



Awareness, perceptions, and choices of physicians pertaining to human papillomavirus (HPV) vaccination in India: A formative research study



Ishu Kataria ^{a,1}, Mariam Siddiqui ^{b,1}, Katherine Treiman ^c, Shaylen Foley ^{d,*}, Meenu Anand ^d, Sutapa Biswas ^e, Digant Shastri ^f, Neerja Bhatla ^g, Diksha Radhakrishnan ^h, Pavan Mamidi ^h, Rengaswamy Sankaranarayanan ⁱ

^a Center for Global Noncommunicable Diseases, RTI International, New Delhi, India

^b RTI International, New Delhi, India

^c RTI International, Rockville, MD, United States

^d American Cancer Society, Atlanta, GA, United States

^e Cancer Foundation of India, Kolkata, India

^f Indian Academy of Pediatrics, Mumbai, India

^g All India Institute of Medical Sciences, New Delhi, India

^h Centre for Social & Behaviour Change, Ashoka University, New Delhi, India

ⁱ Karkinos Healthcare, Mumbai, India

ARTICLE INFO

Article history:

Received 27 January 2022

Received in revised form 26 August 2022

Accepted 13 October 2022

Available online 15 October 2022

Keywords:

Human papillomavirus virus

Cervical cancer

HPV vaccination

Physician

Awareness

Perception

India

ABSTRACT

Introduction: India accounts for one-fifth of the global burden of cervical cancer cases and mortality. A safe and effective vaccine to prevent human papillomavirus (HPV) infections, the primary cause of cervical malignancies, is available in India but multiple barriers lead to its low uptake in the country. Physicians are a key stakeholder and communicator in the Indian health system and have the potential to increase HPV vaccine uptake.

Objective: We undertook formative research to understand awareness, perceptions and choices of physicians when recommending the HPV vaccine to parents of adolescent girls.

Methods: We conducted in-depth interviews with 32 physicians in two districts of West Bengal. Data collection was carried out between July and August 2019. The data was transcribed, coded, and analyzed using NVivo software using the thematic analysis technique.

Results: Our findings suggest that while physicians are generally aware about the burden of cervical cancer and its prevention by HPV vaccination, they face several barriers to recommending the HPV vaccine routinely and strongly. These include the lack of national-level guidance on the age eligibility and dosage, lack of practice-level opportunities such as well or non-sick visits and other routine adolescent vaccines, practice-level barriers like out-of-pocket cost and vaccine availability, and perceived parental hesitancy arising from reluctance to discuss cervical cancer, its prevention, and HPV vaccination.

Conclusions: Physicians in our study exhibited hesitancy when recommending the HPV vaccine. They also faced logistical barriers. It is important that the barriers pertaining to when and how physicians recommend the vaccine be tackled through further education, policy change, and development and implementation of interventions that are evidenced-based.

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Introduction

Cervical cancer is the third most common cancer in India and accounts for the second highest number of cancer deaths [1]. In

2018, there were 96,922 new cases and 60,078 deaths from cervical cancer in India, accounting for one-fifth of the global burden of cervical cancer cases and mortality [1]. The projections by the Indian Council of Medical Research, estimate approximately 104,000 women will be newly diagnosed with cervical cancer in 2020 and a substantial proportion of this population will die from the disease [2].

Cervical cancer is preventable. A safe and effective vaccine to prevent human papillomavirus (HPV) infections, the primary cause of cervical malignancies, has been available for over a decade, since 2006. The HPV vaccine is primarily recommended for girls between

* Corresponding author.

E-mail addresses: ikataria@rti.org (I. Kataria), msiddiqui@rti.org (M. Siddiqui), ktreiman@rti.org (K. Treiman), shaylen.foley@cancer.org (S. Foley), meenu.anand@cancer.org (M. Anand), sutapa@cficancer.org (S. Biswas), diksha.radhakrishnan@ashoka.edu.in (D. Radhakrishnan), pavan.mamidi@ashoka.edu.in (P. Mamidi), sankardr@hotmail.com (R. Sankaranarayanan).

