

RESEARCH ARTICLE

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Awareness of and Barriers to Cervical Cancer Screening among Married Tribal Women in Sirohi, Rajasthan: A Community-based Study

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Abstract

Background: Cervical cancer is the second most prevalent cancer among women in developing nations, including India. This study aims to assess the knowledge, attitude, and practice (KAP) regarding cervical cancer screening, risk factors, and prevention strategies, along with the barriers to participation in screening activities, among married tribal women in Sirohi district, Rajasthan, to identify areas for improvement in this essential aspect of women's health. **Methods:** A cross-sectional, community-based study was conducted among 170 married tribal women recruited from the Tribal Sub-Plan (TSP) zone in Sirohi district, Rajasthan. A standardised, fixed-response questionnaire was used to obtain data on participants' KAP regarding cervical cancer screening. **Results:** The mean age of the study population was 32.81 ± 10.5 years. Out of 170, 28 (16.5%) women had heard of cervical cancer, and 20 (11.8%) women were aware of cervical cancer screening. Only 19.4% of women agreed to undergo screening for cervical cancer. A significant proportion, 86.5% of participants, had poor knowledge, 84.1% had a negative attitude, and only 0.6% demonstrated good practices regarding cervical cancer screening. Knowledge scores were significantly associated with age group, education, socioeconomic class, and number of children ($p < 0.05$). Attitude scores were significantly associated with age, contraceptive method used, and tobacco use. Practice scores were significantly associated with education and menstrual cycle characteristics ($p < 0.05$). Identified barriers to screening included lack of awareness, financial constraints, anxiety about vaginal examinations, feelings of embarrassment, and communication difficulties. **Conclusions:** The study findings indicate a critical deficiency in knowledge, attitude, and practice as well as low willingness to participate in cervical cancer screening among tribal women. Educational interventions through culturally sensitive awareness programs should be conducted in the local tribal language to enhance preventive healthcare in the tribal population.

Keywords: Awareness- Screening- Human Papillomavirus (HPV)- Tribal woman

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Introduction

Cervical cancer remains a significant public health challenge worldwide, especially in low- and middle-income countries (LMICs) such as India, where access to preventive and diagnostic healthcare services is limited [1]. Cervical cancer counts as the fourth most common cancer among women globally, with an estimated 662,301 new cases and 348,874 deaths worldwide in 2022 [2]. In terms of cervical cancer cases, India ranks second among women aged 15 to 44, with an annual

estimated incidence of 122,844 cases and 67,477 deaths [3]. Developing countries account for around 85%, with India alone accounting for one-fourth of the global cervical cancer burden. This situation is mainly due to the unavailability of statewide routine cancer screening programs and lack of awareness [4].

In India, it is estimated that around 5.0% of women in the general population are infected with high-risk HPV (Human Papillomavirus) types 16 or 18 at any given time. Cervical cancer cases are primarily attributed to persistent infection with these HPV strains, and

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approximately 83.2% of invasive cervical cancers in the country are linked to HPV 16 or 18 [5]. Other risk factors include having an early age of marriage, multiple sexual partners, tobacco consumption, prolonged use of contraceptive pills, and increased parity [6]. India holds a significant proportion of the global pattern of declining incidence in cities, however, their transformations are not seen in India's rural areas [7]. Women often possess low awareness, misconceptions, and inadequate preventive interventions regarding cervical cancer [8].

India has the second-largest concentration of tribal populations globally, after Africa. According to the 2011 Census, the tribal population accounts for approximately 8.9% of India's total population [9]. According to the National Family Health Survey (NFHS-5) data for Rajasthan, only 0.4% of women aged 30 to 49 years have undergone a screening test for cervical cancer [10]. Sirohi district, located in the western area of Rajasthan, is India's fourth-largest state by tribal population, is a primarily rural district with a diverse socio-cultural setting. It is also considered one of the state's five aspirational districts [9].

Rationale: Tribal women in India are at heightened risk for cervical cancer due to various socio-economic factors, including a low literacy rate of 52.3% and a high rate of early marriage, with 74.7% married before age 18. Additionally, inadequate menstrual hygiene practices affect 40.6% of these women, and access to screening facilities is extremely limited, with only 2.9% aware of local services. The NFHS-5 report highlights a mere 0.4% coverage of cervical cancer screening in Rajasthan, particularly in Sirohi, a district with a predominantly tribal population striving for development but lacking preventive health services. Existing literature indicates significant knowledge, attitudes, and practices (KAP) deficiencies and unmet screening needs among tribal women, though specific data for southern Rajasthan is scarce.

In India, studies indicated that many tribal women are unaware of the risk factors for cervical cancer and the importance of screening, which contributes to negative attitudes toward preventive measures [11]. Understanding the knowledge, attitudes, and practices (KAP) of women regarding cervical cancer is essential for improving preventive healthcare services and effective awareness initiatives [12]. These aspects are particularly significant in tribal communities, where socio-cultural and educational factors may further influence health-seeking behaviours [13]. As a result, assessing their understanding of cervical cancer and its prevention is critical. The current study aims to explore the knowledge, attitude, and practice of married tribal women regarding cervical cancer, its risk factors, preventive strategies, and barriers to screening.

