

Knowledge, Attitude and Practice of Cervical cancer screening and Vaccination among school teachers of central region of Karnataka

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Abstract

Background: Cervical cancer remains one of the leading causes of cancer-related morbidity and mortality among women in India despite being largely preventable through early detection and vaccination. Knowledge about disease, early screening and Human Papilloma Virus vaccine (HPV vaccine) are most effective for cervical cancer prevention.

Aims and Objectives: To assess the knowledge, attitude, and practices regarding cervical cancer screening and HPV vaccination among school teachers in central region of Karnataka.

Materials and methods: A cross-sectional questionnaire-based study was conducted among female school teachers in central part of Karnataka. A validated structured questionnaire assessing socio-demographic characteristics, knowledge, attitude, and practices related to cervical cancer screening and HPV vaccination was used. Data were analyzed and $p < 0.05$ was considered statistically significant.

Results: A total of 379 school teachers were included in the study. Majority belonged to the age group of 30-49 years. Although positive attitude towards screening and vaccination was high (68.9%), 69.1% exhibited low overall knowledge. Only 10% had undergone Pap smear test and 6.9% reported receiving HPV vaccination. Data shows that participants with "High Knowledge" are more likely to have undergone Pap smear (36.0%) compared to those with "Low Knowledge" (4.6%). A statistically significant association was observed between knowledge level and pap smear uptake ($P = 0.001$).

Conclusion: Despite a favorable attitude toward cervical cancer prevention, the overall level of knowledge and utilization of screening services among school teachers was inadequate. Strengthening educational initiatives and improving accessibility to screening and vaccination programs are essential to bridge the gap between perception and preventive care.

Key words: Cervical cancer, PAP smear, HPV vaccine.

Introduction:

There is a rising epidemic of non-communicable diseases (NCDs) worldwide with cancer being the second most leading cause of death among NCDs. Among cancers, cervical cancer, though preventable, is the second most common cancer among women between age group of 15 to 44 years next to breast cancer in India; with over 1,23,000 new cases and roughly 77,000 deaths annually^[1-3]. Incidence and mortality rates of cervical cancer are higher mainly in low and middle-income countries. Cervical cancer related deaths are often due to late diagnosis of the

disease and accounts for nearly 10% of all cancer-related deaths^[4]. Most of cervical cancers are associated with human papilloma virus infection i.e., HPV 16 & 18^[1-3]. Cervical cancer is preventable with the administration of HPV vaccination and curable if diagnosed in early stages and treated efficiently. HPV vaccination is given to children between 9 to 14 years of age or before the start of sexual life. Cervical cancer has a long pre-malignant phase, that gives an opportunity for early diagnosis and treatment before it becomes invasive cancer by cervical PAP smear testing, which is a non-invasive and cost effective screening method^[5-8].

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According to fifth round of National Family Health Survey report (NFHS-5), cervical cancer screening among women in India between 30 to 49 years is extremely low with only 1.9% of women ever having undergone cervical cancer screening tests in their lifetime. The state-level awareness and coverage of cervical cancer screening across India ranges from 0.2% to 9.8%. In Karnataka, the screening coverage is approximately 0.5%, indicating very limited awareness and participation compared to higher-performing states^[9]. The data related to cervical cancer screening by NFHS-5 survey report demands for strategies and intervention to enhance cervical cancer screening and vaccination related practices among women.

Lack of awareness, negative attitude and poor practice of cervical cancer screening are the major causes for increased incidence of disease and high mortality. Knowledge about the disease, vaccination and screening methods with positive attitude towards it plays an important role in prevention of disease and mortality related to it.

Although several studies from other countries have examined this issue, evidence from the Indian context remains limited and also only few studies have explored cervical cancer screening and vaccination attributes among school teachers in India. Female school teachers constitute an educated and active segment of women within the community. Owing to their social credibility due to regular interactions with families and influential position in society they represent an important group for dissemination of disease related awareness. They can facilitate knowledge transfer both directly through the organization of community based awareness initiatives and indirectly by educating students who subsequently communicate the information to their households. However, before positioning teachers as agents of awareness dissemination, it is imperative to evaluate their own cervical cancer screening practices and human papillomavirus (HPV) vaccination status, as these factors may influence their knowledge base, personal health behaviours and credibility in promoting preventive measures. Therefore, the present study is undertaken to assess the knowledge of cervical cancer, practice of screening and HPV vaccination among school teachers of Karnataka state.

Materials And Methods:

Study Design

A cross-sectional descriptive study was conducted to assess the knowledge, attitude, and practices (KAP) related to cervical cancer, Pap smear screening, and HPV vaccination among female school teachers in the central region of Karnataka, India.

The study was carried out in government and private secondary schools located in the central Karnataka districts namely; Davanagere, Chitradurga, and Shivamogga region. These districts represent a mix of urban and semi-urban populations.

