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Breaking Barriers: Challenges Faced by Nursing Staff in Cervical Cancer Screening at a South Indian Hospital

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Abstract

Background: *Despite sufficient knowledge about cervical cancer screening among female health workers, actual screening rates remain low.*

Objective: *This study aims to assess awareness of cervical cancer among nursing staff and identify perceived and social barriers to utilizing screening services.*

Methods: *A questionnaire-based cross-sectional study was conducted among 510 married female nursing staff at a tertiary health institution in Puducherry, India, from June to October 2020.*

Results: *60.4% of the respondents correctly answered more than 60% of the questions on cervical cancer screening. However, only 40% had undergone a Pap smear. Knowledge scores did not differ significantly between those who had a Pap smear and those who had not. ROC curve analysis revealed that knowledge scores were not significant predictors of either having or being willing to have a Pap smear. The main barriers to testing were lack of availability (37.3%), time constraints (22.3%), and motivation (23.3%), despite the test being free and available at their workplace on all working days. Only 7.2% of respondents cited pain, discomfort, or social reasons for their reluctance to undergo screening. Additionally, 51.8% indicated they would undergo screening regularly if it were made mandatory by their employer.*

Conclusions: *The lack of motivation among health workers to use readily available screening services may be further exacerbated in the general population.*

Keywords: Cervical Cancer Screening, Nursing Staff, Perceived Barriers, Pap Smear, Public Health Programs.

Abbreviations

AUROC: Area Under ROC Curve
CI: Confidence Interval
P: P value
Sn: Sensitivity
Sp: Specificity
PPV: Positive Predictive Value
NPV: Negative predictive Value
DA: Diagnostic Accuracy

Impact

Public health programs should be redesigned as opt-out initiatives that use local registries to identify eligible women, removing the burden of initiative from the general population.

Introduction

Cervical cancer is a significant public health issue in India, ranking as the second most common gynaecological malignancy among Indian women, with 122,844 new cases and 67,477 deaths reported annually [1]. Due to the long latent period of

10–20 years from mild dysplasia to carcinoma, cervical cancer is relatively preventable, providing a strong rationale for regular screening. The Papanicolaou (Pap) test is a proven and effective screening method that has significantly reduced invasive cervical cancer rates in developed countries. Despite this, approximately 30% of cervical cancer cases occur in women who have never had a Pap test, and in developing countries, this figure approaches 60% [2].

In India, even with national guidelines, the responsibility for cervical cancer prevention primarily falls on women themselves. Thus, individual knowledge, motivation, and psychosocial factors greatly influence health-seeking behaviour. Studies among women attending outpatient clinics reveal that most lack adequate knowledge about cervical cancer (81.9%) and its prevention through screening (85.5%) [3]. Conversely, research on female health workers shows that even with sufficient knowledge about cervical cancer screening, actual screening rates remain low (5–20%) [4]. This disparity indicates that awareness of screening services does not necessarily lead to their utilization.

This study aims to evaluate the awareness and utilization of cervical cancer screening among healthcare professionals and to identify both perceived and social barriers to accessing these services.

Methods

Study Setting and Population

This cross-sectional study, conducted between June and October 2020, involved the nursing staff of a tertiary health institution in Puducherry, India, serving populations from Puducherry and neighbouring districts in Tamil Nadu. A questionnaire was administered to married, female nursing staff aged 18–65 to assess their knowledge of cervical cancer, screening methods, attitudes towards Pap smears, and actual screening practices. Participants were chosen based on their presumed awareness of cervical cancer due to medical training and easy access to screening services. Women currently undergoing or previously treated for preinvasive cervical lesions or cervical cancer were excluded.

Sample Size and Sampling Method

A sample size of 459 was determined using a single population proportion formula: n = (z(1-α/2))^2 * p(1-p)/d^2, with z = 1.96 for a 95% confidence level, d = 0.05 for desired accuracy, and p = 77%, based on a study among nursing staff in a similar setting in Gujarat, India [5]. Factoring in a 10% non-response rate, the final sample size was set at 510. The questionnaire was pretested among 10 participants and modified accordingly.

Data Analysis

Data were entered into Microsoft Excel and analysed using STATA version 12. Baseline characteristics were described as mean (SD) for continuous variables (e.g., age) and as proportions (percentages) for categorical variables. Pap smear screening status was the primary outcome variable. Logistic regression was used to estimate associations with demographic characteristics, knowledge, and attitudes toward screening, described as odds ratios. Bidirectional stepwise selection identified the most relevant variables for the final multivariable predictive model. Odds ratios with 95% confidence intervals (CIs) were calculated, and statistical significance was set at $p < 0.05$.

Results

A total of 510 nursing staff members participated in this study, with a response rate of 97.6%. The mean age of the participants was 37.42 ± 9.04 years, and the mean age at marriage was 26.23 ± 2.91 years. Detailed demographic information is presented in Table 1.

