



## A Study on Knowledge, Screening, and Associated Risk Factors for Cervical Cancer among Women in Eastern Uttar Pradesh, India

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### ABSTRACT

Cervical cancer is a prevalent condition affecting women in India, yet only a mere 3% undergo regular screenings. Late-stage diagnoses often result in unfavorable outcomes, underscoring the importance of early detection through screening. Women's inclination to seek cervical cancer screening is influenced by their awareness and attitudes towards the disease. Community health workers play a vital role in motivating women to partake in screening, as outlined in India's cancer screening implementation strategy. This study sought to evaluate women's knowledge and attitudes towards cervical cancer and screening in Eastern Uttar Pradesh. A descriptive cross-sectional study assessed the socio-demographic profile, Knowledge, Attitude, and Practice (KAP) of community health workers regarding cervical cancer and screening. Scoring was employed to gauge awareness and attitudes towards cervical cancer screening. Descriptive statistics, including mean, standard deviation, frequency, and proportion, were used for data analysis. The Chi-square test determined the factors influencing knowledge and screening practices ( $p < 0.05$ ). Results indicated that despite possessing adequate knowledge and perception of cervical cancer and screening, less than 10% of participants had undergone screening. Notably, a significant association was observed between knowledge level and screening practice. The study concluded that bridging the gap between perception and practice necessitates the implementation of educational programs and active participation in screening campaigns. In summary, enhancing awareness and cultivating positive attitudes towards cervical cancer screening among women in Eastern Uttar Pradesh are pivotal for early detection and improved prognosis. Community health workers hold a crucial role in motivating women, and the introduction of educational initiatives is vital to bridge the disparity between perception and practice in cervical cancer screening.

**Keywords:** KAP, Attitude, Awareness, Cancer screening, Prevention

## INTRODUCTION

Cervical Cancer (CC), a type of Gynaecological Cancer (GC), is the second leading cause of death among women aged 15 years to 44 years, following heart disease, globally [1]. This presents a significant burden on societies worldwide [1,2]. Unfortunately, a large number of women, particularly those in rural areas, do not undergo CC screening, resulting in approximately half a million new cases of invasive cervical cancer each year [3]. It is worth noting that more than 80% of these cases occur in developing countries, especially Low-income countries and Middle-Income Countries (LMICs) [2]. However, in affluent nations, there has been a notable decline in cervical cancer mortality due to early detection [3-6]. In India alone, recent data reports 96,922 new cases of cervical cancer and 60,078 deaths attributed to CC [3]. In Uttar Pradesh, the annual screening of cervical cancer cases reaches 18,600, accounting for 15% of all reported cases in India [4]. Tragically, this pace of progress results in the loss of 28 lives every day in Uttar Pradesh alone, potentially surpassing the number of deaths due to CC globally, where approximately 604,127 new cases and 341,831 deaths occur annually [5].

India has the highest age-standardized incidence of Cervical Cancer (CC) and accounts for about 10% of all cancer deaths in the country [6]. The average 5-year survival rate after diagnosis is 48.7% [7]. Cervical cancer is considered one of the most preventable cancers due to its slow progression, identifiable lesions through cytology, and the availability of effective therapies [8]. Recent research has provided a better understanding of the viral causes of cervical cancer [9-11].

Socioeconomic and epidemiological factors significantly contribute to the increased incidence, mortality, and survival rate of cervical cancer [12-15]. In addition, genetic variables, including infections with high-risk types of Human Papillomavirus (HPV), play a role in the development of cervical cancer [16,17]. HPV is the most common sexually transmitted virus globally [18], and is associated with cervical cancer along with other risk factors such as sexual behaviors, reproductive variables, sexually transmitted infections, smoking, and high parity [19]. However, in Uttar Pradesh, India, three key factors contribute to the high incidence rate: low access to screening [13], non-implementation of prevention programs [15], and ineffective and inadequate treatment, along with poor sanitary conditions [16]. To prevent cervical cancer, HPV testing (as a screening approach) and vaccines have been developed [19]. These measures aim to help in the prevention of cervical cancer.

As available reports, only three-fourths of females who are suffering from CC are diagnosed in advanced stages leading to poor prospects of long-term survival and cure [20]; however, early detection and screening of CC can be done through "Pap smear tests" [21]. In India, the Pap Smear Testing (PST) rate-range from 68% to 84%, whereas the rates range from 2.6% to 6.9% among women in communities [21]. Several studies showed that the annual incidence and prevalence of CC have decreased by 50% to 70% in many developed countries the after the introduction of population-based screening through PST [22]. Although screening with visual inspection with acetic acid reduces mortality due to cervical cancer in developing countries [20,21]. In India, a cervical cancer diagnosis is commonly based on opportunistic screening or post-symptom development [21].

