



Role of Nurses in Cancer Education, Screening, and Detection in the Community: Narrative Review Addressing the Existing Lacunae and Scope in India

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Abstract

Across the world, nurses are an important component in both patient and community health care and are excellent ambassadors for community education and awareness endeavors. Cancer is on a rise and creating awareness on the causes, signs, and inculcating the importance on timely detection and accordingly an early treatment-seeking behavior can be very useful in reducing the incidence and can contribute to decreasing the morbidity and mortality associated with the ailment. Effective and correct education play a crucial role in community awareness and nursing interventions in tobacco cessation counselling and cervical cancer screening have been documented from across the world. Efforts to improve the community knowledge, advocacy for cancer screening, and the development of new technologies for cancer screening will allow for improvements in cancer screening over time. This need-of-the-hour narrative review addresses the role nurses can play in cancer education, screening, and detection in the Indian community. In addition to this, the existing lacunae and ways to fill the gap for the betterment of the fraternity and the society at large are also addressed. It is expected that this review, which is the first on the topic from India, will benefit the fraternity and the society at large.

Keywords

- cancer awareness
- screening
- community
- education
- nurses

Introduction

According to recent data published by the world's leading cancer nodal center, the Global Cancer Observatory (GLOBOCAN),¹ in 2020, India was the third leading contributor to

the overall global number of cancer cases.² Recent predictions were that 1,461,427 cases of cancer occurred in India in 2022.³ With a crude rate of 100.4 per 100,000, and information that 1 in 9 persons in India will develop cancer at some point in their lives, it is estimated that cancer will be huge

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health issue and will levy immense stress on the existing health care system.³ What is significantly worrying is that, unlike in the developed countries, majority of Indian patients arrive late for treatment, resulting in high incidence-to-mortality ratio of 0.68 to 0.38.^{4,5} On a summative view, illiteracy and lack of awareness, limited access to quality cancer care, and inability of the patient to afford optimum treatment have all contributed to the skewed incidence-to-mortality ratio.⁵

From an Indian health care provider's view, when compared with the first decade of the millennium, there have been immense improvements in upgrading the system with conscious attempts focused on establishing facilities and providing medical infrastructures in the underserved areas and communities across the length and breadth of the nation.⁶ However, providing an array of medical services to India's population of 1.4 billion, which currently is the World's largest, is a herculean task that needs bridging the gaps.⁶ This is strikingly true in cancer diagnosis and care where several prominent factors contributing to the challenges: inadequate diagnosis and treatment facilities; insurance and public funding; ill-equipped health care system; dearth of medical personnel; huge rural versus urban and socioeconomic disparities; and regional differences in easy access to health care.⁵ This issue is further exacerbated by the cultural norms that discourage seeking medical attention and the propensity for patients and their families to conceal cancer diagnoses out of shame, lack of cancer knowledge, and apprehensions of news spreading among the general population.⁵ Cumulatively, all these factors have affected the low-income lesser educated people and those living in rural areas immensely.⁵

Importance of Cancer Education in Reducing Incidence

Multiple preclinical, clinical, epidemiological, and community-based studies have proved that cancer is a multifactorial disease and that genetic susceptibility, environmental variables, and lifestyle choices all have a role in its etiology.⁷ Therefore, reducing risk factors, such as tobacco use, alcohol consumption, poor diet, low levels of physical activity, workplace and environmental carcinogens, radiation exposure, immunization against hepatitis B and human papillomavirus (HPV),⁸ and prevention of infection with *Helicobacter pylori* and schistosomiasis, can prevent one-third or more cancer incidences and cases.⁹ From a historical perspective, in the landmark review, Van Parijs had emphasized the role of lifestyle factors in carcinogenesis.¹⁰ The review also emphasized the importance of increasing general public knowledge and initiating behavioral changes, such as altering specific risk behaviors (like quitting smoking),^{11,12} inculcating self-examination skills (like breast self-examination [BSE]),¹³ and encouraging early cancer detection among the general population.¹⁰ These preventive measures are now well accepted and have been advocated across the world.