Materials and Methods

This community-based cross-sectional study was conducted in the tribal-dominated Pindwara and Abu Road blocks of Sirohi district. The tribal population of district Sirohi is 292,470, out of which 143,504 are females across 477 villages [14]. The participants were selected from Pindwara and Abu Road using convenience sampling. This community-based survey was conducted

from February 2024 to December 2024. Inclusion criteria comprised married tribal women aged 18 years and above, who consented to participate. Women diagnosed with cervical cancer and who did not provide consent to participate were excluded from the study. Married women were selected as the study population since sexual exposure, a key determinant of HPV infection and cervical cancer risk, predominantly occurs within marriage in tribal communities. This approach also aligns with national screening guidelines that prioritise sexually active women. A total of 170 married tribal women meeting the eligibility criteria were enrolled in the study. To collect data, a standardised fixed-response questionnaire in Hindi was administered, which was validated by experts from the Department of Obstetrics and Gynaecology, AIIMS Jodhpur. The study included independent variables (sociodemographic, reproductive, and lifestyle characteristics) and dependent variables (knowledge, attitude, and practices). The study has been approved by the Institutional Ethics Committee (IEC) of AIIMS Jodhpur, India (Reference No: AIIMS/IEC/2022/4207, dated September 23, 2022). This Study is part of a PhD thesis, and in accordance with the protocol, convenience sampling was employed, based on the availability of tribal women; therefore, the sample size was not predetermined. Since the outcome variables were categorical, normality testing was not applicable; instead, associations were evaluated using the Chi-square test.

Questionnaire for data collection

The questionnaire underwent content validation by subject experts from the Department of Obstetrics and Gynaecology. It was pilot-tested among tribal women to ensure clarity and cultural appropriateness. Considering the sensitive nature of questions related to sexual practices and contraception, interviews were conducted by trained female investigators in a private setting. Rapport was established through informal conversation before data collection. Questions were asked in a culturally sensitive, non-judgmental manner using the local dialect. Verbal explanations and probing were used instead of visual aids due to low literacy levels, ensuring participant comfort and data reliability.

The questionnaire was structured into five sections to collect data on the KAP assessment. The first section (Part A) included six questions designed to collect sociodemographic data from the participants. Socio-economic status was assessed using the Modified BG Prasad classification based on monthly per capita income.

The second section (Part B) contained 10 questions that investigated the reproductive and lifestyle of the participants, whereas the third section (Part C) was divided into three parts and contained a total of 20 questions that assessed participants' knowledge about cervical cancer, their awareness of risk factors, and understanding of cervical cancer screening. The fourth section (Part D) consisted of 10 questions focused on evaluating attitudes toward cervical cancer screening, and the fifth section (Part E) included three questions about practices and cervical cancer screening among participants.

KAP (Knowledge, Attitude, and Practices) assessment

The assessment of knowledge, attitude, and practice towards cervical cancer screening is demonstrated in Table 3. Key information was evaluated to assess participants' knowledge of cervical cancer, its risk factors, prevention, and screening. Each correct response was scored as 1, while incorrect responses were scored 0. The total possible score ranged from 0 to a maximum of 20. Bloom's taxonomy was utilised to classify knowledge levels according to response accuracy. Participants who answered 80-100% of the questions correctly were considered to have excellent knowledge. Those with 60-79% correct responses were considered to have moderate knowledge, whereas scores of 0-59% depicted poor knowledge [15]. To determine the attitude scores, participants were asked to respond with either "agree" or "disagree." Participants who agreed with more than half of the questions reflected a positive attitude, whereas those who agreed with half or fewer indicated a negative attitude. Practices assessed by those who correctly answered more than 70% of the questions and underwent routine testing were classified as having good practices for cervical cancer screening, while those who answered less than 70% of the questions were considered to have poor practices. After assessing the knowledge, attitude, and practices (KAP) concerning cervical cancer screening and identifying the barriers faced by married tribal women in Sirohi, Rajasthan, this data will also guide the development of a subsequent intervention involving health education and communication strategies to improve engagement and support future research opportunities, which was planned to be implemented in the second phase.

Barriers In tribal areas, access to healthcare is significantly limited due to a lack of trust in government health services and prevailing social stigma. As a consequence, only a limited number of participants were aware of nearby screening facilities. Information regarding the proximity to primary health centres and the availability of reproductive health programs could provide additional context for screening barriers

To identify barriers to screening practices among married tribal women, we included those who had never undergone cervical cancer screening. This is intended to determine the primary reasons for not participating in the

screening, as detailed in the discussion (Figure 1).