¹ Joint first authors.

the ages of nine and 14 years in two doses over a period of 6 months. When opportunity to immunize during this age group is missed, girls between the ages of 15 and 26 years are recommended three doses over 6 months [3]. HPV vaccination of adolescent girls between 9 and 14 years, screening of women with a highly sensitive screening test, and effective treatment of cervical cancer precursor lesions and cancer, can effectively reduce morbidity and mortality and make the elimination of cervical cancer possible. To achieve elimination, the World Health Organization recommends coverage targets of 90–70–90, that is—90 % of girls fully vaccinated with HPV vaccine by 15 years of age, 70 % of women screened twice at ages 35 and 45 years, and 90 % women with cervical disease receive treatment by 2030 in all countries, including low- and middle-income countries [4,5].

In India, two prophylactic HPV vaccines are licensed for prescription—a quadrivalent vaccine Gardasil® (marketed by Merck) and a bivalent vaccine Cervarix™ (marketed by GlaxoSmithKline). Additionally, a nine-valent vaccine licensed in 2018, which not only protects against HPV types 16 and 18 but also against other high-risk HPV types, is recently available in India [6,7]. Despite encouraging evidence on the safety and efficacy of HPV vaccines in preventing HPV-related diseases and cervical cancer, the introduction of HPV vaccine in the national immunization programs has remained a major challenge [8–10]. Challenges include affordability, lack of knowledge, misinformation, parental concerns about safety or potential vaccine side effects, moral and cultural issues combined with lack of strong vaccine endorsement by health care professionals, and complacency because cervical cancer rates are falling [7–10].

Health care providers are key stakeholders in the scale-up of HPV vaccination, as their recommendation is often crucial in patient decision-making [11,12]. Patient-physician communication is a modifiable factor impacting HPV vaccination uptake. How the provider announces the vaccine, including message clarity, comprehension, and focus on patient-centeredness, as well as their ability to address questions, can impact vaccine uptake. To date, most of the studies with physicians from India have focused on understanding their knowledge and attitudes [13–16]. Little is known about how provider attitudes and knowledge affect provider recommendation behaviours for the HPV vaccine in India.

The overarching goal of the study was to understand the variation in awareness, perceptions, and choices of physicians when recommending the HPV vaccine to parents of adolescent girls in West Bengal, India. Findings from the study will inform the design of interventions aimed at supporting physicians with making HPV vaccine recommendations routinely and strongly to parents of adolescent girls.

Methods

We used a purposive sampling approach to recruit 32 physicians across the two districts of West Bengal. We intended to include physicians of multiple specialties – paediatricians, gynaecologists, gynae-oncologists, and general physicians in our sample. These physicians were working in both public and private setup across rural, *peri*-urban, and urban areas in the two districts of Howrah and Kolkata in West Bengal. The two districts of Kolkata and Howrah were identified for the study based on low immunization rates and the feasibility and logistical support to carry out the study within the defined timeframe by the study team. A preliminary questionnaire identified physicians with varying perceptions of the HPV vaccine – generally favourable, generally unfavourable, and mostly unsure or with mixed feelings. Following this assessment, we conducted qualitative in-depth interviews (IDIs) using a semi-structured discussion guide. The key topical domains cov-

ered in the IDIs included health issues of adolescent girls, physician's knowledge of cervical cancer, beliefs around HPV vaccine, experience in administering the vaccine, records, follow-ups, and post-vaccine conversations, their patients' understanding of cervical cancer, and their experience around interacting with other physicians on the issues around HPV vaccination.

Data collection was carried out between July and August 2019. To prepare for interviews, we conducted a three-day training for the field team. The training elaborated on the background and purpose of the study and discussed research methods being used in the study and emphasized good research practices and techniques to handle difficult situations. It also addressed ethical considerations and the importance of confidentiality in research, especially in the context of the study [17,18]. The interview sample was guided by the recommended sample size of 30 for qualitative methods aiming to reach data saturation. Interviews were conducted, with some logistical limitations, until data saturation, or the point after which no new data or themes were emerging from in-depth interviews with the key stakeholders.

