

RESEARCH ARTICLE

Knowledge, attitude and practice on cervical cancer screening and human papillomavirus vaccination among adolescent girls residing in a slum of Kolkata



Adwitiya Das¹ | Suhena Sarkar² | Harsh Nawal³ | Debopam Sil⁴ | Sakshi Mohta⁵ | Ankush Banerjee⁶

¹Department of Community Medicine, Diamond Harbour Medical College and Hospital, Diamond Harbour, West Bengal, India

²Department of Pharmacology, Medical College and Hospital, Kolkata, India

³Final year student, Bachelor of Medicine and Bachelor of Surgery, Medical College and Hospital, Kolkata, India

⁴Department of Obstetrics and Gynaecology, Medical College and Hospital, Kolkata, India

⁵Third year student, Bachelor of Medicine and Bachelor of Surgery, Medical College and Hospital, Kolkata, India

⁶Department of Community Medicine, Medical College, Kolkata, India

Abstract

Background: Cervical cancer has emerged as an important public health concern among Indian women as it contributes to significant mortality. Early diagnosis and its prevention are thus of vital importance in the current scenario. This study assessed the knowledge, attitude and practice regarding screening and human papillomavirus vaccination among adolescent girls in a slum area of Kolkata.

Methods: This cross-sectional study was conducted among 227 adolescent girls (aged 14–19 years) at Arpuli Lane, Kolkata. A pre-designed questionnaire was used for data collection. Chi-square test and binary logistic regression analysis were done to findout the factors associated with knowledge, attitude and practice.

Results: Approximately 91% had inadequate knowledge regarding the prevention of cervical cancer, 47% had an unfavourable attitude towards the prevention of cervical cancer, and 22% had undergone a Pap smear examination/HPV test, while only 13% had received HPV vaccination. The educational status of the participants and their mothers was significantly associated with knowledge, attitude and practice regarding cervical cancer screening and HPV vaccination.

Conclusion: Appropriate behaviour change communications should be initiated considering the propensity for high-risk behaviour and poor knowledge and attitude. Future studies should reveal the causes of their poor behaviour to ensure timely screening and adequate vaccine coverage.

Key messages

Knowledge, attitude and practice regarding cervical screening and human papillomavirus vaccination among adolescent slum dwellers in Kolkata are poor. Participants' education was found to be associated with such poor knowledge, attitude and behaviour. Appropriate behaviour change communications should be initiated considering the propensity for poor knowledge, unfavourable attitude and high-risk behaviour.

Correspondence

Ankush Banerjee
ankush.banerjee20@gmail.com

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Introduction

Cervical carcinoma, a malignant neoplasm arising from the epithelial cells of the cervix uteri caused by an infectious disease, having a well-known causal relationship with human papillomavirus (HPV) [1]. It is the second most common of all genital malignancies among women, with developing countries contributing to a massive 80% of all cases [2, 3].

The World Health Organization's Cervical Carcinoma Crisis Card, 2013 paints a grim picture: 500,000 women develop cervical carcinoma every year, a further 275,000 succumbing to the disease and a predicted 500,000 more losing their lives to this condition by 2030, with more than 98% of them being from low- to mid-income countries [4]. Such enormous numbers for what is essentially a vaccine-preventable disease clearly show the need for improved vaccine coverage and the proper address of social and logistic barriers to immunisation.

Risk factors for contracting HPV infection and progression of such an infection to malignancy include sexual promiscuity, early coitarche, multiparity, prolonged usage of combined oral contraceptive pills and/or oestrogen-based hormone replacement therapy and tobacco consumption [5, 6]. It remains asymptomatic or presents with non-specific symptoms initially, eventually progressing to features such as unexplained weight loss, intermenstrual bleeding, post-coital bleeding, post-menopausal bleeding and persistent pelvic pain [7].

Owing, perhaps, to various psychosocial pressures, adolescent girls of slum communities tend to fall victim to multiple of the aforementioned risk factors, thus potentially forming a significant pool of future cervical carcinoma patients in the city. With the ever-increasing emphasis given on early immunisation against HPV, and considering the limited resources of a country like India, vaccination of high-risk populations, such as slum-dwelling adolescent females, is of tantamount importance.

For maximising the efficacy and acceptability of HPV immunisation, it is important to have prior knowledge about the understanding of carcinoma cervix among the recipients, their attitude towards the disease and their stance about vaccination and screening for the same. Thus, a knowledge-attitude-practice study regarding cervical carcinoma among slum-dwelling adolescent girls is essential, and coincidentally, no similar studies were found to have been conducted in a Kolkata-based slum.