According to available reports, only three-fourths of females suffering from cervical cancer are diagnosed in advanced stages, resulting in poor long-term survival and cure prospects [20]. However, early detection and screening of cervical cancer can be achieved through "Pap smear tests" [21]. In India, the rate of Pap Smear Testing (PST) ranges from 68% to 84%, while the rates among women in communities range from 2.6% to 6.9% [21]. Several studies have shown that the introduction of population-based screening through PST has led to a 50% to 70% decrease in the annual incidence and prevalence of cervical cancer in many developed countries [22]. Although screening with visual inspection using acetic acid reduces mortality from cervical cancer in developing countries [20,21], in India, cervical cancer diagnosis is commonly based on opportunistic screening or post-symptom development [23-28].

Screening for cervical cancer is crucial because women often do not experience symptoms until the disease has advanced. Therefore, early detection and screening of cervical cancer are essential to reduce mortality and morbidity in India, particularly in eastern Uttar Pradesh. The following implementation strategies would have a broad impact on screening and detection, ultimately leading to a decrease in the incidence of cervical cancer:

- Raise awareness of cervical cancer through wellness camps in rural and urban areas.
- Enhance the role of healthcare personnel in hospitals, ensuring they provide information about cervical cancer.
- Improve accessibility to facilities and increase knowledge about available screening facilities.

Consequently, this study aimed to assess the Knowledge, Attitude, and Practice (KAP), towards cervical cancer, as well as its screening and prevention, among women aged 16 years and above in eastern Uttar Pradesh. The study also aimed to raise awareness about cervical cancer and the available facilities, providing information from reliable sources and highlighting the role of healthcare experts.

Following data collection, the women were informed about cervical cancer, its screening procedures, and the hospital screening facilities. They were also provided with a hand-out in their preferred local language.

A baseline cross-sectional quantitative survey was conducted at Sir Sunderlal Hospital, the largest tertiary referral hospital affiliated with Banaras Hindu University's Institute of Medical Sciences, from July 2019 to December 2019 [29]. The hospital is located on the BHU campus and serves patients from Varanasi, other cities, and neighbouring rural areas. The study protocol was approved by the Institutional Ethical Committee. The study recruited women attending the OPDs of medicine, physician, and obstetrics and gynaecology who consented to participate and met the inclusion criteria of being between 30 years to 59 years old.

The sample size for this study was 97 subjects, calculated based on a prior study that found the population proportion to be around 50% [29]. A power of 95% and a minor error of 10% were maintained in determining the sample size.

The sampling process was non-random and included women in the order of their compliance with the study requirements. The study utilized a semi-structured questionnaire, which was validated by the department head and researcher director of the Department of Advanced Centre for Traditional and Genomic Medicine and Obstetrics. The questionnaire, available in both English and Hindi, collected information on socio-demographic variables such as age, occupation, and income. It also assessed the participants' Knowledge, Attitudes, and Practices (KAP) towards cervical cancer and its screening, as well as the sources of their knowledge and the role of health experts. Additionally, the questionnaire inquired about any issues or problems encountered during screening.

Each participant spent approximately 30 minutes discussing and providing information for data collection. Women were asked about their awareness of the possibility of uterine cervix cancer to avoid biased information. The interview questions were scored as follows:

- Knowledge about cervical cancer: Assessed if the response to the first screening question ("Have you heard about CC?") was "yes." Two components of knowledge were evaluated: symptoms/manifestations and risk factors for cervical cancer. Each correct response was awarded one point, with a maximum score of nine and a minimum score of zero.
- Awareness about screening: Evaluated using a 12-point scale with 20 knowledge-based questions. The total number of correct answers was converted into a score ranging from 0 to 14. Bloom's cut off points were used to classify knowledge levels, with scores of 11-14 indicating good knowledge, scores of 8-10 indicating moderate knowledge, and scores of 7 and below indicating poor knowledge [12].

The level of knowledge was also graded as follows: less than 4 points indicated poor knowledge, 5-6 points indicated satisfactory knowledge, and 7 points or more indicated good knowledge.

## MATERIAL AND METHODS

### Patients-Information Component

The women were informed about cervical cancer, the value of screening, and the resources available after the data was gathered. A hand-out with explanations and illustrative pictures was given in the language of their choice, and language of their choice, a hand-out with explanations and illustrative pictures was given. Positive and negative results' implications were also discussed.