Data analysis

Epicollect5 version 5.1.55 was used for data collection, after which Microsoft Excel was utilised for data cleaning and organisation. Data was analysed using SPSS version 23. Descriptive statistics were used to summarize sociodemographic variables, health profiles, and KAP scores. The Chi-square test was used to analyse the association between age, tribal groups, education, occupation, economic background, and the number of married tribal women with poor knowledge, negative attitudes, and no practices regarding children. Given the cross-sectional design and categorical outcomes, the study focused on Chi-square analysis. Future analytical studies may explore relative risks to better quantify barriers.

Results*Sociodemographic characteristics of the study participants*

The study included a total of 170 married women from tribal communities. Most of the tribal women were from the age group 18–29 years (44.1%), with a mean age of 32.81 ± 10.5 . About 60% of the participants belonged to the Garasia tribe. A significant proportion, 52.3% of women, were illiterate, 50% were homemakers, and 26.5% worked as labourers. Overall, 75.3% of the women were from low socio-economic backgrounds (Table 1).

Health status of the study group

The mean age at marriage of participants was 17.16 ± 1.75 . A total of 74.7% were married before 18 years of age (legal age of marriage in India). The menarche was experienced by 90% of the participants at 13-14 years of age. About 62.9% reported a menstrual cycle duration between 20 and 35 days. According to the Asian classification of obesity, 44.7% of women were underweight, however, 41.7% were in the normal weight range [16] (Table 2).

Knowledge about cervical cancer, risk factors, and its screening among the study group

A significant 83.5% of women were unaware of cervical cancer. Furthermore, just 1.2% were aware of a

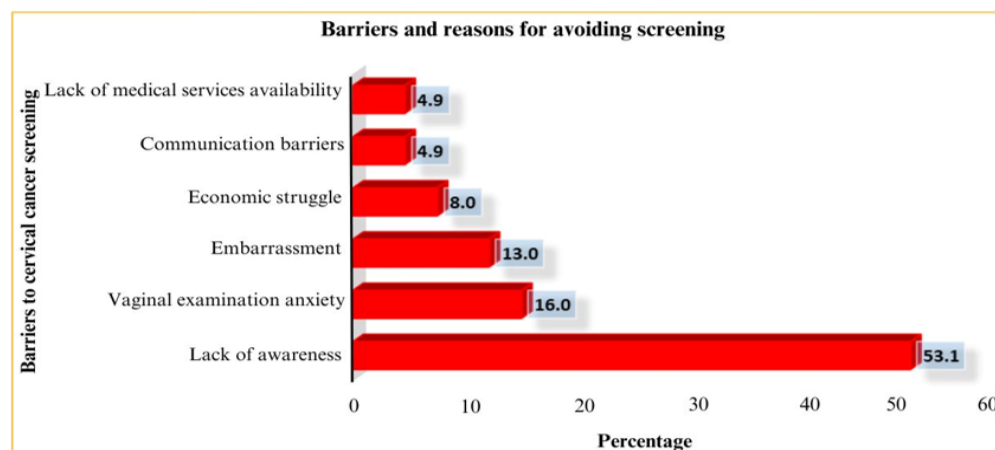


Figure 1. Factors Regarding Barriers and Reasons for Not Participating in Cervical Cancer Screening (n=162)

Table 1. Sociodemographic Details of the Study Participants. (n=170) [PART – A]

S. No.	Variable	Frequency (%)
1	Age (Years) (Mean $\pm$ SD)	(32.81 $\pm$ 10.5)
		18.0-29.9 75 (44.1)
		30-40 55 (32.4)
		>40 40 (23.5)
2	Tribal group	Garasia 102 (60)
		Bhil 21 (12.4)
		Other 47 (27.6)
	Educational status	
3	Educational status	Illiterate 89 (52.3)
		Primary school certificate 21 (12.4)
		Middle school certificate 18 (10.6)
		Secondary school certificate 22 (12.9)
4	Occupation	Graduate 16 (9.4)
		Postgraduate 4 (2.4)
		Housewife 85 (50)
		Labourer 45 (26.5)
5	Economic class	Employed (Government / Private) 20 (11.8)
		Business 1 (0.6)
		Agriculture worker 14 (8.2)
		Student 5 (2.9)
6	Read and write	Upper class 0 (0)
		Upper middle class 0 (0)
		Middle class 7 (4.1)
		Lower middle class 35 (20.6)
7	Lower class	Only write 23 (13.5)
		Read and write 79 (46.5)
		No read and write 68 (40)

family history of cervical cancer. Only 14.1% of women were able to identify symptoms associated with the disease. Also, our findings revealed that 19.4% of women had knowledge about the primary risk factors for cervical cancer, while 22.4% were aware of HPV. Additionally, 33.5% were aware of possible risks associated with prolonged use of oral contraceptives. Awareness regarding cervical cancer screening was significantly lacking; with

Table 2. Reproductive, and Lifestyle Characteristics of Study Participants (n=170) [PART – B]