From cancer prevention perspective, although complete prevention is impossible in some types of malignancies

(pancreatic, brain, etc.),^{14,15} there are strategies to lessen one's vulnerability to some forms.¹⁶ It is estimated that 30 to 50% of all cancer cases might be avoided and that cancer prevention is economically viable and an effective long-term approach to prevent and control cancer.¹⁷ Cancers affecting the oral cavity, breast, uterine cervix, lung, and colorectum are preventable with lifestyle modification, awareness of warning signs, and regular screening, as specified by guidelines considered to be vital and from years of study.¹⁸ In short, the famous adages "*prevention is better than cure*" and "*a stitch in time saves nine*" are apt as they summarize that timely diagnosis is crucial to the success of complete cure of cancer.¹⁸ If people are conscious of their own personal risk factors, they can begin taking steps toward cancer prevention much sooner for the betterment and for family. In lieu of this, primary prevention (like lifestyle modification, vaccination)¹⁹ and secondary prevention (screening and early diagnosis of oral, breast, uterine cervix, colorectum, lung, and prostate cancers)^{20,21} are considered to be an essential part of cancer control and are being advocated affirmatively in some societies of many countries.

Nurses in Cancer Education and Screening

Globally, nurses who constitute 59% of the health workforce are the primary component of direct patient care, and in many countries, some are also involved in administrative endeavors in the health care sector both in hospital and community settings.²² In 2013, as a component of their Global Action Plan for noncommunicable diseases (NCDs), the World Health Organization (WHO) put forth a recommendation for nations to expand the role of nurses and allied health professionals²³ and proposed objectives in the prevention and management of NCDs.²⁴ Importantly, specific emphasis was placed on overcoming obstacles that hindered the effective contribution of these professionals, which needs to be adequately addressed in the future. On a practical note, numerous prospects are available to fully leverage the expertise of nurses specialized in oncology, allowing them to significantly address the challenges posed by the burden of cancer.^{9,25}

On a realistic note, the most critical abilities that the nurses have are the capacity to create strong professional connections with patients, family members, and other caregivers due to their job nature and involvement in patient care. Nurses are in a unique position to spread the word about the importance of cancer prevention in several situations because of their expertise in health care aspects and ability to develop trustworthy relationships (WHO, 2020).²² In her inspiring review, Frank-Stromborg highlighted the value of nurses in both community-based and in-patient settings for primary and secondary cancer prevention, emphasizing the role of oncology nurses.²⁶ Following this, numerous programs were initiated in many developed countries, and reports indicate that nurses have played an important role in the fight against cancer, and that nurse educators in particular have been instrumental in effectively planning and carrying out tobacco cessation counselling and cancer awareness programs.²⁷

With regard to nurse-led cancer screening, seminal studies by Ansell and colleagues²⁸ demonstrated that an intervention program to reduce barriers to breast and cervical cancer screening in Chicago inner city facilities for low-income, high-risk African-American women was successful.²⁸ In this 18-month nurse-delivered interventional study, nurses and public health personnel recruited women for free breast and cervical cancer screening.²⁸ The objective of the intervention was to comprehend barriers to breast and cervical cancer access, knowledge, initial and follow-up screening, and treatment behavior and adherence. The 18-month intervention program with 7,654 low-income women helped identify 84 cases of breast cancer and 9 cases of cervical cancer.²⁸ A post-intervention survey revealed that study participants were more knowledgeable about breast and cervical cancer and were more aware of the program than at baseline. The most important observation was that over 90% of women with breast abnormalities kept their referral appointments clearly indicating the effectiveness of the nurse-led program in cancer prevention and in inculcating the behavior of adherence to safety screening.²⁸

From an Indian perspective, Gajalakshmi and coworkers investigated the effectiveness of training village health nurses (VHNs)²⁹ in identifying cervical abnormality by visual inspection and in Pap smear training.²⁹ The investigators trained 101 VHNs from different villages in Tamil Nadu and sent to their native places.²⁹ In the following 2 years, 6,459 were screened and the observations of the trained VHNs and gynecologists

were found to be 95% consistent in identifying abnormal cervix and 80% consistent in sampling for Pap smear. The study affirmatively indicated that training the nurses would be a really effective means in cancer screening.²⁹