### Statistical Analysis

SPSS version 19 (SPSS Inc., Chicago III, USA) was used to analyse the data. In the appropriate tables, the proportions of fundamental subject characteristics were expressed. The student's independent 't' test was used to determine the statistical significance of the differences in the mean knowledge scores across demographic categories like education, employment, and age at marriage. Significant was determined to be  $p < 0.05$ .

### RESULTS

The study included a total of 97 women, with the majority (37/97, 38.14%) falling in the age group of 36 years to 40 years. Regarding marital age, 79 out of 97 women (81.44%) reported getting married after the age of 16, while 58 women (59.79%) fell into this category.

It is worth noting that the study consisted of a majority of participants from urban areas, with 61 women (62.8%) residing in urban locations. This suggests that the study may have been conducted in an urban setting. Furthermore, a significant proportion of women (43, 44.32%) had received primary education.

These socio-demographic characteristics provide valuable insights into the study population and can aid in interpreting the study's findings and generalizing them to a broader population (Table 1).

**Table 1 Socio-demographic characteristics of the participants (n=97)**

S.no	Demographic Features	n (%)
1	<b>Age (years)</b>	
	30-35	5 (5.15)
	36-40	37 (38.14)
	41-45	30 (30.92)
	46-50	21 (21.64)
	51-56	04 (4.12)
2	<b>Married</b>	
	Yes	79 (81.44)
	No	18 (18.55)
3	<b>Age at marriage (years)</b>	
	<16	58(59.79)
	>28	21(21.64)
4	<b>Have children</b>	
	Yes	76(78.35)
	No	03(3.09)
5	<b>Number of children</b>	
	0	02(2.06)
	<1	69(71.13)
	>2	26 26.80)
6	<b>Income (Monthly salary)</b>	
	>5000	54(55.67)
	<5000	43(44.32)
7	<b>Occupation</b>	
	Professional	12(12.37)
	Business	16(16.49)

	Housewife	54(55.67)
	Others	15(15.46)
8	<b>Education</b>	
	No-schooling	10(10.30)
	Primary	43(44.32)
	Secondary	28(28.86)
	College	16(16.49)
9	<b>Residence</b>	
	Rural	36(37.11)
	Urban	61(62.88)

### Knowledge towards Cervical Cancer (CC)

The evaluation of participants' knowledge regarding cervical cancer screening was conducted using Bloom's Taxonomy. The findings indicate that more than one-third of the participants had poor knowledge, followed by moderate knowledge, and less than one-fourth exhibited good knowledge, as presented in Table 2.

**Table 2 Knowledge about cervical cancer and its screening among study participants (n=97)**

S.no	Question	No. of Responder	Frequency (%)
1	Have you ever heard about cervical cancer?	Yes-87	89.69
		No-12	12.37
2	<b>Whom did you learn about cervical cancer?</b>		
	Teacher	23	23.71
	Media (News-paper, News)	12	12.37
	Friends, family, relatives,	15	15.46
	Through Awareness programs	18	18.55
	Magazine	16	16.49
	Healthcare experts	13	13.4
3	<b>Do you know about the Sign and Symptoms of CC?</b>		
	Intermenstrual heavy-bleeding	25	25.77
	Foul-smelling discharge	12	12.37
	Postmenopausal bleeding	14	14.43
	Postcoital bleeding	17	17.52
	Excess vaginal discharge Itching in the vagina	42	43.29
	Don't know		
4	<b>What are some risk factors for developing cervical cancer?</b>		
	Bacteria	21	21.64
	Virus	15	15.46
	Parasite	44	45.36
	Fungi	9	9.27
	Don't know	11	11.34
5	<b>Do you have any idea about the Risk factors for cancer of the cervix?</b>		
	Human papilloma virus	15	15.46

	Having multiple sexual partners	18	18.55
	Early age marriage	13	13.4
	Cigarette smoking	17	17.52
	Alcohol drinking	15	15.46
	Early sexual intercourse	5	5.15
	All above mentioned	11	11.34
	Don't know	3	3.09
6	<b>Who should undergo CC screening?</b>		
	Women of >25 years	10	10.3
	Women of <25 years	15	15.46
	Only those women who	18	18.55
	Have any problem	19	19.58
	Married women of any age	13	13.4
	Unmarried women of any age	17	17.52
	Don't know	5	5.15
7	<b>The screen should at which age</b>		
	Before 25 years	39	40.2
	After 25 years	58	59.79
	Don't know		
8	<b>Do you know about the method for screening CC?</b>		
	Papanicolaou smear	21	21.64
	Visual inspection with acetic acid	26	26.8
	Biopsy	12	12.37
	All	24	24.74
	No methods available	14	14.43
	Don't know		

It is important to acknowledge that Bloom's Taxonomy is just one of the assessment frameworks available, and alternative frameworks may yield different outcomes. Moreover, the cut off scores utilized to categorize knowledge levels can vary depending on the specific context and objectives of the study.