This study was done to assess the knowledge, attitude and practice of participants regarding the prevention, screening and treatment of cervical cancer and assess any association between sociodemographic characteristics and the knowledge, attitude and practice of the participants

Methods

A cross-sectional study was done among 227 adolescent girls (14–19 years) residing for more than 6 months in the slum area of Arpuli Lane, Kolkata from March to April 2024. Arpuli Lane comes under the purview of the urban field practice area of the

Medical College, Kolkata, where essential health services are provided. Adolescent girls who could not be contacted even after three attempts on three separate days during non-school hours were excluded from the study.

Sampling

A list of adolescent girls aged 14–19 years residing in the study area was collected from the updated family folder registers of the urban health training centre of Medical College, Kolkata. It was found that 389 adolescent girls satisfied the inclusion criteria. The minimum sample size was estimated as 227, by considering the prior prevalence of adequate knowledge regarding cervical screening among women in Mangalore city, Karnataka, India, as 18% from a study by Kumar *et al.* [8]. Epi Info™, version 4.0 was used for sample size calculation.

Data collection

A pretested semi-structured questionnaire comprised four sections, i.e., (1) sociodemographic details of the participants; (2) 16 questions focussing on the subjects' assessment of the knowledge component. Responses could be either 'Yes' or 'No', in which the maximum total scores ranged between 0 to 16. A cut-off score of 8 (50% of the maximum attainable score) was taken for adequate knowledge; (3) 10 questions focussing on the assessment of the attitude component of subjects. Responses ranged between 'strongly agree', 'agree', 'neutral', 'disagree', and 'strongly disagree' in a 4-point Likert scale. The total scores in this section ranged from 10 to 50, and 30 (50% of the score range) was taken as the cut-off for a favourable attitude; and (4) 2 questions focussing on assessing the practice component of subjects whose responses were dichotomous: either 'Yes' or 'No'.

One-on-one 10-interviews were done. Variables were selected from an extensive literature review, and correct responses were coded from the existing national-level guidelines. The demographic variables were age in completed years, level of education indicated by school enrolment, and last class passed, which was then classified as illiterate, primary (Class 4 passed), middle school (class 8 passed) and secondary level of education. Other variables included religion (Hinduism, Islam, Christianity and others) and educational level and occupation of both their parents.

The tool was pretested on 20 adolescent girls who were excluded from the study. The Cronbach's alpha for internal consistency was 0.73. Test-retest reliability was around 70%. Semantic equivalence was assessed by a team consisting of an epidemiologist, a communication and linguistic expert and a psychologist. The tool was translated from its original English version to Bangla and Hindi and back-translated to English to check for semantic and statistical invariance.

Statistical analysis

Data were analysed using Microsoft Excel 2019 and SPSS software, version 23. Data were described using number and percent. Univariate and multivariable binary logistic regression analysis was done to estimate the unadjusted and adjusted odds ratios

Table 1 Knowledge level on cervical cancer screening and human papillomavirus among adolescent girls (n=227)

Knowledge questions	No, n (%)
Is human papillomavirus infection a risk factor for cervical carcinoma?	178 (78.5)
Is having multiple sexual partners a risk factor for cervical carcinoma?	178 (78.5)
Is having sex at an early age a risk factor for cervical carcinoma?	167 (73.8)
Do genital infections increase the risk of cervical cancer?	169 (74.6)
Is smoking a risk factor for cervical carcinoma?	119 (52.3)
Does having children at an early age increase the risk of cervical carcinoma?	190 (83.8)
Does the HPV virus cause cancers in other body parts?	169 (74.6)
Is foul-smelling vaginal discharge a symptom of cervical carcinoma?	162 (71.5)
Is postcoital bleeding a symptom of cervical carcinoma?	169 (74.6)
Is postmenopausal bleeding (PMB)/intermenstrual/ irregular bleeding a symptom of cervical carcinoma?	199 (87.7)
Can cervical cancer be symptomless in its early stages?	185 (81.5)
Are you aware of the screening methods for cervical cancer? Can you name one?	169 (74.6)
Is it possible to detect cervical cancer in the pre-cancer stage with routine screening?	194 (85.4)
Are you aware cervical carcinoma, if detected early, is treatable?	143 (63.1)
Do you know that it is preventable with a vaccine against HPV?	197 (86.9)
Do you know the government is going to promote vaccination against HPV?	140 (61.5)

(95% confidence intervals) for determining the factors associated with the knowledge and attitude of the study participants. A chi-square test was done to find the associates of practice regarding cervical cancer screening and HPV vaccination.