Our study was part of a larger study guided by the socioecological theory of behaviour, which posits that individual behaviour is influenced not only by individual characteristics, perceptions, and resources, but also by contextual factors and processes [19–21]. This manuscript focuses solely on the findings from physicians as we wanted to highlight the untapped opportunity that physicians provide in the effort to increase vaccine rates. This is critical for India as it plans to introduce the HPV vaccine nationally at the end of this year [22].

Prior to conducting the research, we obtained necessary ethical approvals and the study was deemed exempt from Ashoka University's and RTI International's Institutional Review Boards as it involved very minimal or no risk. All participants provided oral and written consent before participating in the interviews. No monetary incentives were provided to participants. For each interview, another team member accompanied the interviewer to take notes and audio-record the interview. Interviews were conducted in English, Hindi, and Bengali languages as per the comfort of the participant.

Data analysis

To analyse the data from the IDIs, we developed a detailed data analysis plan. After completing the IDIs, audio-recordings were used to develop transcripts, which were translated into English. We considered the content in terms of themes with the goal of noting regularities, patterns, explanations, and propositions contained in the data. We then conducted thematic analysis in which we systematically analyzed the findings from each IDI to identify common themes and similarities and differences. We coded the qualitative data in QSR NVivo and prepared code summaries for analysis. We followed a systematic data coding method, including double coding a portion (30 %) of the transcripts and used an iterative process to develop a final codebook for analysis.

Results

We conducted a total of 32 IDIs with physicians in West Bengal. The mean age of the participants were 49 years (range: 35–62 years). When initially screened, majority of the participants interviewed were identified as generally favourable towards the HPV vaccine (78 %) followed by generally unfavourable (13 %) and those being unsure or having mixed feelings (9 %). Most of the participants interviewed were male (63 %). Three-quarter reported practicing in both hospital and clinic settings (75 %).

Table 1
Demographic characteristics of physicians.

	Total (N = 32)	Kolkata Urban (n = 20)	Howrah Peri-urban (n = 7)	Howrah Rural (n = 5)
Age	49 years Range: 35–62 years	49 years Range: 37–62 years	50 years Range: 39–61 years	48 years Range: 35–51 years
Gender				
Male	20 (62.5 %)	9 (45.0 %)	6 (85.7 %)	5 (100.0 %)
Female	12 (37.5 %)	11 (55.0 %)	1 (14.3 %)	0 (0.0 %)
Practice Type				
Government	4 (12.5 %)	2 (10.0 %)	2 (28.6 %)	0 (0.0 %)
Private	14 (43.8 %)	10 (50.0 %)	3 (42.9 %)	1 (20.0 %)
Both	14 (43.8 %)	8 (40.0 %)	2 (28.6 %)	4 (80.0 %)
Specialization				
Pediatrician	16 (50.0 %)	11 (55.0 %)	3 (42.9 %)	2 (40.0 %)
Gynecologist	5 (15.6 %)	3 (15.0 %)	2 (28.6 %)	0 (0.0 %)
Gynae-oncologist	5 (15.6 %)	3 (15.0 %)	2 (28.6 %)	0 (0.0 %)
General Physician	4 (12.5 %)	1 (5.0 %)	0 (0.0 %)	3 (60.0 %)
Other (Public Health Specialist and Professor)	2 (6.3 %)	2 (10.0 %)	0 (0.0 %)	0 (0.0 %)
Place of Work				
Hospital only	5 (15.6 %)	3 (15.0 %)	2 (28.6 %)	0 (0.0 %)
Private Clinic only	2 (6.3 %)	1 (5.0 %)	1 (14.3 %)	0 (0.0 %)
Hospital and Private Clinic	24 (75.0 %)	15 (75.0 %)	4 (57.1 %)	5 (100.0 %)
Research Institute	1 (3.1 %)	1 (5.0 %)	0 (0.0 %)	0 (0.0 %)
Aware of the HPV vaccine (yes)	32 (100.0 %)	20 (100.0 %)	7 (100.0 %)	5 (100.0 %)
Views about the HPV Vaccine				
Generally Favorable	25 (78.1 %)	13 (65.0 %)	7 (100.0 %)	5 (100.0 %)
Unsure or Mixed Feelings	3 (9.4 %)	3 (15.0 %)	0 (0.0 %)	0 (0.0 %)
Generally Unfavorable	4 (12.5 %)	4 (20.0 %)	0 (0.0 %)	0 (0.0 %)