S. No.	Variable	Frequency (%)
1	Age at Marriage (Years) (Mean $\pm$ SD)	(17.16 $\pm$ 1.75)
		<18 127 (74.7)
		18 and 18 above 43 (25.3)
2	Number of sexual partners	1 156 (91.8)
		>1 14 (8.2)
3	Age of menarche (Years)	Early menarche (10-12) 4 (2.4)
		Normal menarche (13-14) 153 (90)
		Delayed menarche (15-17) 13 (7.6)
4	Menstruation cycle (days)	<20 12 (7.1)
		20-35 107 (62.9)
		>35 10 (5.9)
5	Age of menopause (Years)	Menopause 41 (24.1)
		<45 22 (12.9)
		>45 19 (11.1)
6	BMI	NA* 129 (75.9)
		(Mean $\pm$ SD) (19.32 $\pm$ 3.26)
		Normal (18.5-22.9) 71 (41.7)
7	Smoking status	Underweight (<18.5) 76 (44.7)
		Overweight (23-24.9) 12 (7.1)
		Obese I (25-29.9) 11 (6.5)
8	Tobacco status	Never 167 (98.2)
		Quitter 1 (0.6)
		Smoker 2 (1.2)
9	Use of pads during menstruation	Never 113 (66.5)
		Quitter 8 (4.7)
		Chewing 49 (28.8)
10	Contraceptive method	sanitary pads 60 (35.3)
		Homemade clothes 69 (40.6)
		NA 41 (24.1)
11	Contraceptive method	Condoms 23 (13.5)
		Contraceptives pills 8 (4.7)
		None 139 (81.7)

NA*, Number of women who are still menstruating; NA, Number of women who are menopausal and not using pads.

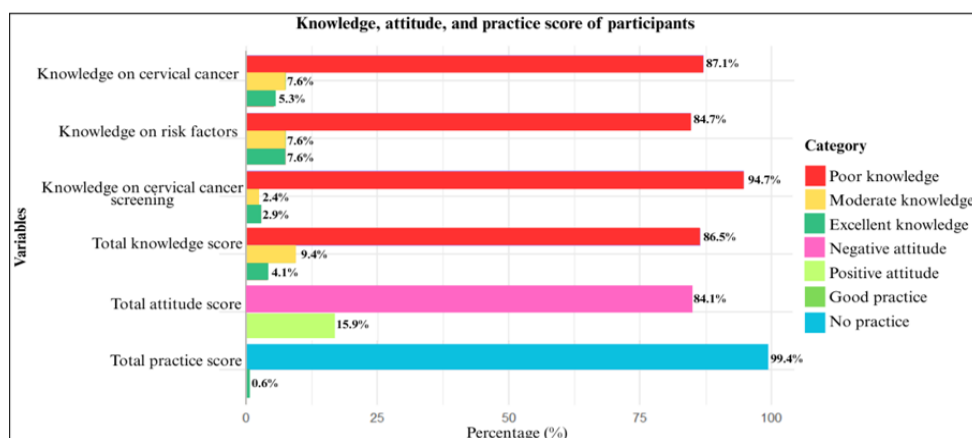


Figure 2. Distribution of Knowledge, Attitude and Practice Score among the Study Participants

Table 3. Assessment of Knowledge, Attitude and Practice among Participants (n=170)

S. No.	Questions	Response n (%)	
		Yes	No
Regarding knowledge about cervical cancer			
1	Do you know about cervical cancer?	28 (16.5)	142 (83.5)
2	Can you die from cervical cancer?	35 (20.6)	135 (79.4)
3	Cervical cancer can be associated with sexually transmitted diseases?	52 (30.6)	118 (69.4)
4	Have you or any of your family members been in direct contact with the disease?	2 (1.2)	168 (98.8)
5	Do you know cervical cancer can affect you later in life?	35 (20.6)	135 (79.4)
6	Do you know cervical cancer is preventable?	26 (15.3)	144 (84.7)
7	Do you know any symptoms of cervical cancer?	24 (14.1)	146 (85.9)
Regarding knowledge about risk factors of cervical cancer			
8	Do you know any primary causes of cervical cancer?	33 (19.4)	137 (80.6)
9	Do you know what is HPV?	38 (22.4)	132 (77.6)
10	Do you know about HPV vaccination?	35 (20.6)	135 (79.4)
11	Do you know about any following risk factors of cervical cancer?	35 (20.6)	135 (79.4)
12	Did you know to take a bath during menstrual periods?	55 (32.4)	115 (67.6)
13	Did you know that long-term use of oral contraceptives increases risk of cervical cancer?	57 (33.5)	113 (66.5)
14	Can cervical cancer be associated with infection?	28 (16.5)	142 (83.5)
Regarding knowledge about cervical cancer screening (CCS)			
15	What is the Cervical cancer screening?	20 (11.8)	150 (88.2)
16	Do you know about the locations of screening?	31 (18.2)	139 (81.8)
17	Did you know that screening plays a major role in reducing the spread of cervical cancer?	10 (5.9)	160 (94.1)
18	Do you know if cervicovaginal samples are used for cervical cancer screening, and where are they collected from?	4 (2.4)	166 (97.6)
19	Do you know about any screening methods?	13 (7.6)	157 (92.4)
20	Do you know any healthcare services available near you that offer cervical cancer screening?	5 (2.9)	165 (97.1)
Regarding attitude about cervical cancer screening among participants [PART - D]			
S. No.	Questions	Agree	Disagree
1	Do you want to get screened for cervical cancer?	33 (19.4)	137 (80.6)
2	Do you think undergoing a pap smear is painful?	155 (91.2)	15 (8.8)
3	Screening tests are not expensive?	12 (7.1)	158 (92.9)
4	Raising awareness about cervical cancer and its screening is essential.	18 (10.6)	152 (89.4)
5	I believe cervical cancer screening should be available at local health centres.	53 (31.2)	117 (68.8)
6	I would prefer a female healthcare provider to conduct my cervical cancer screening.	169 (99.4)	1 (0.6)
7	I would feel worried if I experienced signs of cervical cancer.	44 (25.9)	126 (74.1)
8	Cultural beliefs play a role in my decision to undergo cervical cancer screening.	46 (27.1)	124 (72.9)
9	I would be willing to participate in cervical cancer screening if it were free of charge.	170 (100)	0 (0)
10	I feel comfortable discussing cervical cancer with a healthcare provider.	26 (15.3)	144 (84.7)
Regarding practices of cervical cancer screening among participants [PART-E]			
S. No.	Questions	Yes	No
1	Have you ever undergone cervical cancer screening?	8 (4.7)	162 (95.3)
2	Have you received the HPV vaccine?	6 (3.5)	164 (96.5)
3	Would you like to go for a pap test?	30 (17.6)	140 (82.4)