### Attitudes Observation

The study survey also examined the attitudes of the subjects towards cervical screening. According to the data provided in Table 3, the majority of subjects displayed a positive attitude towards cervical screening.

**Table 3 Attitude of study participants regarding cervical cancer and its screening (n=97)**

S. no	Questions to assess attitudes	Level of agreement (Likert scale)				
		Strongly agree, (%)	No agree, (%)	Neither agree nor disagree, (%)	No. Disagree, (%)	Strongly disagree, No. (%)
1	Is cervical cancer is one of major female cancer in India	56 (57.77)	32 (32.98)	3 (3.09)	4 (4.12)	2 (2.06)
2	Any adult woman including you can develop cervical cancer	39 (40.20)	37 (38.14)	12 (12.37)	6 (6.18)	3 (3.09)
3	In the upcoming years, I will likely develop	29 (29.89)	32	19 (19.58)	11 (11.34)	6 (6.18)

	cervical cancer		(32.98)			
4	Every married or unmarried woman aged 25-70 years should be screen	41 (42.26)	35 (36.08)	2 (2.06)	3 (3.09)	0 (00)
5	Screening can help in early detection and better treatment	37 (38.14)	38 (39.17)	13 (13.40)	5 (5.15)	4 (4.12)
6	If screening is free and will cause no harm, then you will undergo screening	54 (55.67)	34 (35.05)	2 (2.06)	3 (3.09)	4 (4.12)
7	It is embarrassing to undergo a screening procedure	27 (27.83)	29 (29.89)	21 (21.64)	14 (14.43)	6 (6.18)

### Analysis of Good Knowledge and Screening CC

The analysis indicates that a significant number of women residing in rural areas possess moderate-poor knowledge regarding cervical cancer and its screening. Table 4 presents the results, highlighting the notable differences between the moderate and satisfactory knowledge levels.

**Table 4 Predictors of good knowledge and screening among participants (n=97)**

S. no	Demographic Variables	Level of knowledge		Chi square ( $\chi^2$ ), p-value (df)
		Satisfactory/Good No (%)	Moderate-poor No. (%)	
1	Rural	11 (30.55)	25 (69.44)	10.88 with 1(df), 0.001
2	Urban	21 (34.42)	40 (65.57)	11.83 with 1(df), 0.006
3	Lower education	24 (39.34)	37 (60.65)	5.54 with 1(df), 0.0186
4	Higher education	11 (68.75)	5 (31.25)	4.50 with 1(df)
5	<b>Age-wise</b>			
	>25	4 (13.04)	42 (86.95)	66.64 with 1(df), 0.001
	<25	8 (15.68)	43 (84.31)	48.039 with 1(df), 0.01

## DISCUSSION

To our knowledge, this study is the first to assess knowledge, attitudes, and factors related to cervical cancer among women visiting Sir Sunder Lal Hospital at Banaras Hindu University. The findings revealed low levels of knowledge and negative attitudes towards cervical cancer among the participants. Most women had never undergone cervical screening and had limited information about cervical cancer. These factors likely contribute to increased cervical cancer morbidity and mortality in the Eastern part of Uttar Pradesh. It is concerning to observe the low levels of knowledge, negative attitudes, and low uptake of cervical cancer screening among the study participants.

The research sample had similar characteristics in terms of age, marital status, number of children, level of education, and income compared to women sampled in the 2019 Demographic Health Survey (DHR) [12]. The study found that higher levels of education were associated with a better understanding of risk factors, knowledge, attitudes, and practice related to cervical cancer screening, consistent with previous studies [22, 29-32]. In rural areas, individuals with low income often seek medical attention at an advanced stage of cancer [30-33]. In Eastern Uttar Pradesh, low levels of knowledge have been linked to late presentation and poor prognosis of cervical cancer [34,35].

Women residing in urban areas of Eastern Uttar Pradesh demonstrated nearly three times more knowledge about cervical cancer compared to their rural counterparts. Higher literacy levels, lower poverty rates, peace, a greater number of health facilities, and a higher density of health professionals could contribute to the better knowledge levels observed among women in this region [13,14]. Community-based family planning and cervical cancer awareness programs implemented by societal organizations have also played a role in improving cervical cancer awareness in rural areas [15]. Addressing negative attitudes and enhancing awareness around cervical cancer screening are crucial components of an effective cervical cancer prevention program [16,17].