Nearly half of the participants interviewed (44 %) were in private practice. The key demographic characteristics for the physicians participating in the IDIs in West Bengal are summarized in Table 1.

Overall, the physicians mentioned that parents are concerned about a range of health issues for their adolescent girls. These issues included concern about nutrition and dietary habits; obesity; mental health; anaemia; menstruation issues, such as dysmenorrhea; puberty-related issues; contraception; worm infestation; urinary tract infection; fever; cough; cold; and behavioural issues. Physicians reported that female adolescent patients were mostly accompanied by their mother. Parents of adolescent girls initiated different types of conversations with physicians depending on the physician's specialty. Discussion with paediatricians revolve around issues of menstruation, polycystic ovarian disease, delayed menarche, body image and peer pressure, dietary habits, and sedentary lifestyle. Gynaecologists and gynae-oncologists discussed issues of obesity, menstruation problems, polycystic ovary disease, and vaginal discharge. General physicians usually addressed health issues such as fever, cough, cold, dietary habits, and vaginal discharge. In all of these discussions, physicians reported that parents rarely raised the issue of vaccination for their adolescent daughters themselves, with only a few trying to ask for information about the HPV vaccine. When asked about parental decision-making for female adolescents, physicians believed that parents were jointly making decisions about their adolescent daughter's healthcare and overall well-being.

Awareness and perceptions of cervical cancer and HPV vaccination

Physicians were generally aware of cervical cancer prevalence, treatment, and prevention. Most physicians reported acquiring this knowledge on cervical cancer through their Bachelor of Medicine, Bachelor of Surgery (MBBS) or postgraduate degree, continuing medical education, reading the scientific literature, and attending scientific conferences. All of them believed that early diagnosis is critical for successful treatment of cervical cancer.

Most physicians believed that cervical cancer can be prevented effectively through raising awareness, screening, and HPV vaccination. However, they felt that it needs to be a priority for the government – as there is currently not strong political commitment or attention in the country's maternal and child health programmes given to cervical cancer and HPV vaccination.

When asked about the common risk factors for cervical cancer, a majority of physicians cited having multiple sexual partners and poor menstrual hygiene as the most common ones. They reported that HPV infection is a risk factor for cervical cancer and having multiple partners increases the probability of coming in contact with a person who has an HPV infection. Some physicians also cited multiparity and early marriage as risk factors for cervical cancer. There were a few physicians (paediatricians and general physicians) who stated they were not aware of any risk factors.

All physicians reported that there is a lack of awareness about cervical cancer among patients and in the community. A few of them noted that when they do community outreach activities in rural settings, even the physicians serving in those communities are not aware of cervical cancer, and that there is better awareness about breast cancer as compared to cervical cancer. Overall, physicians believed cervical cancer is not a priority for women and they are not willing to go for screening if they are not presenting with any symptoms.

“The awareness [of cervical cancer] is not very good. People do not know that it exists, can cause high mortality, is preventable and does not cost a fortune. People do not know about this. Even among the educated middle class in West Bengal or the country.” – Paediatrician, Howrah (peri-urban)

In addition to a lack of awareness about symptoms, physicians attributed delays in seeking care for cervical cancer and other health issues to competing life priorities. Many lamented these delays in seeking timely care, particularly for something like cervical cancer, which is both preventable and treatable.