only 11.8% of women aware of cervical cancer screening and 18.2% knew the locations where screening occurs. Moreover, 97.6% of tribal women were not familiar with cervicovaginal sample collection (Table 3).

Attitudes toward cervical cancer screening among the study group

About 80.6% of participants were hesitant about getting screened, 91.2% believed that a Pap smear would be painful, and 92.9% of women perceived screening tests as costly. A total of 89.4% of women showed a negative perception toward raising awareness about

Table 4. Association of Variables with Poor Knowledge, Negative Attitude and Poor Practice (n=170)

Background characteristics	Total	Poor Knowledge n (%)	P Value	Negative Attitude n (%)	P value	Poor Practice n (%)	P value
Age (in years)							
18- 29	75	57(76.0)	0.005*	59 (78.66)	0.027*	75 (100)	0.349
30-40	55	51(92.72)		45 (81.81)		54 (98.18)	
>40	40	39(97.50)		39 (97.50)		40 (100)	
Education*							
Illiterate	89	89 (100)	<0.001*	89 (100)	<0.001*	89 (100)	<0.001*
Primary School certificate	21	21 (100)		21 (100)		21 (100)	
Middle school certificate	18	18 (100)		18 (100)		18 (100)	
Secondary school certificate	22	16 (72.72)		14 (63.63)		22 (100)	
Graduate	16	3 (18.75)		1 (6.25)		16 (100)	
Postgraduate	4	0 (0)		0 (0)		3 (75)	
Economic Class							
Middle class	7	6 (85.71)	0.001*	5 (71.42)	0.001*	7 (100)	0.144
Lower middle class	35	23 (65.71)		20 (57.14)		34 (97.14)	
Lower class	128	118 (92.18)		118 (92.18)		128 (100)	
Number of alive children							
0	9	6 (66.66)	0.005*	4 (44.44)	0.001*	9 (100)	0.848
1	33	24 (72.72)		25 (75.75)		33 (100)	
2 and >2	128	117 (91.40)		114 (89.06)		127 (99.21)	
Age at marriage (in years)							
<18	127	113 (88.97)	0.193	113 (88.97)	0.003*	127 (100)	0.085
18 and 18 above	43	34 (79.06)		30 (88.23)		42 (97.67)	
Menstrual cycle duration (in days)							
<20	12	8 (66.66)	0.064	7 (58.33)	0.008	11 (91.66)	0.004*
20-35	107	90 (84.11)		88 (82.24)		107 (100)	
>35	10	9 (90)		8 (80)		10 (100)	
Menopause	41	40 (97.56)		40 (97.56)		41 (100)	
BMI							
Normal	71	60 (84.50)	0.394	61 (85.91)	0.167	71 (100)	0.004*
Underweight	76	67 (88.15)		63 (82.89)		76 (100)	
Overweight	12	9 (75)		8 (66.66)		11 (91.66)	
Obese I	11	11 (100)		11 (100)		11 (100)	
Tobacco use							
Never	113	93 (82.30)	0.174	89 (78.76)	0.022*	112 (99.11)	0.776
Quitter	8	7 (87.50)		7 (87.50)		8 (100)	
Chewing	49	47 (95.91)		47 (95.91)		49 (100)	
Use of pads during menstruation							
Sanitary pads	60	40 (66.66)	<0.001*	37 (61.66)	<0.001*	59 (98.33)	0.398
Homemade cloths	69	67 (97.10)		66 (95.65)		69 (100)	
NA	41	40 (97.56)		37 (90.24)		41 (100)	
Use of contraceptive method							
Condoms	23 (13.5)	15 (65.21)	0.010*	12 (52.17)	<0.001*	23 (100)	0.894
Pills	8 (4.7)	6 (75)		7 (87.5)		8 (100)	
None	139 (81.7)	126 (90.64)		124 (89.20)		138 (99.28)	

*p value <0.05 is considered significant; NA, Not applicable (Number of women who are menopausal and not using pads)

screening. Almost all participants, 99.4%, preferred a female healthcare provider for screening. All participants were willing to undergo screening if it was provided free of cost [Table 3].

