

Original Research Article

Bangladeshi parents' knowledge and awareness about cervical cancer and willingness to vaccinate female family members against human papilloma virus: a cross sectional study

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ABSTRACT

Background: Cervical cancer (CC) is an important cause of cancer death among Bangladeshi women and human papillomavirus (HPV) is the causative factor for developing CC. HPV vaccination is yet to be implemented as part of national immunization programme in Bangladesh.

Method: The objective of this cross-sectional research was to evaluate the understanding of CC, HPV, and the willingness to accept HPV vaccination among parents of school-aged children (between 5-16 years) from grades 1-10 in the capital city of Bangladesh, Dhaka. The study was conducted from February 2020 to January 2021 by paper-based survey.

Results: This study showed 86.6% of participants knew that CC is preventable and 98.6% knew that vaccine can prevent CC. Only 1.3% of the participants heard about HPV. Majority (97.1%) were interested in HPV vaccination to female family members. Knowledge about visual inspection with acetic acid (VIA) test, CC prevention and HPV vaccine were significantly associated with willingness to give vaccine. Gender, age, educational level and socioeconomic condition of respondents have no relation with vaccine acceptance ($p > 0.05$). This study showed that total 1319 (45%) respondents sought the vaccine free of cost and personal relation as friends and family were major source of information (64.8%).

Conclusions: The study's results revealed that a significant number of Bangladeshi parents were aware of CC, CC prevention, and HPV vaccination. Nonetheless, most participants expressed a willingness to vaccinate their female family members against HPV.

Keyword: Bangladeshi parents, Perception, CC, Acceptance, HPV vaccine

INTRODUCTION

Bangladesh is recognized for its significant population density, placing it among the highest in the world. Recently, the world bank categorized Bangladesh as a lower middle-income country (LMIC).¹

CC ranks as fourth most prevalent cancer among females globally, and in Bangladesh, it stands as the second most common cancer affecting women. Approximately 12% of female cancer cases in Bangladesh are attributed to CC.¹⁻³

Human papilloma virus (HPV) is the causative agent for CC in 99.7% of the cases.⁴⁻⁶ The high prevalence of this

cancer is related to early marriage, multiparity, sexually transmitted diseases (STD) and low socio-economic condition.^{4,6} WHO declared global strategy for elimination for CC by 2020-2030 about three goals: 90% coverage of HPV Vaccination of girls (by 15 years of age), 70% coverage of screening with high precision test by age 35 and again by 45 years, 90% of women identified with cervical disease receive treatment.^{7,8}

WHO recommend Paps smear, HPV DNA test for CC screening tool. LMICs encounter significant difficulties in implementing CC screening, promoting active involvement in the early detection of precancerous cervical lesions and HPV vaccination. Bangladesh, being one of the pioneering nations, adopted VIA as the screening method for its national CC screening program in 2004. The VIA screening program is more practical in Bangladesh as it is integrated into the current healthcare infrastructure compared to the Pap smear and HPV DNA tests.⁹

HPV vaccination is a primary preventive measure for CC. It specifically targets girls aged 9-15 years. Countries with high HPV vaccination coverage have reported a significant reduction in HPV prevalence by 73-85% and a decline of 41-57% in high-grade cervical lesions.¹⁰

In 2006, the quadrivalent HPV vaccine, which targets HPV-6, 11, 16, and 18, was introduced, followed by the bivalent cervarix vaccine against HPV-16 and 18 in 2009.^{11,12} Although the HPV vaccine has been available in the market in Bangladesh since 2006,¹³ the country has not been able to incorporate it into the national immunization program. In 2016, a pilot program was initiated in Gazipur, Bangladesh, to introduce the HPV vaccine among school-going children with the aim of establishing a national HPV vaccination program. However, as of now, Bangladesh does not have any HPV vaccination coverage, making the country more susceptible to CC.^{14,15}

Parental awareness and perceptions regarding the HPV vaccine play a crucial role in its acceptance and coverage. Therefore, the objective of this study is to assess parental perceptions of CC, HPV, and the HPV vaccine, as well as predict the willingness of parents to pay for the HPV vaccine. These findings aim to inform CC prevention guidelines and strategies in Bangladesh, including screening programs and the implementation of the HPV vaccine. The results of this study could have significant implications for the design and implementation of effective CC prevention strategies in Bangladesh.