“Most of the women neglect their health. They do not have the time to think of these things. Then when they come to the hospital, they

come with the advanced stages of it [cervical cancer]. At that particular time, it is very difficult to treat. But, if they come early, like cervical screening programs are going on. They do Pap smear screening in all the medical colleges. From there if it comes positive and early surgery is done then it is quite treatable.” – Paediatrician, Kolkata (Urban)

Physicians expressed less certainty about information on the HPV vaccine. When the HPV vaccine was first launched in the country, physicians reported that they had questions about the effectiveness, efficacy, age group, impact on adolescent girl's fertility, dosage, cost, and side effects, among others.

Physicians said the subject of HPV vaccination gets discussed in their interaction with fellow physicians. The discussion is mostly about the age group recommendation, number of doses, efficacy of the vaccine, brand preference, cost of the vaccine, latest findings in vaccine trials, increasing awareness and uptake of the vaccine, and how to address vaccine hesitancy among parents. Some of the physicians mentioned that their discussions have particularly focused on the age of vaccination and side effects of the vaccine.

A majority of the physicians believed the HPV vaccine is necessary and effective in preventing cervical cancer. However, some did not think it was necessary to give to adolescent girls and there were apprehensions related to the vaccine's effectiveness after sexual debut in older age groups. All of them believed that the HPV vaccine prevents cervical cancer, with some mentioning that the quadrivalent vaccine can prevent genital warts as an additional benefit. The high cost was brought up frequently as a constraining factor because people in low socioeconomic strata could not afford it – a major barrier to its uptake in their opinion. Some of them also felt that screening was a viable alternative to vaccination since screening is happening in the country on a much larger scale through national and community level programmes as well as in the private sector.

“If diagnosed early in the preventive stage and early and screening is there it is totally preventable. In the Western world that is how cervical cancer has gone down so much through screening. Unfortunately, in our country screening is totally based on the gynaecologist or the person herself.” – General Physician, Kolkata (Urban)

Physician practices and behaviours regarding HPV vaccination

Physicians reported that most discussions about cervical cancer were initiated by them opportunistically while attending to patients and not in reaction to an inquiry from patients. Some paediatricians brought up cervical cancer as a means to inform parents about HPV vaccine when adolescent girls came in for their TT or Td/Tdap booster vaccination around 10 to 12 years of age or with menstruation problems. During these healthcare visits, paediatricians would inform the parents about age of vaccination, prevalence of cervical cancer, and benefits of the vaccine. In contrast, general physicians and gynaecologists were not routinely discussing cervical cancer or HPV vaccination with their patients.

Most physicians claimed that they have never hesitated in their recommendation of the vaccine. Those that reported hesitating did so for various reasons. Parents asking too many questions about the vaccine prompted hesitancy.

“When parents question too much, I leave it to them and don't push further. Won't force them. And it's also not like the government of India is recommending it.” – Paediatrician, Kolkata (Urban)

Additionally, physicians reported that changing parameters on age eligibility and dosage made them feel like the HPV vaccine is experimental and therefore they did not want to risk their reputation by recommending a 'controversial' vaccine. Some physicians

reported not recommending the HPV vaccine for fear of congenital abnormalities in the future progeny of adolescents. A common concern reported was the age at which to recommend the vaccine. Many felt it was unnecessary to recommend the HPV vaccine to 10- and 11-year-olds, as they believed that sexual debut does not start that early in India.

“If somebody is asking me at the age of 11 if I need to give the HPV vaccine, I would say no, because I am not very convinced myself that sexual debut starts that early here. I would probably say, 'No, you don't need it at this age. You could wait.' I would be comfortable in giving around 16 years.” – Paediatrician, Kolkata (Urban)

Providers frequently hesitated to recommend the vaccine to low socioeconomic groups because of the high vaccine cost.

“Other than monetary issues, I have no hesitancy because it is an expensive vaccine. Because after hearing the cost, some parents cannot afford it. That is a very sad part of it.” – Paediatrician, Kolkata (Urban)

Lastly, a few physicians cited not wanting to burden their patients with additional information apart from the current health concern, while others stated that they do not recommend the HPV vaccine to adolescent males because they believe it only prevents a female disease.