Study Population

The study population comprised female school teachers working in secondary and higher secondary schools.

Inclusion Criteria

Female teachers aged 20 years and above, currently employed in selected schools & willing to provide informed consent

Exclusion Criteria

Teachers with a history of total hysterectomy, teachers absent during data collection & Participants who didn't give consent

Sample Size

The sample size was 379, calculated using the formula for cross-sectional studies: $n = z^2pq/d^2$ ¹⁰

Where; n is the minimum sample size required,

Z = 1.96 (95% confidence level)

p = 0.37 (knowledge of cervical screening from previous studies)³

q = 1 - p

d = 0.05 (tolerable error margin of 5%).

An additional 10% was added to account for non-response.

Sampling Technique

A multistage sampling technique was used: Districts were selected purposively from central Karnataka namely; Davanagere, Chitradurga, and Shivamogga region. Schools were selected by simple random sampling. Eligible teachers from each school were selected using proportionate sampling. Those who gave consent were given the pre-validated questionnaire form to fill the details.

Study Tool

Data were collected using a validated, self-administered 20-item questionnaire consisting of:

- Socio-demographic profile (4 items)
- Knowledge of cervical cancer (9 items)
- Attitude towards prevention and screening (4 items)
- Practices related to screening and vaccination (3 items)

Scoring System:

Knowledge score: 0-9

Low: <4

Moderate: 5-6

High: 7-9

Attitude score: 0-4

Positive attitude: score $\geq$ median

Practice variables: analysed as categorical outcome.

Data Collection Procedure

Data were collected over 4 weeks. Participants completed the questionnaire anonymously under supervision of trained investigators.

Data Analysis:

Data were entered into SPSS and analyzed using:

Descriptive statistics (frequency, percentage, mean $\pm$ SD)

Chi-square test for association

Level of significance was set at $p < 0.05$ **Ethical Considerations:**

Ethical clearance was obtained from the Institutional Ethics Committee.

(IERB no. 742, dated 20/12/2023)

Results:

A total of 379 Teachers participated in the study. Majority of participants were in the age group of 30-49 years with mean age of 40.8 $\pm$ 8.6 years. Majority (67.8%) of them were married (Table 1).

Table 1: Socio-Demographic Characteristics of Respondents (n = 379)

VARIABLE	Frequency (n)	Percentage
Age group (years)		
20-29	72	19.0%
30-39	138	36.4%
40-49	128	33.8%
>50	41	10.8%
Marital status		
Unmarried	92	24.3%
Married	257	67.8%
Divorced/Widowed	30	7.9%
Education		
Undergraduate	297	78.4%
Post graduate	82	21.6%

In our study, 49.1% of the participants had knowledge about risk factors and symptoms of cervical cancer. Around 44% of the respondents had idea about screening test. (Table 2)

Table 2: Knowledge of Cervical Cancer Risk Factors and Prevention (n = 379)

Knowledge Item	Correct n (%)
HPV is a risk factor	172 (45.4)
Early sexual activity increases risk	159 (41.9)
Multiple sexual partners	183 (48.3)
Poor menstrual hygiene	198 (52.2)
Abnormal vaginal bleeding	166 (43.8)
Post-coital bleeding	151 (39.8)
Cervical cancer is preventable	274 (72.3)
Pap smear is a screening test	168 (44.3)
HPV vaccine prevents cervical cancer	142 (37.5)

Overall knowledge level of the participants were scored as low, moderate and high as shown in Table 3. Majority of them (69.1%) had low knowledge of cervical cancer.

Table 3: Overall Knowledge Level of Respondents (n = 379)

Knowledge Level	Frequency (n)	Percentage (%)
Low (<4)	262	69.1
Moderate (5-6)	92	24.3
High (7-9)	25	6.6

In present study, 68.9% (261 out of 379 participants) demonstrated a positive attitude towards screening practices and vaccination against cervical cancer. This positive attitude was determined based on a score at or above the median for several key beliefs mentioned in Table 4.

Table 4: Attitude towards Cervical Cancer and Prevention (n = 379) Positive attitude (score $\geq$ median): 261 (68.9%)

Attitude Statement (Agree)	n (%)
Cervical cancer is preventable	296 (78.1)
Any woman can develop cervical cancer	241 (63.6)
Screening needed even without symptoms	268 (70.7)
HPV vaccination before sexual activity	257 (67.8)

There is a notable disparity between the high percentage of women who agree screening is necessary (70.7%) and those who have actually undergone it. Only 10.0% of the participants had ever undergone Pap smear test and only 6.9% had received the HPV vaccination. Results shown in Table 5.