METHOD

This paper-based survey was conducted as a cross-sectional study in the Capital City, Dhaka, Bangladesh, targeting parents of school-going children. The study took place from February 2020 to January 2021. Both male and female children aged between 5 and 16 years were

included in the study. A total of twenty schools in Dhaka City were aimlessly selected for participation. Study participants were defined as parents who voluntarily took part in the study while accompanying their children to the school.

Ethics, consent and permission

The study protocol received approval from the institutional review board at Bangabandhu Sheikh Mujib medical university (BSMMU) in Dhaka. Additionally, permission to conduct the study was obtained from the relevant school authorities. Parents were informed about the upcoming survey through various means, such as notice boards and distribution of leaflets to children in classes, with a one-week prior notice. Any interested individuals who fulfilled the eligibility criteria, including being residents of Dhaka, over 18 years old, and having at least one female child, were invited to participate in the study. Informed verbal consent was obtained from all individuals who expressed interest in being study participants. Individuals who did not provide their consent were not included in the study.

Data collection and survey measures

The concise survey consisted of questions written in both Bangla and English. It was divided into four sections. The first section gathered socio-demographic information from participants, including age, sex, monthly income, and educational level. Providing participants' names, addresses, and contact numbers was optional.

Second section focused on female participants aged 30 years and above who eligible for CC screening VIA. They asked whether they had undergone VIA test/ not.

The third section comprised questions about participants' knowledge. All participants were asked whether they had heard about CC or not. Those who answered 'NO' were directed to the fourth section. Those who had heard about CC were asked about their knowledge on the following topics: (i) if CC can be prevented (ii) if they were aware that vaccines can prevent CC, (iii) if they knew about the VIA test (iv) if they had heard about the HPV virus. Question 1, 2, 3, and 4 had 'Yes' or 'No' response options. Question 5 was a multiple-choice question with the following options: (a) early marriage, (b) too many childbirths, (c) multiple sexual partners, (d) low socio-economic condition, and (e) lack of personal hygiene (f) others with specification. Participants were allowed to choose multiple answers.

In que 6, participants were asked to indicate their primary sources of information regarding CC. Options were categorized as follows: personal contacts (friends and family, colleagues), media sources (social media, television, radio, billboards, etc.), government programs (government hospitals, public health campaigns) and others.

In the fourth section, all parents were asked whether they were interested in vaccinating their female family members in the future. If yes, respondents were asked about their expected price for the HPV vaccine.

Data analysis

Data obtained from pre-designed questionnaire underwent editing, cleaning, and compilation. Data analysis was performed using SPSS version 25 for Windows, located in Chicago, United States. Analysis included calculating frequencies and examining associations between variables. Association between various parameters and parents' willingness to vaccinate their female family members against HPV was assessed using chi-square test. A *p* less than 0.05 was considered statistically significant.

RESULTS

A survey was conducted among 3,022 parents using a paper-based questionnaire. The majority of the participants were female (93.4%) compared to males (6.6%). The age group of 30-40 years represented a significant portion of the participants (62.6%). In terms of education, most respondents had completed primary education (52.8%), while a small proportion had no formal education (9.5%) (Table 1). Among the female participants, a large number (2411) fell within the target age range for CC screening in Bangladesh (30 years), but only a small percentage had undergone the screening (5.8%) (Table 2).

Table 1: Socio-demographic characteristics of the respondents.