Practice on screening for cervical cancer among the study group

About 95.3% of women had never participated in cervical cancer screening. Additionally, 3.5% had received the HPV vaccine, which was relatively low (Table 3).

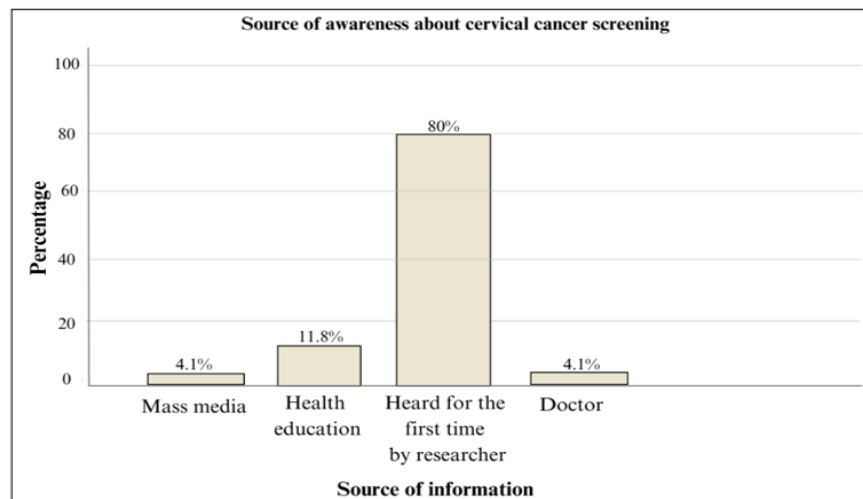


Figure 3. Distribution of the Source of Awareness about Cervical Cancer Screening among Tribal Women

Knowledge, attitude, practice (KAP) score among participants

Figure 2 demonstrates the different levels of scores of the knowledge, attitude, and practice of cervical cancer screening among the study participants. According to Bloom's cutoff scoring, the overall knowledge assessment indicated that 86.5% of women had poor knowledge. Regarding attitude, only 15.9% of participants demonstrated a positive attitude toward cervical cancer screening. Additionally, screening practices were severely lacking, with 99.4% of the tribal women never undergoing to screening.

Association of variables with poor knowledge, negative attitude, and poor practices

Educational status showed a strong and statistically significant association with knowledge regarding cervical cancer screening ($p < 0.001$). All illiterate women demonstrated poor knowledge, whereas higher educational attainment was associated with markedly better knowledge scores. Poor literacy, coupled with negligible exposure to cervical cancer cases within families or neighbourhoods, may explain the extremely low awareness levels observed.

Table 4 presents the association between knowledge, attitude, and practice with different characteristics of the participants. There was a considerable association between age and poor knowledge. Individuals over 40 showed the most significant occurrence of poor knowledge, 97.50%. The findings indicate that all the uneducated women showed significant associations with knowledge, attitude, and practice. Among various tribal groups, the Bhil community exhibited a 100% occurrence of poor knowledge, negative attitudes, and no practices. Economic status had a significant association with poor knowledge and negative attitudes, with those from lower economic backgrounds showing the highest occurrence, 92.18% for both. Women with more than two children were more likely to exhibit inadequate knowledge, 91.40%, and negative attitudes, 89.06%.

Discussion

This study was conducted among 170 married women recruited from the TSP zone of the Sirohi district of Rajasthan. The mean age of the married tribal females was 32.81 ± 10.5 years, with a predominance of young-age women (44.1%). These results are similar to those found by Jha et al. in Borivali Taluka, Mumbai, where the average age recorded was 32.52 ± 10.03 years, and 38% were younger women [17]. A majority (60%) of the participants belong to the Garasia tribe. This closely corresponds with data from the 2011 Census, which reported that 68% of the local population was from the Garasia community [18]. Moreover, 52.3% of the women were found to be uneducated, and half of them were homemakers. These data correspond with the findings presented by Dwivedi et al. about the demographics of tribal women in Sirohi, wherein 50.9% of the population was found to be uneducated, and 58.9% were identified as homemakers [19]. Women older than 30 years had an average of 2.5 living children, a figure that is nearly identical to the data from NFHS-5, where women aged 45–49 reported an average of 2.9 children living [20].