Following this, studies from Tshwane, South Africa³⁰; Cardiff, United Kingdom³¹; Malawi³²; Brazil³³; Belfast, United Kingdom³⁴; Ireland³⁵; and Ras Al Khaimah in United Arab Emirates³⁶ have all shown that nurse-led community-based endeavors had a positive role and were vital in creating cancer awareness and highlighting importance of screening in the society. According to a systematic review of health promotion interventions to increase breast cancer screening in countries across different continents, positive outcomes were achieved, including women's perceptions of breast screening, BSE, and knowledge of breast screening.³⁷ Following this, another systematic review that addressed primary care nurses' knowledge of cancer screening recommendations, as well as the frequency of early cancer diagnosis-related discussions with patients, found differences across study areas, possibly due to measurement bias and differences in clinical duties in the health systems they were serving.³⁸ In the recent past, studies have been conducted to ascertain the knowledge and teaching of cancer awareness^{39–65} and the details are listed in ►Table 1.

Nurses in Cancer Education in India

Nurses, as in the rest of the globe, form the backbone of the Indian health care system. In India, nurses, who make up

Table 1 Details of studies with results indicating observations on cancer awareness in nurses

Cancer (reference)	Objective	Type of study	Sample size	Observation and Inference
Cervix (Shekhar et al, 2013) ³⁹	Assessment of knowledge, attitude, and practices	Cross-sectional	262	Majority (77%) were aware of Pap smear, 50% knew about its ability of precancerous lesion detection. While 23.4% recognized HPV as a risk factor, only 7% nurses had undergone screening. 85% never did Pap smear for patients. 90% did not refer for Pap testing; viewed as doctor's job.
Breast (Fotedar et al, 2013) ⁴⁰	Knowledge of risk factors, early detection methods, and screening practices	Cross-sectional study	457	Nurses' average knowledge of risk factors was 49%. Knowledge levels varied: poor 10.5%, good 25.2%, very good 45%, excellent 16.3% for risk factors and early detection. BSC nurses had higher knowledge; 54% practiced annual BSE. Less than one-third had recent CBE; 7% had prior mammograms.
Cervix (Thippeveeranna et al, 2013) ⁴²	Knowledge, attitude, and practice of Pap smear screening	Cross-sectional study	224	Majority (98.6%) knew about cervical carcinoma, but 18.3% lacked risk factor knowledge. Adequate Pap smear knowledge in 88.8%, and 11.6% had prior tests. Common nonparticipation reasons: no symptoms (58.4%), lack of counselling (42.8%), no physician request (29.9%), fear of exam (20.5%).

(Continued)

Table 1 (Continued) Details of studies with results indicating observations on cancer awareness in nurses

Cancer (reference)	Objective	Type of study	Sample size	Observation and Inference
Cervix (Singh et al, 2012) ⁴¹	Knowledge of cervical cancer and Pap smear screening among staff nurses	Questionnaire-based survey	205	It was observed that 74% recognized Pap smear for cervical cancer detection, but 59% knew its dual role. HPV vaccine known to 18%. While 47% respondents never had Pap smear; 63% did not refer patients. Most (79%) considered speculum exam and Pap smear doctor's tasks. Only 11% had personal Pap smear.
Breast (Paul et al, 2015) ⁴³	Women's knowledge, risk factor awareness, and screening practices in BSE	Cross-sectional population-based survey	560 nurses	BSE knowledge was only 16%, with 15.6% practicing it once. Well-known risks: alcohol (64.6%) and smoking (64%). Least known: early menarche (17.2%), red meat use (23%). Key recovery factors: doctor's support (95%) and family support (94.5%).
Cervix (Shankar et al, 2015) ⁴⁴	Impact of awareness programs in adoption of safe practices in prevention and early detection.	Pre-test and post-test questionnaire	156	Knowledge increased for cervical and breast cancer at 6 months, sustained at 1 year. BSE more adopted than CBE, mammography, and Pap test. Over 60% teachers learned from magazines and 75% from doctors about Pap test. Awareness changed alcohol/smoking habits at 6 months and 1 year. Key reasons for not screening: ignorance (50%), lethargy (44.8%), lack of time (34.6%)
Cervix (Sreeramulu et al, 2022) ⁴⁵	Knowledge of cervical cancer and its relationship with genital hygiene	Questionnaire-based survey	87 respondents	Six domains on awareness of physical and genital hygiene, cervical cancer causation and prevention, health education and personal experience of cervical cancer were explored. In the awareness domains, the response was uniformly poor in 45–50% of respondents. Nurses had poor knowledge in every domain of the questionnaire
Breast (Ramakant et al, 2018) ⁴⁶	Awareness about breast cancer prevention, early detection, symptoms, and management in urban and rural Indian women and correlation with education and socioeconomic strata	Prospective cross-sectional observation study	270	The medical group had more knowledge, but prevention attitudes and BSE skills were low across all subgroups (rural/urban). Reasons for delays: lack of BSE knowledge, BC symptom unawareness, cancer stigma, and financial issues. To boost awareness: media ads, campaigns (roadside/colleges), discussions. Also, involve Anganwadi workers/nurses for village outreach
Breast (Malik et al, 2020) ⁴⁷	Identification of the extent of women in Fiji and Kashmir, India have BCA and practice breast self-examination (BSE) and factors associated	Survey	399 and 1,982 women in Kashmir and Fiji	Among the 1,968 women in Fiji, 57% were deemed to have an acceptable BCA compared with only 7.3% of 395 women in Kashmir. Having some education was associated with having BCA with an odds ratio (OR) of 4.7 (1.7–13) in Fiji and 10 (1.7–59) in Kashmir. Of 1,976 women in Fiji, 40% had tertiary education, while 40% of 392 women in Kashmir had no education at all. The lack of female doctors or nurses with whom to discuss issues was perceived as a problem in both countries.