Characteristics	N	Percentage (%)
Gender, (n=3022)		
Male respondent	198	6.6
Female respondent	2824	93.4
Age (In years), (n=3022)		
20-29	443	14.6
30-40	1916	62.6
41-50	576	19.1
51-60	87	3.7
Educational qualification, (n=3022)		
No formal education	287	9.5
Primary	1595	52.8
SSC	692	22.9
≥HSC	448	14.8
Monthly family income (BDT), (n=3022)		
Low income: BDT <6821-16	948	31.4
Lower middle income: BDT (6827.75-26851.98)	1634	54.1
Upper middle income: BDT (26858.64-83018.21)	374	12.4
High income: BDT ≥ 83024-87	66	2.2

Socioeconomic classifications:(World Bank Data Team 2016).¹⁶

The participants identified several risk factors for CC, including lack of personal hygiene (37.7%), early marriage (30%), multiple childbirths (25.2%), multiple sexual partners (12.6%), low socioeconomic conditions (9.8%) and other (5.2%) (Figure 1). Among others factors some of the topics brought up by the participants include concept of destiny, immoral actions, disrespect towards religion, and idea of inherited traits or characteristics. Personal relationships were primary source of the information mentioned by the participants (64.8%), followed by government sources (23.4%) and media (11.8%).

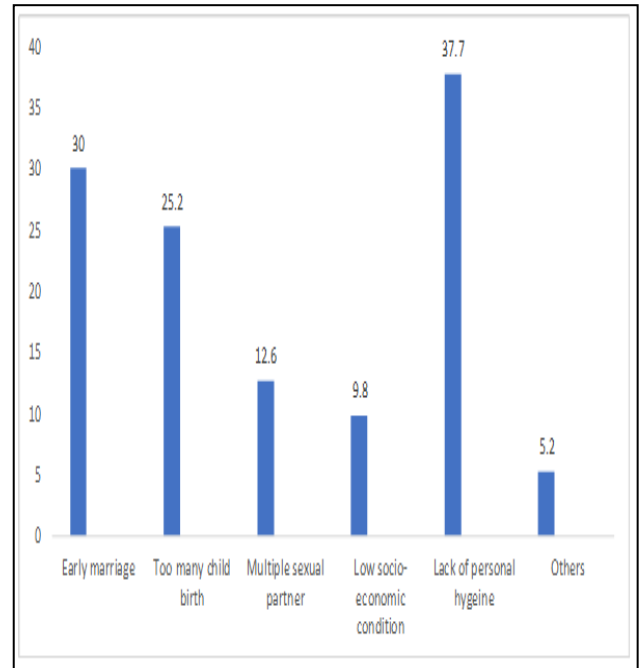


Figure 1: Knowledge about the risk factors of CC.

Number of participants heard about CC is 2804 were asked about risk factors of CC. Total will not correspond to 100% because of multiple answers in individual patients.

The majority of participants (92.8%) had heard about CC, with 86.6% knowing it was preventable, 86.6% aware of the preventive potential of vaccines, and 78.4% familiar with the VIA test. However, 98.7% had never heard of the HPV virus. Regardless of knowledge, 97.1% of respondents expressed interest in giving the HPV vaccine to their female family members (Table 3). No significant relationship was found between the willingness to vaccinate and factors such as gender, age, education, socioeconomic condition, knowledge of CC or HPV virus.

Respondents who had information about CC prevention, including knowledge of the VIA test and the preventive potential of vaccines, were more concerned about HPV vaccination for their female family members (Table 4). A majority of the respondents (45%) preferred the vaccine to be free of cost, while 37.7% wanted it to cost less than one hundred taka (Table 5).

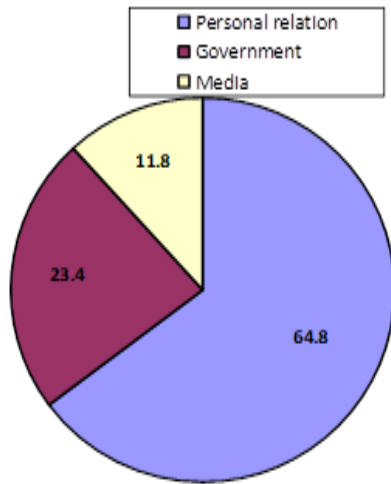


Figure 2: Source of information regarding CC.

