of these studies may have limited generalizability to Indians with cultural diversity, different religions, and socioeconomic status that are distinctively different from western societies.

Our study found results consistent with those of previous studies on school and college students and their knowledge of HPV [9, 10]. Key factors affecting the results of our study are barriers like cost of the vaccine, lack of awareness, misconceptions and negative attitudes along with poverty to a successful vaccine uptake.

The willingness to get vaccinated also showed some important exceptions. Middle- and low-income group adolescents showed keen interest to get vaccinated but stressed on free vaccination from the Government. We observed a low interest in Muslim girls among three religions. Among those who were not sure of getting vaccinated 13.6 %, ($n = 136$), 8 % ($n = 80$) are Muslims. These adolescents expressed concerns of cost burden as there are several girls in the households in the age range recommended for vaccination. Unlike west, in India, HPV vaccination is an individual choice for one's own protection, and the cost of the vaccine is borne by the parent or guardian of the vaccine recipients.

Since India has high vaccine uptake in nationwide universal immunization program as it offers free vaccinations, most of the girls had expectations that the Indian government has to provide HPV vaccine to be free as well. The findings of this study were compared with previous research as portrayed in Table 2.

When comparing the social and demographic characteristics among the respondents from five cities, the differences were rather small. In the present study, majority of participants had little knowledge and awareness on HPV infection or HPV vaccination across five cities in the focused age groups. Seventy-two percent have not heard of HPV but were willing to know more about the vaccine. This shows a positive attitude toward vaccination and is consistent with other studies that have reported a favorable attitude.

A study published in 2008 by Kwan TT et al. [1] among Chinese adolescent girls in Hong Kong demonstrated that participant's knowledge on cervical cancer was poor. Participants had difficulty understanding the link between HPV and cervical cancer. Another study of Latin and African-

Table 2 Findings compared with previous research

Question	Study result	Previous research
How was the knowledge and awareness in 13–19 years old young women regarding cervical cancer, HPV infection and vaccination?	A quarter of the study heard of HPV and the vaccine. However, they were unsure if its association with cervical cancer	Consistent: Kwan et al. [1]; Lee et al. 2007; Madhivanan et al. [6] Inconsistent: Caskey R et al. [18] ; Mathur MB et al 2010 [12]
Are the young women if 13–19 yrs aware that HPV is acquired through sexual contact?	Two-thirds of the study are unaware that HPV is acquired through sexual contact	Consistent: Kwan et al. [1] ; Hsu et al. 2009
Do the young women 13–19 yrs perceive benefits to vaccination?	In this study after the health talk, majority of them understood the benefits of vaccination	Consistent: Anhang R Wright TC et al. [19]; Zimet GD et al. 2005 [13]
What do the young women perceive as obstacles to obtaining HPV vaccination	In this study, obstacles identified are cost concerns, lack of awareness which were on the top and a small number expressed fears of safety, and fears of needle prick.	Consistent: Madhivanan et al. [6, 7]
How is the personal acceptability to receive HPV vaccination in the adolescent girls of 13–19 yrs	According to the results of the survey, majority of the sample viewed vaccination in a positive light. Physician's recommendation was central to the acceptability	Consistent: Zimet GD et al. [13]; Kahn JA et al. [20]

Table 3 HPV-related Information given to the study group

- HPV is the most common sexually transmitted infection worldwide. It affects both men and women
- HPV infection with low risk types 6 and 11 leads to genital warts
- HPV infection with high risk types 16 and 18 is a well established causative factor for cervical cancer
- Cervical cancer is the most common cancer among women in India followed by breast cancer
- Indian government has approved HPV Vaccine for women of 9–26 years of age
- Two vaccines are available to prevent the HPV types that cause most cervical cancers. These vaccines are cervarix (GlaxoSmithKline) and Gardasil (Merck). Both vaccines are given in three shots over 6 months
- The vaccines are highly effective in people who are not infected with HPV and less effective in young women who have already been exposed to one or more HPV types
- Both vaccines have been licensed by the food and drug administration (FDA) for females aged nine through twenty six years and approved by centers for disease control and prevention(CDC) as safe and effective

American adolescent girls from low income, urban neighborhoods demonstrated that most participants had never heard of cervical cancer and among those who heard of it, knowledge about HPV is poor.

In the present study, though initially youngsters were unaware of HPV, after brief intervention with a health talk, acceptance rates were high as Hoover and colleagues have predicted.

Second part of the questionnaire has shown a statistically significant improvement in knowledge and awareness for all HPV-related questions.

Recent studies by Cates JR et al. in 2010 and Brewer NT et al. [11, 12] in 2011 have shown that vaccine uptake was positively associated with having heard about the vaccine from a health care provider. Our findings also confirmed prior HPV awareness as a positive correlate of HPV vaccine acceptability as majority (74.4 %) of the respondents viewed HPV vaccination in a positive light. Physician's recommendation was central to the acceptability. The study emphasizes that health care providers, obstetricians and gynecologists, and pediatricians could play an important role in affecting the adolescents' attitudes and awareness about vaccination [13].

Beyond the results of our analysis and other information presented in this study, we think that a study of this type is worthwhile for the discussion as it may be valuable in helping the researchers to design educational protocols for adolescents and encourage around the need for further studies on this aspect of awareness in adolescents.

HPV-related information provided to the study is given in Table 3.

Conclusions

Issues of adolescent health care have been changed in all nations recently. In the last few years, cancer control and women's health care have been taken up as global priority by world leaders [14].

India has a large section of adolescent population about 22.5 % that is about 225 million (census information 2009). FOGSI adolescent committee strongly feels that the health care needs to be restructured effectively with a comprehensive health care promotion strategy for them. In that context, the present study is under taken.

Indian adolescent girls seem to be disadvantaged group both economically and by their lack of knowledge and health awareness like many other Asian countries.

Key considerations of our study are barriers like cost of the vaccine, lack of awareness, and negative attitudes. It is encouraging from the adolescent health perspective that majority (74.4 %) of the respondents reported that they would get vaccinated. However, the percentage of those would not get vaccinated is a concern.

Efforts to control cervical cancer were largely unsuccessful in the past because preventive interventions were not utilized by many sections of women [15]. Furthermore preventive programs based on the cytology screening with Pap smears and colposcopy needed a good team work among health care professionals which was not always possible.

The new option of HPV vaccine as a primary prevention in adolescents is a unique opportunity of this era which promises a significant reduction of cervical cancer in coming decades [16]. Provided a consistent and correct care to these adolescent girls, they will never be among those thousands of women who die each year of this preventable and treatable disease.

In conclusion, in resource-poor settings, the ideal program to prevent cervical cancer would be undoubtedly the vaccination of adolescent girls [17].In addition to increasing knowledge-based programs in schools and college's, efforts should also be made to increase the decision-making capacity through evidence-based approach.

Beating cervical cancer is possible through research, outreach, education, screening and treatment. Lets us hope that the novel option for cervical cancer prevention through vaccination of adolescents is a gateway to reduce global burden!

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