Table 1 (Continued) Details of studies with results indicating observations on cancer awareness in nurses

Cancer (reference)	Objective	Type of study	Sample size	Observation and Inference
Cervix (Raj et al, 2023) ⁴⁸		Cross-sectional analytical study	118 paramedical professionals	After implementing EI2W, scores improved in all domains except cervical pre-cancer. ANMs showed better knowledge post-EI2W. More experience led to higher cervical cancer awareness. KAP analysis displayed strong reliability: practice (0.726), and knowledge (0.711).
Breast (Dhakal et al, 2023) ⁴⁹	Assessment of duration of an educational intervention for a woman's intention to do a breast self-examination (BSE) and mammography screening.	Interventional study	360 females	Initially, attitudes, perceived behavioral controls, and intents were similar between IG and CG for both mammography and BSE, except subjective norms. BSE intentions effective for 4 months, and mammography for 4 and 12 months. Stable attitudes for both tests at 4, 8, and 12 months. Good control persisted for 4 months in both tests. Session maintained BSE and mammography intent for 4 months.
Cervix (Chacko 2022) ⁵⁰		Pre-test and post-test design	Community health workers working in selected centers in Najafgarh, Delhi	Initially, community health workers lacked VIA test knowledge. After a structured teaching program, their post-test knowledge scores significantly improved, establishing a positive relationship.
Cervix (Rahman and Kar, 2015) ⁵¹	Assessment of baseline knowledge of cancer cervix, screening, and practice of Pap smear screening	Pre-designed, pretested, self-administered multiple responses questionnaire survey	Sikkimese staff nurses in India.	Around 90.4% of nurses knew about cancer cervix, but most did not know it is the commonest site. Among those aware, 79% knew about screening. Only a third knew Pap smears' start age. Age influenced awareness, with older staff more aware. Marital status and religion also impacted awareness. Only 16.6% nurses who knew about Pap smears had one. Most common reason offered for not undergoing Pap smear test were they felt they were not at risk (41%), uncomfortable pelvic examination (25%), and fear of a bad result (16.6%).
HPV vaccine (Shetty et al, 2019) ⁵²	Knowledge, attitude, and factors associated with acceptability HPV vaccine among undergraduate medical, dental, and nursing students in South India.	Post-test study design	988	In a survey of 988 students, most were familiar with cervical cancer (95%), HPV (89.3%), and genital warts (77.5%). About 59.7% knew about the HPV vaccine, 65.2% intended to receive it, and 68.3% would recommend it. Age influenced vaccine acceptance, with <22-year-olds less likely. Medical students (OR: 1.12), alcohol users (OR: 1.15), and moderate knowledge holders (OR: 1.14) were more likely to intend vaccination. Course and attitude significantly affected vaccine intention on multivariate analysis.
HPV vaccine (Swarnapriya et al, 2015) ⁵³	Assessment of the knowledge, attitude, and practices regarding cervical cancer screening and HPV vaccination among medical and paramedical students	Cross-sectional study	957 participants belonging to medical, dental, and nursing streams	Out of 957 participants, 430 (44.9%) displayed good knowledge and 65 (6.8%) had received HPV vaccination. Among the unvaccinated, 433 (48.54%) were not willing to take the vaccine. Concerns regarding the efficacy (30.5%), safety (26.1%), and cost of the vaccine (21.7%) were responsible for this.