Results

Among 227 participants, the mean (standard deviation) age was 16.7 years, and 80.8% of participants were Hindus. Twelve (5.3%) participants were illiterate, and 75 (54.6%) participants had education up to the primary level. While considering the education level of the mothers, 48 (34.6%) were illiterate, and 95 (28.5%) had an education level up to the primary level. The median (interquartile range) number of siblings was 3 (2–4). Sixty percent of the mothers were homemakers, and 72.3% of the fathers of the study participants were unskilled workers.

Table 2 Attitude regarding prevention of cervical cancer among the study participants (n=227)

Attitudes	Strongly disagree n (%)	Disagree n (%)	Neutral n (%)	Agree n (%)	Strongly agree n (%)
Cervical cancer is a common cancer in women in India	28 (12.3)	59 (26.2)	38 (16.2)	52 (23.1)	50 (22.3)
Any adult woman could develop cervical cancer during her lifetime	24 (10.8)	67 (29.2)	50 (22.3)	63 (27.7)	23 (10.0)
All women aged 30–65 years should undergo cervical screening	33 (14.6)	43 (19.2)	70 (30.8)	65 (28.5)	16 (6.9)
Screening can help in early detection of cancer cervix	30 (13.1)	56 (24.6)	47 (20.8)	78 (34.6)	16 (6.9)
Would you go for cervical cancer screening if available free of cost?	24 (10.8)	72 (31.5)	42 (18.5)	63 (27.7)	26 (11.5)
Would you like to go for a cervical cancer screening if it would cause no harm?	38 (16.9)	66 (29.2)	43 (18.5)	59 (26.2)	21 (9.2)
Would you like to go for HPV vaccination after knowing its role in the prevention of cervical carcinoma?	26 (11.5)	56 (24.6)	45 (20.0)	70 (30.8)	30 (13.1)
Would you go for an HPV vaccination if it is available free of cost?	26 (11.5)	63 (27.7)	63 (27.7)	51 (22.3)	24 (10.8)
Would you like to go for an HPV vaccination if it causes no harm?	33 (14.6)	77 (33.8)	54 (23.8)	44 (19.2)	19 (8.5)
All women need an HPV vaccine	30 (13.1)	47 (20.8)	56 (24.6)	61 (26.9)	33 (14.6)

Knowledge, attitude and practice on cervical cancer screening and HPV vaccination

Approximately 90.8% had inadequate knowledge regarding the prevention of cervical cancer (Table 1). Nearly half (47.0%) had unfavourable attitudes towards preventing cervical cancer (Table 2). Out of 227 study participants, only 51 (22.3%) have undergone a Pap smear examination/HPV test, while only 29 (12.8%) have received HPV vaccination.

Factors associated with knowledge, attitude and practice regarding cervical cancer screening and HPV vaccination

Multivariable binary logistic regression analysis showed that the primary and below educational status had higher odds (aOR 2.2; 95% CI 1.8–2.7) of having inadequate knowledge compared to those with higher levels of education (Table 3). While considering attitude, again, the educational status of primary and below showed higher chances of having an unfavourable attitude towards cervical cancer screening (aOR 2.0; 95% CI 1.8–4.3) (Table 4). Both the multivariable models fit well (Hosmer-lemeshow test $P>0.05$). While analysing factors regarding practice for prevention and early diagnosis of cervical cancer, it was found that the educational status of both the participant as well as their mothers had a significant association with undergoing screening for cervical cancer through Pap smear examination (Table 5). None of the sociodemographic variables were associated with HPV vaccination (Table 6).

Discussion

The key takeaways from this study may be summarised as follows: i) a vast majority of the subjects had inadequate knowledge regarding the causes, symptoms and preventive measures for carcinoma cervix; ii) nearly half of them have unfavourable attitudes towards prevention of the disease, and iii) Level of education of the subjects and their mothers have essential bearings on the knowledge and attitude regarding cervical cancer, as well as the likelihood of the subject undergoing a Pap smear examination.