Table 1: Sociodemographic Characteristics of the Respondents

Demographic Details	Mean ± SD || Median (IQR) || Min-Max
Age (Years)	37.42 ± 9.04 || 35.00 (31.00-43.00) || 20.00 - 65.00
Age at Marriage (Years)	26.23 ± 2.91 || 26.00 (24.00-28.00) || 15.00 - 39.00
Age at childbirth (Years)	27.77 ± 3.21 || 28.00 (26.00-29.00) || 16.00 - 44.00
Frequency (%)	
Religion Hindu Muslin Christian	372 (74.7%) 120 (24.1%) 6 (1.2%)
Husband's Education High School Higher Secondary Diploma Undergraduate Postgraduate PhD	10 (2.0%) 30 (6.0%) 61 (12.2%) 214 (43.0%) 176 (35.3%) 7 (1.4%)
Domicile Tamil Nadu Puducherry Kerala	241 (48.4%) 145 (29.1%) 104 (20.9%)
Parity 0 1>=2	94 (18.9%) 147 (29.5%) 257 (51.6%)

Contraceptive Use (ever) Yes No	103 (20.7%) 395 (79.3%)
Work Experience in Gynaecology Yes No	272 (54.6%) 226 (45.4%)

Knowledge about Cervical Cancer and Screening Methods

Most participants recognized cervical cancer as the most common gynaecological cancer and identified the human papillomavirus (HPV) as its etiological agent. They understood the rationale for screening with the Pap smear (detecting cervical cancer at an early, curable stage) and were aware of vaccines available to prevent cervical cancer. The majority (82.5%) attributed their knowledge to nursing training, while 17.8% credited their work in the hospital. Only three respondents gained this knowledge through personal contact with a health physician, and one from the media. Overall, 60.4% of participants correctly answered more than 60% of the questions on cervical cancer screening. However, many had difficulty identifying risk factors for cervical cancer (72.7%), the recommended screening interval for Pap smears (64.1%), and the appropriate age to discontinue screening if prior tests were normal (68.9%). Detailed responses to questions on cervical cancer and screening practices are illustrated in Figures 1 and 2.

Cervical Cancer Screening (Pap Smear) Practices

Of the 510 participants, 475 (95.5%) were eligible for cervical cancer screening (defined as being over 25 years of age and sexually active). Among them, 40% had undergone a Pap smear at least once, despite the availability of the test at their institution. Only 4.8% of the eligible participants adhered to ideal screening practices (initiating screening between 21-30 years of age, undergoing Pap smears every three years, and consistently retrieving the results).

Among the 498 respondents, 92.8% expressed willingness to undergo a Pap smear. The 36 respondents (7.2%) who were unwilling cited reasons such as anticipated pain (32), embarrassment (30), perceived low risk of developing cervical cancer (22), and lack of spousal consent [2]. There were no significant differences in demographic characteristics between those willing and unwilling to undergo screening. However, those who had undergone a Pap smear were generally older (41.81 ± 8.66 vs. 35.66 ± 7.74 years), had a higher proportion of multiparas (64.2% vs. 47.0%) and fewer nulliparas (8.4% vs. 20%), reported greater contraceptive use, and had more work experience in gynecological fields compared to those who had not been screened (Table 2). Additionally, a larger proportion of those who had not undergone Pap smears preferred self-collected smears and screening by a private practitioner rather than by the gynecologist available at their workplace.

Table 2: Association between Demographic Parameters and the Likelihood of taking a Pap Smear

Parameters	Taken PAP Smear		p value
	Yes (n = 190)	No (n = 285)	
Age (Years)*	41.81 ± 8.66	35.66 ± 7.74	<.001[a]
Age at Marriage	26.46 ± 2.78	26.39 ± 2.89	.887[a]
Religion			.283[b]
Hindu	136 (38.6%)	216 (61.4%)	
Christian	50 (42.7%)	67 (57.3%)	
Muslim	4 (66.7%)	2 (33.3%)	
Husband's Education			.281[b]
High School	6 (75.0%)	2 (25.0%)	
Higher Secondary	10 (34.5%)	19 (65.5%)	
Diploma	27 (45.0%)	33 (55.0%)	
Undergraduate	73 (36.7%)	126 (63.3%)	
Postgraduate	71 (41.0%)	102 (59.0%)	
PhD	3 (50.0%)	3 (50.0%)	
State*			.004[b]
Tamil Nadu	108 (45.8%)	128 (54.2%)	
Puducherry	55 (41.7%)	77 (58.3%)	
Kerala	24 (24.2%)	75 (75.8%)	
Lakshwadeep	1 (33.3%)	2 (66.7%)	
Andhra Pradesh	1 (50.0%)	1 (50.0%)	
Karnataka	1 (50.0%)	1 (50.0%)	
Meghalya	0 (0.0%)	1 (100.0%)	