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Table 1 (Continued) Details of studies with results indicating observations on cancer awareness in nurses

Cancer (reference)	Objective	Type of study	Sample size	Observation and Inference
				Age, gender, family history of malignancy, and mother's education had no influence on knowledge. Compared with medical students, nursing students had better knowledge and students of dentistry had poor knowledge.
Breast (Santhanakrishnan et al, 2015) ⁵⁴	Assessment of the knowledge, attitude, and practices (KAP) regarding the breast cancer and its screening methods among staff nurses.	Cross-sectional study	198 staff nurses working in tertiary-care hospital in Puducherry	Family history (40.9%), inadequate breast feeding (29.8%), and lifestyle factors (24.7%) were important risk factors as per participants. About 36.9% mentioned biopsy as a diagnostic test; 73.2% mentioned BSE as a screening test; 67.5% were practicing BSE, but only 5.5% were practicing it regularly. Only 11.6% mentioned CBE as a screening test, and 10.8% had undergone CBE only once. About 18.7% mentioned mammography as a screening test.
Cervix (Goyal et al. 2012) ⁵⁵	Evaluation of knowledge, attitude, and practices (KAP) of the nurses on cervical cancer and screening.	Cross-sectional study using self-administered, structured, open-ended, and pretested questionnaire	200 nurses in a teaching hospital in Surat	Majority (88%) were married; most common age of marriage being 21–25 years. Nurses linked multiple sexual partners (61%), sex at an early age (44%), HPV infection (38.6%), and heredity (31%) to cervical cancer. Approximately 70% believed that cervical cancer is preventable, detectable, and curable if detected early. Pap smear was recognized as a major screening technique by 74% nurses. Eighty percent nurses never took cervical screening while 87.5% did not recommend it to others.
Cervix (Kosambiya et al, 2018) ⁵⁶	Exploring the knowledge, attitude, and practices of nurses about cervical cancer and screening	Pretested semi-structured questionnaire method	103 nurses of a tertiary care center in Western India.	Majority (98%) were aware about cervical cancer, while 73.8% agreed that it could be prevented. Major symptoms of cervical cancer recognized were irregular bleeding (31.7%) and foul smelling vaginal discharge (34.2%). Nursing academic study (51.3%) was the leading source of all information. Risk factors identified were HPV (15.6%) and poor personal hygiene (14.7%).
Oral health (Philip et al, 2019) ⁵⁷	Knowledge, attitude, and practice of nurses regarding oral care for hospitalized patients	Cross-sectional survey	244 nurses working in a tertiary care hospital in Bangalore	The mean oral health knowledge score was 6.74 out of 22. Nurses understood inpatient oral care's significance and oral health's systemic links. Knowledge gaps existed mainly in medication impacts and denture care. Higher qualifications and longer department stay related to better attitudes. Prompt oral health assessment post-admission was common, but protocols and documentation showed inconsistencies.
Cervix (Shah et al, 2012) ⁵⁸	Evaluating nursing staff's knowledge on cervical carcinoma. Understanding respondent behavior toward prevention and screening.	Cross-sectional interview-based survey	100 nursing staff from one of the tertiary health institutes of Ahmedabad, India	Only 5 (5%) respondents underwent Pap test

Table 1 (Continued) Details of studies with results indicating observations on cancer awareness in nurses