The study's results showed that 86.5% of women among the total participants had poor knowledge, similar to Gandhi et al.'s findings, which reported that 83% of rural women in Gujarat, India, had poor knowledge [21]. In the present study, only 15.9% of the participants had positive attitudes towards cervical cancer screening, which aligns with the findings of Singh et al., who reported that 18.2% of the participants had an adequate attitude [22]. Regarding screening practice, only 0.6% of the participants had done cervical cancer screening. These findings are similar to the study conducted by Ghosh et al. in southern India, which reported a similarly low screening uptake of 0.9% among rural women [13].

Assessing the association of knowledge, attitudes, and practices with education in the study population found a significant relationship, which is similar to the findings by Ramaiah and Jayarama [23]. The result showed a significant relationship between age and knowledge,

with younger participants showing poorer knowledge levels. This aligns with the study of Ghosh et al., which showed that age group was significantly associated with knowledge regarding cervical cancer screening among younger tribal women [12]. Our study also showed that 77.6% of participants were unaware of HPV, similar to the 77.2% reported in the previous study [24]. As shown in Figure 3, around 80% of the participants mentioned that they had never heard of cervical cancer screening. Of those who were aware, merely 11.8% revealed health education programs as their source of information. Similar findings were observed in other studies, in which 75.8% of the participants had never heard about the screening for cervical cancer [25].

The study demonstrates the possible barriers to cervical cancer screening among tribal women in India (n=162), which included a lack of awareness, fear of undergoing a vaginal examination, feelings of embarrassment, financial difficulties, communication issues, and limited access to healthcare services, as shown in Figure 1. These barriers were also identified in previous studies [26, 27].

The findings underscore the urgent need to strengthen the implementation of NPCDCS at the grassroots level. Integration of cervical cancer screening services within Ayushman Bharat – HWCs (Health and Wellness Centres), deployment of female health workers, and culturally tailored IEC activities in tribal languages could substantially improve the commitment to free screening under the National Health Mission program.

In conclusion, the study concludes that a gap existed among the majority of married tribal women concerning poor knowledge and a negative attitude toward cervical cancer screening, with poor practices. This underscores the critical need for organized education and healthcare program initiatives in preferably in local tribe's language. Key issues can guide policymakers to improve cervical cancer screening and to reduce the prevalence of cervical cancer among tribal women.

Although factors such as household decision-maker, spousal education, and occupation may impact screening behaviour, these variables were not evaluated, representing a limitation of the study.

Author Contribution Statement

All authors contributed equally in this study.

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References

1. Gupta K, Mandal R, Chatterjee P. Navigating the landscape of cervical cancer in india: Epidemiology, prevention, current status, and emerging solutions. *J Obstet Gynaecol Res.* 2024;50 Suppl 1:55-64. <https://doi.org/10.1111/jog.16030>.
2. Ferlay J, Ervik M, Lam F, Laversanne M, Colombet M, Mery L, et al. Global Cancer Observatory: Cancer Today [Internet]. Lyon: International Agency for Research on Cancer; 2024 [cited 2025 Apr 3].
3. Thobbi VA, Khan F. Cervical cytology by pap smear in reproductive population. *Int J Reprod Contracept Obstet Gynecol.* 2018;7(5):1988-92. <https://doi.org/10.18203/2320-1770.ijrcog20181943>.
4. Vora K, Saiyed S, Joshi R, Natesan S. Community level barriers for cervical cancer screening in marginalized population. *Int J Reprod Contracept Obstet Gynecol.* 2020;9(12):5006-11. <https://doi.org/10.18203/2320-1770.ijrcog20205238>.
5. Ramamoorthy T, Sathishkumar K, Das P, Sudarshan KL, Mathur P. Epidemiology of human papillomavirus related cancers in india: Findings from the national cancer registry programme. *Ecancermedicalscience.* 2022;16:1444. <https://doi.org/10.3332/ecancer.2022.1444>.
6. Bansal AB, Pakhare AP, Kapoor N, Mehrotra R, Kokane AM. Knowledge, attitude, and practices related to cervical cancer among adult women: A hospital-based cross-sectional study. *J Nat Sci Biol Med.* 2015;6(2):324-8. <https://doi.org/10.4103/0976-9668.159993>.
7. Srinivasan S, Johari V, Jesani A. Cervical cancer screening in India. In: Schroeder D, Cook J, Hirsch F, Fenet S, Muthuswamy V, editors. *Ethics Dumping*. Cham: Springer; 2018. p. 33-48.
8. Shariati-Sarcheshme M, Mahdizadeh M, Tehrani H, Jamali J, Vahedian-Shahroodi M. Women's perception of barriers and facilitators of cervical cancer pap smear screening: A qualitative study. *BMJ Open.* 2024;14(1):e072954. <https://doi.org/10.1136/bmjopen-2023-072954>.
9. Office of the Registrar General and Census Commissioner, India. Census of India 2011 [Internet]. New Delhi: Government of India; 2011 [cited 2025 Apr 9].
10. International Institute for Population Sciences (IIPS), ICF. National Family Health Survey (NFHS-5), India, 2019–21: Rajasthan [Internet]. Mumbai: International Institute for Population Sciences; 2021 [cited 2025 Apr 3].
11. Ghosh S, Mallya SD, Shetty RS, Pattanshetty SM, Pandey D, Kabekkodu SP, et al. Knowledge, attitude and practices towards cervical cancer and its screening among women from tribal population: A community-based study from southern india. *J Racial Ethn Health Disparities.* 2021;8(1):88-93. <https://doi.org/10.1007/s40615-020-00760-4>.
12. Ghosh S, Mallya SD, Pattanshetty SM, Pandey D, Kamath VG, Kabekkodu SP, et al. Awareness, attitude, and practice towards cancer cervix prevention among rural women in southern india: A community-based study. *Clin Epidemiol Glob Health.* 2024;26. <https://doi.org/10.1016/j.cegh.2024.101546>.
13. Gupta B, Sridevi P. Knowledge, attitude and practices towards cervical cancer and its screening among women from tribal population of anuppur district. *J Prev (2022).* 2025;46(1):133-56. <https://doi.org/10.1007/s10935-024-00813-y>.
14. Office of the Registrar General and Census Commissioner, India. Census of India 2011: Sirohi District Profile [Internet]. New Delhi: Government of India [cited 2025 Apr 9].
15. Narayana G, Suchitra MJ, Sunanda G, Ramaiah JD, Kumar BP, Veerabhadrapa KV. Knowledge, attitude, and practice toward cervical cancer among women attending obstetrics and gynecology department: A cross-sectional, hospital-based survey in south india. *Indian J Cancer.* 2017;54(2):481-7. https://doi.org/10.4103/ijc.IJC_251_17.
16. World Health Organization, International Association for the Study of Obesity, International Obesity Task Force.