Parity*			<.001[c]
P0	16 (21.9%)	57 (78.1%)	
P1	52 (35.6%)	94 (64.4%)	
≥P2	122 (47.7%)	134 (52.3%)	
Age at childbirth	27.53 ± 3.39	27.96 ± 3.05	.173[a]
Contraceptive use *	53 (51.5%)	50 (48.5%)	.007[c]
Work experience in OBGYN*	136 (50.6%)	133 (49.4%)	<.001[c]
Total knowledge score	12.64 ± 1.41	12.41 ± 2.01	.481[a]
Abbreviated knowledge score	4.08 ± 0.75	4.04 ± 0.84	.916[a]
Preferred specialist for smear*			.002[c]
Gynaecologist	167 (45.4%)	201 (54.6%)	
Nurse	9 (34.6%)	17 (65.4%)	
Private Practitioner	3 (13.0%)	20 (87.0%)	
Family Physician	3 (17.6%)	14 (82.4%)	
Prefers self-collected smear *	27 (26.5%)	75 (73.5%)	.003[c]

Knowledge Scores and Predictive Analysis

Total knowledge scores were calculated based on the sum of correct responses to 16 questions (Figures 1 and 2). An abbreviated knowledge score, consisting of five key questions, was also created to assess fundamental awareness:

- Cervical cancer is the most common gynaecological cancer in India.
- It is a preventable disease.
- Pap smears are necessary even in the absence of symptoms or family history.
- Pap smears should be performed every three years.
- Vaccines are available to prevent cervical cancer.

There were no significant differences in total or abbreviated knowledge scores between participants who had undergone a Pap smear and those who had not (total score: 12.64 ± 1.41 vs. 12.41 ± 2.01, p = 0.481; abbreviated score: 4.08 ± 0.75 vs. 4.04 ± 0.84, p = 0.916). ROC curve analysis indicated that neither the total nor the abbreviated knowledge scores significantly predicted the likelihood of undergoing a Pap smear or willingness to be screened (Table 3).

Table 3: Diagnostic performance of knowledge to predict practice of undergoing screening and willingness to undergo screening among the respondents

Predictor	AUROC	95% CI	P	Sn	Sp	PPV	NPV	DA
Willingness to undergo screening								
Total knowledge score	0.524	0.425-0.623	0.624	27%	78%	94%	8%	30%
Abbreviated knowledge score	0.536	0.454-0.619	0.420	29%	81%	95%	8%	32%
Practice of undergoing screening								
Total knowledge score	0.519	0.468-0.569	0.481	83%	25%	42%	68%	48%
Abbreviated knowledge score	0.503	0.455-0.55	0.916	97%	6%	41%	73%	42%

Barriers and Facilitators to Screening

Over one-third (37.3%) of the nursing staff identified the lack of availability as a barrier to screening, despite the test being free and accessible at their workplace on all working days. Lack of time (22.3%) and motivation (23.3%) were also frequently cited as barriers. Additionally, 51.8% of participants indicated they would undergo regular screening if it were mandated by their employer. Some participants suggested more encouraging behavior from physicians (23.7%) and the availability of self-collected Pap smears (23.3%) as facilitators. Lack of family support was not a commonly reported barrier.

In univariable logistic regression analysis, factors significantly associated with cervical cancer screening included age, parity, work experience in gynecology, and a preference for private practitioners to conduct screening. In multivariable logistic regression analysis, only participant age (OR 1.08; 95% CI: 1.05–1.12, p < .001) and age at childbirth (OR 0.90; 95% CI: 0.83–0.97, p = .005) remained significantly associated with screening.

Discussion

India has largest number of estimated cervical cancer deaths in the world [6]. Cervical cancer is a great economic burden, both nationally and to the individual patient. A study among cervical cancer patient in a public tertiary care centre in North India identified that 62% incur catastrophic health expenditure, and 30% have to borrow money or sell assets to cope with the expense [7].

Surveys among urban and rural Indian women have found that only 2-7% of women have undergone screening for cervical cancer at-least once in their lifetime, which has been uniformly linked to poor knowledge levels. (3,8–10). Improving knowledge levels might influence screening practices in women with low-income backgrounds and it is noted that media and contact with health professionals are supposed to be sources of knowledge for this population. However, studies among health workers

in India, Korea, Ethiopia and other parts of Africa have demonstrated screening rates of 5-20%, despite sufficient knowledge of screening practices (4,5,11–15) [8]. In our study, only 40% of 475 eligible nursing officers have undertaken a Pap smear even once, despite formal education and access to screening opportunities.

Knowledge regarding cervical cancer did not influence screening practices in this study populations and only 7.2% of the respondents were unwilling to undergo screening due to pain, discomfort, or social reasons. Rather, the majority identified lack of time and motivation as deterrents to screening and felt that mandatory health check-ups would be beneficial [9-15].

The lack of impetus experienced by health workers to utilise an accessible screening service will be compounded in the general population, who would have to travel distances to screening sites, spend time in queues, and may need financial aid from their families. These factors suggest that the responsibility to undergo screening should not be on the population, but rather a public requirement to be effective.

Public health programs to spread awareness must be coupled with organised opt-out screening programmes, identifying eligible women through local registries, and targeting all sectors of the society. Despite the challenges of funding and infrastructure, National public funded HPV vaccination of adolescents and aggressive screening by Pap smear, visual inspection methods or HPV testing, are the need of the hour in India, to allay the burden of cervical cancer [16].

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