Table 3 Factors associated with inadequate knowledge among the study participants: Univariate and multivariable binary logistic regression analysis (n=227)

Variables	Unadjusted odds ratio (95% CI) ^a	Adjusted odds ratio (95% CI) ^a
Decreasing age	1.1 (1.0–1.2)	1.1 (1.0–1.2)
Religion		
Hindu	1.2 (0.9–2.4)	
Others	Ref	
Educational status		
Primary and below	2.4 (2.0–3.5)	2.2 (1.8–2.7)
Above primary	Ref	Ref
Educational status of mother		
Primary and above	1.5 (0.8–2.4)	
Below primary	Ref	
Occupation of mother		
Homemakers	1.3 (0.9–2.0)	
Others	Ref	
Occupation of father		
Unskilled	1.2 (1.1–2.2)	1.0 (0.9–1.6)
Semi-skilled/ unskilled	Ref	Ref

^aCI indicates confidence interval

These findings are consistent with those of a study done on reproductive age-group females in an urban slum of Karnataka by Bathija *et al.* [9]. The current adolescent female age group will form a major portion of the reproductive age group for approximately the next 3 decades, contributing significantly to the cervical carcinoma incidence rate of 22 per 100,000 woman years [10]. This, coupled with the fact that nearly one-third of Kolkata's population resides in slums, could lead to a significant burden on the healthcare system, as well as psychosocial and economic turmoil for the families of those affected [11, 12]. Therefore, targeting the preventive measures towards the main future beneficiaries, adolescent females, is essential in controlling the disease.

Table 4 Factors associated with unfavourable attitude among the study participants: Binary logistic regression analysis (n=227)

Variables	Unadjusted odds ratio (95% CI) ^a	Adjusted odds ratio (95% CI) ^a
Decreasing age	0.9 (0.7–1.2)	
Religion		
Hindu	1.3 (1.0–1.8)	
Others	Ref	
Educational status		1.98 (1.8–4.3)
Primary and below	2.7 (2.2–5.3)	
Above primary	Ref	Ref
Educational status of mother		
Primary and above	1.4 (1.0–2.4)	
Below primary	Ref	
Occupation of mother		
Homemakers	1.0 (0.7–1.4)	
Others	Ref	
Occupation of father		1.2 (0.9–1.8)
Unskilled	1.6 (1.1–2.4)	
Semi-skilled/ unskilled	Ref	Ref

^aCI indicates confidence interval

The target population's baseline knowledge and pre-conceived notions are key considerations for optimal acceptance of any preventive intervention. Cervical carcinoma is a stigmatised issue in various conservative sections of society, thereby compounding the, perhaps expected, lack of knowledge among young slum-dwellers by an unfavourable attitude towards various aspects of the disease [13].

This study demonstrates the association between the level of schooling and knowledge and favourable attitudes among the subjects, highlighting the necessity of secondary and higher education among girls in improving the overall health outlook of the nation. This is especially important here because 60% of the subjects are illiterate or have completed primary schooling. A holistic approach to reproductive health education, along with basic instructions for self-detection of reproductive tract infections (including HPV infections) may be adopted in schools [14]. Paying attention to maternal educational level might contribute to better screening.

A closer look into the answers to the questionnaire revealed a profound ignorance about the spread, symptoms, treatment options and preventive strategies. Religion and the father's occupation were not found to be as strongly associated as the education of the subjects.

Table 5 Association of practice regarding Pap smear examination with selected socio-demographic variables (n=227)

Variables	Undergone Pap smear examination		P
	Yes, n (%)	No, n (%)	
Education level of adolescent			
Primary and below (n=136)	20 (14.7)	116 (85.3)	<0.01
Above primary (n=91)	31 (34.1)	60 (65.9)	
Education of mother of adolescent			
Illiterate (n=78)	7 (8.9)	71 (91.1)	<0.01
Primary school (n=66)	6 (8.1)	60 (91.9)	
Middle school (n=73)	31 (42.9)	42 (57.1)	
High School (n=10)	7 (66.7)	3 (33.3)	
Occupation of mother			
Homemakers (n=136)	25 (17.9)	111 (82.1)	0.21
Unskilled (n=51)	16 (31.0)	35 (69.0)	
Semi-skilled (n=38)	9 (22.7)	29 (77.3)	
Skilled (n=2)	1 (50.0)	1 (50.0)	
Occupation of father			
Unskilled (n=164)	37 (22.3)	127 (77.7)	0.63
Semi-skilled (n=61)	13 (21.3)	48 (80.0)	
Skilled (n=2)	1 (50.0)	1 (50.0)	
Religion			
Hinduism (n=183)	42 (22.9)	141 (77.1)	0.80
Islam (n=37)	7 (19.0)	30 (81.0)	
Christian (n=7)	2 (25.0)	5 (75.0)	

Among the subjects in middle and high school, only 15.4% had received HPV vaccination, which falls way short of the coverage rates recommended by the WHO for low to middle-income countries [15]. Along with lack of knowledge and unfavourable attitude, hesitancy among physicians in routine recommendation, coupled with logistic barriers, acts as possible deterrents from achieving a desirable rate of HPV prophylaxis [16].