The general physicians and public health specialists reported that they were not administering HPV vaccine in their practice. Only a few paediatricians, gynaecologists, and gynae-oncologists were administering the vaccine routinely. The age range of the group to which they administered varied between 9 and 48 years, based on each physicians' preference. Women/girls receiving vaccination were mostly well-educated and from upper-middle class or affluent backgrounds, as they could afford the vaccine cost. Physicians reported administering the vaccine to only a few adolescent girls from low socioeconomic backgrounds, either free or at a subsidized rate through community camps and charitable hospitals.

“I typically practice in two settings. In the semi-government setting, we cater to low- and middle-class populations, who are unable to afford the vaccine and frankly speaking I do not talk to them about it. The vaccine is not available in the government sector. In my private set up, I talk about the vaccine as I cater to patients who are from an affluent background.” – Paediatrician, Kolkata (Urban)

The few physicians who reported administering the HPV vaccine also reported that did not stock HPV vaccines because of low demand from their patients or because their facility could not maintain a cold chain for storage. However, unlike childhood immunizations, the HPV vaccine is not available through general pharmaceutical stores due to its high cost, so some physicians reported referring patients to a vaccine distributor or procuring the vaccine themselves if the parent were interested in vaccinating their adolescent girl.

Physicians administering the HPV vaccine reported vaccinating patients in the deltoid region of the arm, a procedure similar to other vaccines. A majority of physicians mentioned general side effects associated with the HPV vaccine, such as pain in the injected site, redness, inflammation, and fever. However, they believed them to be common side effects for all vaccines. Only very few physicians were concerned about syncopal and vasovagal attacks and consequently administered the vaccine when the patient was lying down and observing them for 20 to 30 min post administration of the vaccine. All physicians were proactive in keeping patient records for HPV vaccination and physicians reported no loss to follow-up for subsequent doses in the series

because the health facility sent reminders through phone calls or emails or the parents were diligent in keeping up with the dosage schedule. These physicians reported that a majority of the parents did not raise any questions or concerns during vaccination and very few asked about any possible side effects.

Many physicians reported believing that their fellow physicians are largely supportive of the vaccine and routinely recommend it in their practice. Only a few of them mentioned knowing other physicians that are opposed to it. The reasons mentioned for this opposition include—HPV vaccine being unnecessary, cost of the vaccine, early age of vaccination, fear of potential side effects (arising from limited knowledge), possible lack of awareness about cervical cancer, false or negative reports in the media on the HPV vaccine, and lack of longitudinal data on efficacy of the vaccine.

“I meet both [supportive and opposed physicians]. Mostly [they] are not very convinced and that [this vaccine] is [necessary] because of the age and cost is another thing. Like why it should be so costly?” – Paediatrician, Kolkata (Urban)

“Some doctors do not recommend it [the HPV vaccine] because it is not in the government UIP guidelines. It is only in the IAP [Indian Academy of Paediatrics] guidelines. And we have to be honest that IAP guidelines are made by a bunch of paediatricians who have their own vested interests. You never know what their rationale was behind making those guidelines.” – Paediatrician, Kolkata (Urban)

Physician challenges with HPV vaccination

There appeared to be a ‘rotation game’ [one specialist passing the onus to other] when it came to discussing HPV vaccine for cervical cancer prevention among physicians. Some paediatricians felt that gynaecologists have a greater opportunity to spread awareness and talk about the HPV vaccine for adolescents since most of the paediatricians dealt only with childhood vaccinations.

“I think anyone [physician] can recommend after knowing [about] the vaccine and they [adolescents] can take it from the gynaecologist.” – General Physician, Howrah (Rural)

When discussing the HPV vaccine with parents, physicians are faced with multiple questions. These include questions about effectiveness, efficacy, availability, dosage, age when it should be given, need for the vaccine, possible side effects, safety, cost, effect on sexual life, effect on fertility, duration of the protective period, its non-inclusion in the Universal Immunization Programme (UIP) schedule, and the need for any booster dose. Physicians reported trying to tackle these questions by providing evidence and/or analogies with other childhood vaccines to make their case. They also mentioned that some parents had reservations about the vaccine because they believed that their daughters would never be sexually active during the age of 9 to 14 years; consequently, there wasn’t any need for vaccination – which made it difficult for the physicians to recommend the vaccine. Physicians reported that answering these questions was time consuming.