Participants heard about CC were asked about the risk factors of CC (n=2804).

Table 2: Screening status of participant.

Screening status (VIA)	N	Percentage (%)
Yes	140	5.8
No	2271	94.2

Target age of VIA test in Bangladesh is 30 years.¹⁷ Number of female participants above the age 30 is 2411.

Table 3: Frequency of different knowledge about CC, VIA test, HPV, HPV vaccine and willingness to HPV vaccination to female family members.

Variables	N	Percentage (%)
Ever heard about CC (n=3022)		
Yes	2804	92.8
No	218	7.2
Whether know CC is preventable (n=2804)*		
Yes	2428	86.6
No	243	8.7
Don't know	133	4.7
If aware of vaccine can prevent CC (n=2804)*		
Yes	2766	98.6
No	38	1.4
Whether know about VIA test (n=2804)*		
Yes	2370	84.5
No	434	15.5
Ever heard of a virus name HPV (n=2804)*		
Yes	39	1.3
No	2765	98.7
Interested in giving the HPV vaccine to female member of family (3022)		
Yes	2933	97.1
No	89	2.9

*Number of participants is different as not all participant were asked every question.

Table 4: Association of the different parameters creating interest in vaccination to the female family members.

Different parameter	Interested in giving vaccine to other female member of family		P value
	Yes, (n=2933)	No, (n=89)	
Age, (In years) (n=3022)			
20-29	43 1(14.7)	12 (13.5)	0.146
30-40	1859 (63.4)	57 (64)	
41-50	562 (19.2)	14 (15.7)	
51-60	81 (2.8)	6 (6.7)	
Respondents, (n=3022)			
Male	193 (6.6)	5 (5.6%)	0.718
Female	2740 (93.4)	84 (94.4)	
Educational qualification, (n=3022)			
No formal education	276 (9.4)	11 (12.4)	0.425
Primary	1553 (52.9)	42 (47.2)	
SSC	667 (22.7)	25 (28.1)	
≥HSC	437 (14.9)	11 (12.4)	
Monthly family income (BDT), (n=3022)			
Low income: BDT <6821.16	918 (31.3)	30 (33.7)	0.910
Lower middle income: BDT (6827.75-26851.98)	1586 (54.1)	48 (53.9)	
Upper middle income: BDT (26858.64-83018.21)	365 (12.4)	9 (10.1)	
High income: BDT ≥ 83024.87	64 (2.2)	2 (2.2)	
Heard of CC, (n=3022)			
Yes	2720 (92.7)	84 (94.4)	0.555
No	213 (7.3)	5 (5.6)	
Know about VIA test, (n=2804)*			
Yes	2116 (77.8)	80 (95.2)	0.001
No	604 (22.2)	4 (4.8)	
CC is preventable (n=2804)*			
Do not know	125 (4.6)	0 (00)	0.001
Yes	2214 (81.4)	27 (32.1)	
No	381 (14.0)	57 (67.9)	
Ever heard of a virus name HPV (n=2804)*			
Yes	36 (1.3)	0 (00)	0.056
No	2684 (98.7)	84 (100)	
Vaccine can prevent CC (n=2804)*			
Yes	2514 (92.4)	58 (69.0)	0.001
No	206 (7.6)	26 (31.0)	

*Number of participants is different as not all participant were asked every question.

Table 5: Affordability (Taka) for the vaccine.

Affordability (Taka)	N	Percentage (%)
Free of cost	1319	45.0
1-100	1107	37.7
101-500	412	14.0
>500	95	3.2

The 2933 participant who interested in giving vaccine were asked about their expected price of HPV vaccine, (n=2933).