Table 6 Association of practice regarding human papilloma-virus vaccination with selected socio-demographic variables (n=227)

Variables	Received HPV vaccination		P
	Yes, n(%)	No, n (%)	
Education level of adolescent			
Illiterate (n=12)	1 (8.3)	11 (91.6)	0.80
Primary School (n=124)	14 (11.6)	110 (88.4)	
Middle school (n=58)	9 (15.2)	49 (84.8)	
High School (n=33)	5 (15.8)	28 (84.2)	
Education of mother of adolescent			
Illiterate (n=78)	9 (11.5)	69 (88.5)	0.15
Primary school (n=66)	5 (7.6)	61 (92.4)	
Middle school (n=73)	12 (16.4)	61 (83.6)	
High school (n=10)	3 (30.0)	7 (70.0)	
Occupation of mother			
Homemakers (n=136)	12 (8.8)	124 (91.2)	0.06
Unskilled (n=51)	8 (15.7)	43 (84.3)	
Semi-skilled (n=38)	8 (21.0)	30 (79.0)	
Skilled (n=2)	1 (50.0)	1 (50.0)	
Occupation of father			
Unskilled (n=164)	18 (10.9)	146 (89.1)	0.16
Semi-skilled (n=61)	10 (16.4)	51 (85.6)	
Skilled (n=2)	1 (50.0)	1 (50.0)	
Religion			
Hinduism (n=183)	23 (12.6)	160 (87.4)	0.42
Islam (n=37)	4 (10.8)	33 (89.2)	
Christian (n=7)	2 (28.6)	5 (71.4)	

Inculcating basic knowledge about the mode of transmission, risk factors and symptoms of HPV infection at an early level, as well as behaviour change communication, targeted both at the adolescent females and their mothers, is essential in improving both the knowledge and the attitude of the slum-dwelling population [17]. In particular, discussions about the safety and efficacy of HPV vaccines may help mitigate pre-conceived prejudices and misplaced concerns about prophylaxis, especially seeing that 78.2% of the respondents either outright refused or were unsure about getting vaccinated even if the vaccination causes no harm. Outreach programmes to the slums may also prove to be beneficial. Additional studies should be conducted regarding the logistic barriers, and steps should be taken accordingly to address them.

Taking into account the annual expenditure for HPV vaccination and cervical carcinoma treatment, prophylaxis among adolescents has been demonstrated to be a very cost-effective strategy [18]. Slum-dwelling adolescents are more likely to indulge in unsafe sexual practices and tobacco addiction, both of which are well-known risk factors for carcinoma cervix [19]. Coupled with poor health-seeking behaviour, the burden of HPV infection is, therefore, relatively high, with a large number of cases probably lying undetected. Early detection of cervical neoplasms is a key aspect of their management, hence the importance of detecting and protecting the undiagnosed cases. A study among adolescent slum-dwellers by Jain and Mohan shows that they are eager to know about safe sexual practices, perhaps earmarking the subjects as potential subjects of successful educational campaigns [20].

Conclusion

Education of the slum-dwelling girls could be instrumental to the cervical cancer prevention. Considering the economic implications, propensity for high-risk behaviour, slum-dwelling adolescents are ideal candidates for behaviour change communication. A knowledge, attitude, and practices study is essential to determine the knowledge and perceptions of HPV infections, cervical carcinoma and preventive measures at periodic intervals. Addressing the subjects' concerns and dispelling any misgivings and prejudices is essential for ensuring adequate vaccine coverage which will ultimately contribute to a healthy female population in the years to come.

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Author contributions

Conception or design of the work; or the acquisition, analysis, or interpretation of data for the work: AD, SS, AB, HN. *Drafting the work or reviewing it critically for important intellectual content:* AD, SS, AB, HN, DS, SM. *Final approval of the version to be published:* AD, SS, HN, DS, SM, AB. *Accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved:* AD, SS, AB.

Conflict of interest

We do not have any conflict of interest.

Data availability statement

We confirm that the data supporting the findings of the study will be shared upon reasonable request.

Supplementary file

None

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