“Time is important. You need 5 min to explain the full thing. They are seeing 10 patients and they are very quick [visits] and [I] do not have time [to explain this vaccine].” – General Physician, Kolkata (Urban)

Physicians described challenges in discussing the topic of cervical cancer and HPV vaccination either with their patients or those accompanying them. These included women giving no priority to their own health, lack of awareness about the burden of cervical

cancer, limited available time for patient-physician interaction, and discomfort in discussing with parents about HPV infection which is sexually transmitted.

“Priorities are something else other than health issues. You really have to embark on women’s health issues and understand their priorities. Their priority is their children, getting their work done, generating income, safety, and security. So, health issues for women have taken a back seat.” – Professor, Kolkata (Urban)

From a health system perspective, high cost of the vaccine, as well as its non-availability in the primary health care system, were key factors that the physicians identified as barriers to its uptake. Some physicians believed that it is the people from low socioeconomic strata to whom the cost matters the most and hence they could not afford the vaccine even if they want it. In such cases, the physicians reporting being conscious of not pushing the parents from low socioeconomic strata, and often do not actively recommend the vaccine when they think someone cannot afford it. Several suggested that the inclusion of HPV vaccine in the UIP would be very important because it will remove the cost factor from the decision-making process, which currently is a big issue affecting vaccine uptake.

“If the cost of the vaccine comes down, then it will become universal protection.” – Gynaecologist, Howrah (Peri-urban)

Discussion

The results of our formative research study provide insights on awareness, perceptions, practices, and behaviours of physicians pertaining to the HPV vaccine and its recommendation to parents of adolescent girls in West Bengal. Our findings suggest that while physicians are generally aware about the burden of cervical cancer and its prevention by HPV vaccination, they face several barriers to recommending the HPV vaccine routinely and strongly. These include lack of national-level guidance on the age eligibility and dosage, practice-level opportunities such as routine adolescent health check-ups, patient-level barriers like out-of-pocket cost, and provider-level barriers like vaccine availability and perceived parental hesitancy arising from reluctance to discuss cervical cancer, its prevention, and HPV vaccination. Several studies in India have indicated limited knowledge about HPV infection, cervical cancer, and the vaccine, emphasizing the need for increasing knowledge among physicians and parents of adolescent girls to improve HPV vaccine uptake in India [13–16]. As India prepares to add the HPV vaccine to the national immunization programme, we believe these findings are both timely and important for understanding how to support and educate providers in West Bengal on the HPV vaccine and its administration [22].

In our study, physicians were largely supportive of the HPV vaccine. The limited number of studies from India on this subject similarly suggest that physicians and medical students generally have positive attitudes towards the HPV vaccine [23,24]. This is crucial as health care providers are important influencers for vaccine decision-making [25–27]. To our knowledge, this study is the first initiative to explore the underlying perceptions, practices and behaviours relating to HPV vaccination recommendations among practicing physicians in India. Most prior studies have assessed knowledge and attitudes either among practicing physicians or medical students [13–16].

Our study recognizes vaccine hesitancy as a spectrum with degree of indecision attributed by varied social, cultural, political, and personal factors. We found that physicians were unsure or had mixed feelings about the HPV vaccine when recommending it to parents of adolescent girls. Physicians described hesitating

to recommend the HPV vaccine for various reasons, including limited time for patient-physician interaction to answer concerns, doubt because of changing guidelines around age and dosage of the vaccine, and a presumption that a later age of sexual debut among adolescent girls in India meant the vaccine could be postponed. Physicians require more reassurance and clarity on why the HPV vaccine is most effective at early ages, its safety, and on how to communicate concisely to parents.