Most women in the study were aware that cervical cancer could develop (87, 89.69%). The prevalence of knowledge about risk factors, symptoms, and screening was higher compared to previous studies conducted in the general Indian population [18,20], although similar to other studies [21,22]. However, nearly half of the subjects in the study required better knowledge, particularly regarding screening. While awareness of cervical cancer was higher compared to community and facility-based studies in the general Indian population, it was lower compared to studies involving healthcare providers with higher qualifications [18, 22-24]. Furthermore, most study participants had a positive attitude toward screening consistent with previous research (Table 4). However, the low proportion of women who had undergone screening indicates a gap between perception and practice [18-20,24]. These findings align with previous research showing that older women and those with higher education tend to have better knowledge and attitudes towards cervical cancer and screening. Although awareness of cervical cancer and its risk factors and screening was higher in this study compared to previous studies in the general Indian population, there is still room for improvement [25,26].

Most women in the study (87, 89.69%) were aware that cervical cancer can develop. The prevalence of knowledge regarding risk factors, symptoms, and screening was higher compared to previous studies conducted in the general Indian population [18,20], but similar to other studies [21,22]. However, almost half of the subjects lacked sufficient knowledge, particularly regarding screening. Awareness of cervical cancer was higher compared to community and facility-based studies in the general Indian population [18,22], but lower compared to studies involving healthcare providers with higher qualifications [23,24].

Additionally, most study participants had a positive attitude toward screening, which aligns with previous research (Table 4). However, it is concerning that only a small number of participants had undergone screening, indicating a gap between perception and practice [18-20,24]. These findings are consistent with previous research that has shown older women and those with higher levels of education tend to have better knowledge and attitudes toward cervical cancer and screening. Although awareness of cervical cancer, its risk factors, and screening was higher in this study compared to previous studies in the general Indian population, there is still room for improvement [25,26].

### **Gap Analysis of the Study**

The study reveals a gap between perception and practice, which can be attributed to inadequate knowledge about screening and various barriers. To improve screening uptake, it is crucial to identify and address these barriers. Possible barriers may include limited access to screening facilities, fear or embarrassment related to the screening process, lack of awareness about the importance of screening, and cultural or social norms that discourage women from seeking screening. Addressing these barriers requires a comprehensive approach, including community-based education and awareness campaigns, enhancing access to screening facilities, and addressing cultural and social norms that hinder women from seeking screening services.

Healthcare providers play a critical role in promoting screening and addressing concerns and queries of women regarding the screening process. However, our study identified reasons cited by participants for not undergoing screening. It is concerning that many women lack understanding about screening and relies on symptoms before seeking screening, which is not an effective approach. Educating individuals about the benefits of screening and the significance of early detection is essential.

Furthermore, it is worrisome that many subjects fear potential pain during the screening procedure and are unsure about where to go for screening. Addressing these concerns by providing education and information about the screening process can help enhance screening uptake. Additionally, addressing social stigma and embarrassment associated with screening can encourage more individuals to seek screening services.

Lack of time was also reported as a reason for not undergoing screening, a common barrier in various settings. Introducing flexible screening options, such as evening or weekend hours, to accommodate individuals' schedules and make screening more accessible may be necessary. Thus, the reasons mentioned by participants regarding their decision not to undergo screening underscore the need for targeted education and awareness campaigns, along with efforts to overcome practical barriers that hinder individuals from seeking screening services. Such efforts can contribute to improving screening uptake and reducing the burden of cervical cancer in the population.



## CONCLUSION

The study emphasizes the significance of enhancing awareness and addressing negative attitudes toward cervical cancer screening as an integral part of an effective prevention program. It is crucial to take into account socio-economic and cultural factors that influence knowledge and attitudes regarding cervical cancer and screening, including the urban-rural divide, literacy levels, poverty levels, and access to healthcare facilities and professionals. Community-based interventions and programs, particularly those implemented by societal organizations, can play a vital role in increasing awareness and encouraging screening participation in rural areas.

Additionally, the study highlights the potential impact of heightened awareness of cervical cancer on the uptake of the HPV vaccine. This is particularly important as the country contemplates introducing the HPV vaccine to the national vaccination program. By addressing knowledge gaps, negative attitudes, and barriers to screening, efforts can be made to improve overall awareness and promote preventive measures, including the uptake of the HPV vaccine.

## DECLARATIONS

### Conflict of Interest

The authors declared no potential conflicts of interest concerning the research, authorship, and/or publication of this article.

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