Table 5: Practices Related to Screening and Vaccination (n = 379)

Practice Variable	Yes n (%)
Regular gynaecology consultation	124 (32.7)
Ever had Pap smear	38 (10.0)
Received HPV vaccination	26 (6.9)

Association between knowledge and screening practice is shown in Table 6. The data suggests a strong correlation between knowledge and action. Participants with "High Knowledge" were significantly more likely to have had a Pap smear (36.0%) compared to those with "Low Knowledge" (4.6%).

Table 6: Association Between Knowledge Level and Pap Smear Uptake

Knowledge Level	Pap Smear Done n(%)	Pap Smear Not Done n(%)	χ^2	p-value
Low	12 (4.6)	250 (95.4)	18.7	0.001
Moderate	17 (18.5)	75 (81.5)		
High	9 (36.0)	16 (64.0)		

Discussion:

This cross-sectional study assessed knowledge, attitude, and practices (KAP) related to cervical cancer, Pap smear screening, and HPV vaccination among female school teachers in central Karnataka. The overall findings reveal a persistent gap between awareness, attitude, and preventive practices, a pattern consistent with other studies conducted in southern India.

Knowledge of Cervical Cancer and Preventive Measures

In the present study, although a majority (72.3%) acknowledged that cervical cancer is preventable, awareness of specific risk factors and screening tests was low for example, only 45.4% recognized HPV as a risk factor and 44.3% identified Pap smear as a screening test. These results mirror the observations in a community-based study in rural Karnataka (Udupi district), where women exhibited poor knowledge about HPV infection, its link to cervical cancer, and nearly negligible awareness of Pap smear testing despite high literacy levels. In that study, none of the participants had heard of HPV, and only 2.4% of sexually active women had undergone Pap smear testing^[11].

Similarly, in another South Indian context (Tamil Nadu), outpatient women demonstrated low awareness of risk factors, screening, and vaccination, with only 36.2% being aware of Pap smear and a mere 3.4% reporting HPV vaccination^[12]. These findings highlight

a persistent lack of detailed knowledge about cervical cancer prevention, even among relatively educated women.

Attitude Towards Cervical Cancer Prevention

Our study revealed a generally favourable attitude toward preventive practices: nearly 79% agreed that cervical cancer is preventable and over two-thirds supported regular screening and early vaccination. This positive attitude, despite limited knowledge, resembles patterns observed in tribal women from coastal Karnataka, where most women held favourable opinions towards screening, yet knowledge remained low and none had been screened before^[13].

A favourable attitude may be influenced by broader public health messaging and community awareness initiatives, although this alone is insufficient to translate into action, as evidenced by the low uptake of screening and vaccination in our cohort.

Practices: Screening and Vaccination Uptake

Only 10% of teachers reported ever having a Pap smear, and 6.9% had received HPV vaccination. This low uptake parallels findings from the rural Karnataka study, where Pap smear utilization was only 2.4% among ever-sexually active women^[11]. In general Indian settings, similar low utilization patterns are repeatedly documented; for instance, outpatient women in Tamil Nadu showed only 12.6% had ever undergone Pap smear, and HPV vaccination awareness was only 25%^[12].

Analogous trends in South Indian hospital-based populations further confirm this gap. A study among medical and paramedical students in south Karnataka demonstrated that only 6.8% had been vaccinated against HPV, despite significant knowledge about HPV and its role in cervical cancer^[14]. These findings underscore that positive attitude alone is not sufficient to drive behavior change when barriers such as perceived risk, cost, access, and health system constraints exist.

Association Between Knowledge and Screening Uptake

The significant association observed between higher knowledge levels and Pap smear uptake ($p = 0.001$) reinforces existing evidence that enhanced awareness is a key determinant of preventive behavior. This pattern is documented in other Indian and global studies, where women with better understanding of cervical cancer risk and prevention are significantly more likely to undergo screening.

Public Health Implications

The low utilization of Pap smear and HPV vaccination facilities among educated teachers indicate that

educational attainment does not automatically translate into effective engagement with preventive services. This suggests the need for sustained public health interventions—tailored health education, improved access to screening services, and integration of HPV vaccination programs through school-based outreach or teacher-led awareness campaigns.

Conclusion:

In central Karnataka, female school teachers exhibit positive attitudes toward cervical cancer prevention yet show insufficient knowledge regarding risk factors, screening modalities and vaccination. This discordance correlates with poor uptake of Pap smear screening and HPV vaccination, mirroring trends reported in other Karnataka and South Indian populations.

Given the significant association between knowledge and screening uptake observed in this study, targeted educational campaigns, integrated community engagement, and stronger health system support for preventive services are urgently needed. Empowering teachers with accurate information can create a ripple effect improving awareness and preventive practices among students, families and the broader community. Such efforts align with national and regional goals to reduce cervical cancer burden and optimize women's health outcomes.

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