DISCUSSION

The world health organization (WHO) has recognized CC as a significant public health issue.^{6,7} Bangladesh is currently encountering difficulties in developing effective cancer prevention initiatives, particularly for CC. However, it's important to note that CC can largely be prevented. The key approach to primary prevention lies in administering HPV vaccinations, mainly by implementing the national HPV vaccination program under the expanded programme of immunization (EPI). The level of health awareness within the nation can be assessed by observing the understanding of CC, HPV, and the significance of primary prevention through vaccination.

In our research, we discovered that a significant majority of participants (92%) demonstrated awareness of CC. Similar observations were made in a population-based, cross-sectional survey conducted by Islam et al in Bangladesh (90%)¹⁸ and in Northern India (87.3%).¹⁹ However, the level of awareness was comparatively lower in Nepal (53.3%).²⁰ This difference in awareness could possibly be attributed to the absence of adequate health education programs focused on CC, which is a common issue in many developing countries. On the other hand, a recent study conducted in Chennai, India, involving 318 healthcare professionals, revealed a high level of knowledge about CC, with 90.6% of them being well-informed.²¹

Despite a limited understanding of HPV (1.3%), a vast majority of participants (97.8%) expressed a strong interest in getting the HPV vaccine for their female family members to protect them from cancer. This indicates a positive and encouraging attitude towards HPV vaccination in the region. Interestingly, the study found that gender, age groups, and socioeconomic conditions did not significantly impact vaccine acceptance. Similar observations were made by Islam et al who also reported that knowledge about HPV was not related to gender, age groups, educational level, occupation, or socioeconomic status.¹⁸

The study revealed that positive attitudes towards HPV vaccination were associated with knowledge about CC prevention, prevention through VIA test, and the HPV vaccine itself. Therefore, it is crucial to impart effective knowledge to parents to target the population aged 9-15

years for HPV vaccination. To achieve this, the government of Bangladesh (GOB) should take proactive steps to improve community motivation and encourage their participation in the vaccination program. A study in the USA by Malo et al also emphasized the role of motivational messages in convincing parents to vaccinate their children against HPV.²² Kolek et al conducted a study in Kenya to examine the impact of parental knowledge and beliefs on the HPV vaccine.²³ The study revealed that positive beliefs and knowledge about the vaccine were associated with a higher likelihood of parents being willing to vaccinate their children. Conversely, lower levels of parental education and younger maternal age were associated with a lower willingness to vaccinate. However, there is limited available data on the knowledge and awareness of CC, HPV, and HPV vaccination among parents in Bangladesh. It's worth noting that there has been a significant time gap since the HPV vaccine was piloted in Bangladesh by the ministry of health and family welfare, with support from the global alliance for vaccines and immunizations (GAVI).¹³

In this study, the researchers also investigated the risk factors associated with CC among the participants. They identified several factors that were perceived as potential risks, including early marriage, multiple childbirths, having many sexual partners, low socioeconomic status, and lack of personal hygiene. Interestingly, a study conducted in India by Singh et al.²⁴ described similar risk factors among their study population, including early marriage (9%), multiparity (12%), frequent childbirths (11%), multiple sexual partners (6%), HPV infection (15%), and reproductive tract infections (12%).

Moreover, a study conducted in Africa by Mengesha et al reported that participants in that region considered sexually transmitted diseases as a major risk factor for CC.²⁵ These findings highlight the importance of understanding and addressing these risk factors in the context of CC prevention and control efforts.

In this study, the majority of participants received information about CC and the HPV vaccine from personal sources such as family, friends, relatives, and neighbors. Media had a relatively limited role (11.4%) in raising awareness. This trend of poor media involvement in promoting CC awareness is not unique to this study but has been observed in other South Asian regions like Bangladesh, India, and South Africa as well.²¹⁻²⁷

Another study conducted in rural areas of Bangladesh found that cable line advertisements (25.5%), microphone announcements (21.4%), and discussion sessions (20.4%) were effective in creating awareness about VIA as a method for CC screening. Television was mentioned as the most effective method (37.4%) for general awareness creation.²⁸ However, in North Korea, healthcare providers were the main source of information (69%) about the CC.²⁹

The varying roles of media in different countries and the discrepancy in awareness creation methods can be attributed to differences in health service infrastructure and government attitudes towards promoting healthcare. The findings of this study offer valuable insights into the common sources of knowledge utilized by Bangladeshi women for health-related information, particularly about CC and the HPV vaccine, highlighting areas for further development. Media has the potential to play a vital and crucial role in raising awareness about the prevention of CC, and it is recommended that the government utilize media to reach a broader population and improve awareness levels.