Providers also mentioned logistical challenges that affected their recommendation and administration of the HPV vaccine, including the cost of the vaccine and its availability. The high cost of the HPV vaccine is often cited by providers in India as one of the key barriers to vaccine uptake [13,28–30]. In a national survey of paediatricians from a national list of Indian Academy of Paediatrics members, only 46 % of paediatricians reported using HPV vaccine routinely or selectively and postulated high cost, cultural issues around premarital sex, along with vaccine safety as some of the reasons complicating vaccine delivery [31]. Our study largely corroborates these postulations. There are significant opportunities to strengthen and unify policies and guidelines on HPV vaccination in India. Furthermore, adding the HPV vaccine to UIP could fundamentally bolster physician confidence in the vaccine.

Physicians in our study indicated several parental concerns about the HPV vaccine including the lack of understanding the benefit of the vaccine, its safety profile, recommended age and number of doses, possible side effects, effect on fertility, and its non-inclusion in the UIP schedule. Physicians may benefit from more training and resources on how to discuss HPV vaccination as a means for cervical cancer prevention and to address standard parental questions or concerns confidently.

Our study had a few limitations which might affect the interpretation of results. Our study relied on qualitative responses which has the potential to be influenced by social desirability bias. Additionally, since we used a purposive sampling of participants from one state in India rather than a probability-based sample drawn from the entire country, the study results are not generalizable to the larger physician community in India, it instead reflects the views of paediatricians, gynaecologists, gynae-oncologists, and general physicians from both public and private setup across rural, peri-urban, and urban areas in the two districts of Howrah and Kolkata in West Bengal. Additionally, our sample of 32 physicians mostly included those who were generally favourable or with mixed feelings about HPV vaccine. We were able to reach data saturation with this group of providers. We were unable to cover the entire vaccine hesitancy spectrum with the physicians in our study with as much depth as planned and due to the lack of available physicians with these views, struggled to reach thematic saturation within these interview groups. Despite this limitation, we were still able to get good insights into the variation in perception, practice, and behaviours across the physician groupings. Another challenge was our inability to find paediatricians from rural areas in the two districts of West Bengal. We therefore focused on interviewing general physicians in these areas to understand their awareness and perceptions around cervical cancer and HPV vaccination. Lastly, the authors acknowledge that there are many other types of healthcare providers in India that support immunization, including community health workers such as Auxillary Nurse Midwives (ANMs), Accredited Social Health Activists (ASHAs), Anganwadi and Municipality Health workers. Our qualitative research focused on interviewing various key stakeholders involved in adolescent health care in India and in this regard we conducted discussions with community health workers (e.g. ANMs, ASHAs, Anganwadi and Municipality Health workers) as part of the study. However, the findings from these key stakeholders are not included in the current manuscript.

Conclusions

Even though physicians reported high awareness and favourable perceptions of HPV vaccination and cervical cancer prevention, they exhibited mixed feelings and gaps in knowledge of the HPV vaccine and its delivery. This likely affected their choice to recommend the vaccine as well as the strength of that recommendation. Physicians additionally faced logistical barriers like high cost, limited availability, lack of opportunity to communicate because of high workload and lack of government endorsement demonstrated by its non-inclusion in the UIP. These results indicate an urgent need for addressing relevant knowledge gaps among physicians and for increasing community awareness towards cervical cancer prevention through HPV vaccination, along with continued efforts to have the HPV vaccine included in the UIP to address the cost and availability barriers. Engaging and persuasive interventions that are evidence-based would be particularly useful to support physicians in making a high-quality recommendation of the HPV vaccine to parents of adolescent girls in India.

Data availability

The data that has been used is confidential.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgments

The authors wish to thank Aratrika Bhadra of RTI International, Pooja Sikund, and Karuna Banerjee of Centre for Social & Behaviour Change at Ashoka University for their research assistance. We would also like to acknowledge Dr Jacqui Drope of American Cancer Society for supporting and envisioning this research.

Funding

This publication was supported in part by a grant from the American Cancer Society (Grant # 57664). Its contents are solely the responsibility of the authors and do not necessarily represent the official views of [grantor].

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