- The Asia-Pacific perspective: redefining obesity and its treatment. Geneva: World Health Organization; 2000.
17. Jha N, Panot AH, Singh U. Awareness about gynecological cancers amongst tribal females. *Asian Pac J Cancer Care*. 2020;5(2):113-8. <https://doi.org/10.31557/apjcc.2020.5.2.113-118>.
 18. Sinha R. Work and migration pattern: A case of the Garasia tribe of Rajasthan. *Int J Creat Res Thoughts*. 2024;12(6):a221-a234.
 19. Dwivedi R, Goel AD, Vyas V, Yadav SS, Sharma PP, Bhardwaj P, et al. Gap identification for improvement in maternal and early infant health care practices among tribal pregnant women in an aspirational tribal district sirohi, rajasthan. *J Family Med Prim Care*. 2023;12(12):3291-7. https://doi.org/10.4103/jfmpe.jfmpe_234_23.
 20. International Institute for Population Sciences (IIPS), ICF. National Family Health Survey (NFHS-5), India 2019-21. Mumbai: International Institute for Population Sciences; 2021. Gandhi R, Patel A, Patel M, Sojitra SA, Kundal TS, Murugan Y. Cervical cancer prevention among rural women in gujarat, india: A mixed methods study on risk factors and kap (knowledge, attitude and practice). *Cureus*. 2024;16(9):e69169. <https://doi.org/10.7759/cureus.69169>.
 22. Singh M, Ranjan R, Das B, Gupta K. Knowledge, attitude and practice of cervical cancer screening in women visiting a tertiary care hospital of delhi. *Indian J Cancer*. 2014;51(3):319-23. <https://doi.org/10.4103/0019-509x.146780>.
 23. Ramaiah R, Jayarama S. Knowledge, attitude and practices about cervical cancer among rural married women: A cross sectional study. *Int J Community Med Public Health*. 2018;5(4):1466-70. <https://doi.org/10.18203/2394-6040.ijcmph20181218>.
 24. Ramavath KK, Olyai R. Knowledge and awareness of hpv infection and vaccination among urban adolescents in india: A cross-sectional study. *J Obstet Gynaecol India*. 2013;63(6):399-404. <https://doi.org/10.1007/s13224-013-0413-3>.
 25. Rai R, Sehgal R, Singhal S, Suri V, Shivkumar P, Balasubramani L, et al. Cervical cancer screening coverage at tertiary care institutes across india. *Asian Pac J Cancer Prev*. 2023;24(12):4269-75. <https://doi.org/10.31557/apjcp.2023.24.12.4269>.
 26. Ahmad S, Eram U, Abedi AJ, Mehnaz S, Ahmad A, Saif S. An epidemiological study on early detection of cervical cancer and barriers for seeking preventive healthcare among rural females in north india. *J Epidemiol Found India*. 2024;2(3):103 - 9. <https://doi.org/10.56450/JEFI.2024.v2i03.006>.
 27. Thapa N, Maharjan M, Petrini MA, Shah R, Shah S, Maharjan N, et al. Knowledge, attitude, practice and barriers of cervical cancer screening among women living in mid-western rural, nepal. *J Gynecol Oncol*. 2018;29(4):e57. <https://doi.org/10.3802/jgo.2018.29.e57>.



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