The cost of the HPV vaccine plays a crucial role in the successful implementation of an HPV vaccination program. Bangladesh has achieved remarkable success in its expanded immunization program (EPI), which has provided free vaccination coverage to more than 90% of the population against eleven diseases.³⁰ Australia has been offering the HPV vaccine free of cost to all school-going children aged 12-13 years through the national HPV vaccination program since 2007. This initiative led to a vaccination coverage of 79% among females and 77% among males in aboriginal and Torres Strait Island, Australia, resulting in a 100% reduction of genital warts and 70-80% reduction of CC.³¹ Wijayanti and colleagues found that in the ASEAN member-countries, parents showed a strong inclination towards accepting and receiving the HPV vaccine when it was provided at no cost, despite their limited understanding of CC and the HPV.³²

The current study conducted in Bangladesh has shed light on the perceptions of the Bangladeshi population regarding the price of the HPV vaccine. A significant number of participants (45%) expressed the desire for the vaccine to be provided free of cost, while others mentioned the preference for low prices. Ensuring an appropriately low-priced HPV vaccine would enable more people to have the opportunity to avail of HPV vaccination, ultimately contributing to higher vaccination rates and improved protection against CC.

Since 2005, VIA has been the primary screening method used in Bangladesh to detect CC, focusing on females between 30 and 60 years of age.¹⁷ Despite a relatively high level of awareness about CC screening using VIA (79.9%), only a small proportion of the study population has actually undergone the screening (5.8%). Over the years, the screening coverage has shown slow improvement, as Islam et al reported a screening coverage of 3.8% in 2011.¹⁸ However, the CC screening coverage in the last 5 years has increased to about 11.5% of the target population.³³

Several factors may be contributing to the low practice of CC screening tests, including education, employment status, place of residence, income level, and the availability of opportunistic CC screening.^{27,35} These

factors seem to play a role in the utilization of screening services and need to be addressed to improve screening rates and ensure early detection of CC cases.

However, it's encouraging that the government of Bangladesh (GOB) is planning to incorporate the HPV vaccine into the expanded immunization program (EPI), which could enhance accessibility and coverage. To ensure successful HPV vaccination and screening programs for preventing CC, media outlets should play a crucial role in distributing information about CC screening and its prevention to the public.

Moreover, efforts should be made to establish effective coordination among all stakeholders, including physicians, other health professionals, and the community. A collaborative approach will promote cancer prevention education and help maintain affordable access to the HPV vaccine for the population, ultimately contributing to the reduction of CC cases in the country.

This study population was limited to urban areas, so attention should be exercised in generalizing the findings to the entire country's population. Additionally, the study questionnaire might not cover all aspects of CC, HPV, and its prevention, which could limit the depth of understanding gained from the study.

CONCLUSION

The majority of participants demonstrated awareness of CC, prevention methods, and VIA tests. However, despite having information about CC and VIA tests, only a small number of women actually underwent VIA tests. Interestingly, parents who possessed information about CC prevention (VIA, HPV) showed more interest in getting their children vaccinated against HPV. The government should prioritize the role of media in promoting CC awareness. Providing vaccines free of cost or at a reasonably low price is crucial to encourage widespread vaccination. It is essential to disseminate cancer preventive knowledge across all aspects of the healthcare system to ensure that more people understand the importance of CC screening and HPV vaccination. This comprehensive approach can significantly enhance awareness and participation in preventive measures, ultimately contributing to the reduction of CC cases.

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