Cancer (reference)	Objective	Type of study	Sample size	Observation and Inference
Cervix (Chawla et al, 2021) ⁵⁹	To summarize the knowledge, attitude, and practice toward screening of cervical cancer among health professionals in India	Review	22 studies with a total of 6,811 health professionals	The overall knowledge of cervical cancer among health professionals was 75.15%. The knowledge, attitude, and practice toward screening was 86.20, 85.47, and 12.70%, respectively.
Breast cancer (Oza et al, 2011) ⁶⁰	Knowledge, attitude, and practices of nursing staff toward the early detection of breast cancer	Cross-sectional study	250 nurses	Almost 74% knew that early detection of breast is possible and 71% of the nurses would like to go for early detection by mammography. Only 7.2% of nurses had undergone investigation for early detection. 96% of nurses want information regarding the breast cancer and most them by the means of seminar and workshop.
Breast (Sujindra and Elamurugan, 2015) ⁶¹	Assessment of the level of knowledge, attitude, and practice regarding self-breast examination	Cross-sectional study	254 female nursing students	Response rate was 94.5%. Total mean knowledge score was 14.08 ± 3.42 . Acceptance of early detection's survival benefit was at 87.5%, while 89.2% knew about BSE for early breast cancer detection and 93.3% considered BSE necessary and 87.5% had done it before. Some (5%) nursing students found BSE embarrassing. Regular BSE practice was low at 33.3% annually.
Cervix (Gedam and Rajput, 2017) ⁶²	Assessment of the knowledge, attitude, and practices regarding cervical cancer screening and HPV vaccination and to analyze the factors associated	Cross-sectional study	143 nurses and 75 nursing students (total 218)	Among the nurses surveyed, 33.49% had received education about cervical cancer and HPV. 84.4% believed they faced no risk of cervical cancer. 65.60% knew about Pap smear as a screening method. Among married nurses, only 27.28% underwent regular gynecological exams, and 74.47% never had Pap smear. 54.59% were unaware of the Pap smear's appropriate starting age. Knowledge about HPV transmission (33.49%) and HPV vaccine (26.15%) was limited. Almost all (98.62%) nurses had not received the HPV vaccine.
Cervix (Swapnajaswanth et al, 2014) ⁶³	Knowledge, attitude, and practice (KAP) regarding screening (Pap test) and vaccination for carcinoma cervix and to assess barriers to acceptance of the Pap test.	Cross-sectional, descriptive study using semi-structured, self-administered questionnaire	Among female doctors and nurses in a tertiary care hospital in Bangalore	Higher proportion of doctors, 45 (78.9%), had very good knowledge as compared with only 13 (13.3%) of the nurses, about risk factors for cancer cervix and Pap test ($p = 0.001$). As many as 138 (89.6%) of the study subjects had favorable attitude toward Pap test and vaccination, but 114 (73.6%) of the study subjects never had a Pap test and the most common reason 35 (31%) for not practicing was absence of disease symptoms.
Cancer (Rao et al, 2019) ⁶⁴	Assessment of the level of cancer awareness among hospital nurses, identify the knowledge gaps, and to incorporate them into training	Cross-sectional survey	244 nurses in a tertiary care hospital in North Delhi	Out of 244 nurses, 75.81% were aware of cancer and approximately 77.5% recognized cancer as a significant Indian health concern, while 79.9% knew about its rising incidence. About 66.4% understood cancer as a lifestyle disease while 75.4% recognized cancer's preventability, and 78.7% agreed on early detection. 23% thought all lumps were cancerous. Almost 75% knew warning symptoms; nearly 90%

(Continued)

Table 1 (Continued) Details of studies with results indicating observations on cancer awareness in nurses

Cancer (reference)	Objective	Type of study	Sample size	Observation and Inference
				understood causative factors. It was seen that 21% held cancer myths: 23.4% thought it is contagious, 25% familial, and 13.9% due to curse. Misconceptions included cancer spread by biopsy (17%) or surgery (21.7%).
Cervix and breast (Dhanasekaran et al, 2022) ⁶⁵	Educational intervention for medical education reforms to include curricula to strengthen knowledge about cancer screening	Manuscript workshop pre- and post-test method using structured questionnaire	91 nursing students	Ninety-one students attempted both pre- and post-surveys, of which 56 were from Group 1 and 35 from Group 2. Students demonstrated statistically significant improvements in knowledge on cervical and breast cancer screening after participating in the workshop.

Abbreviations: ANMs, auxiliary nurse midwives; BC, breast cancer; BSE, breast self-examination; CBE, clinical breast examination; HPV, human papillomavirus; VIA, visual inspection of the cervix with acetic acid.

30.5% of the health workforce, are a vital part of the country's health care infrastructure and are involved in direct care of people affected with a range of ailments that include road traffic injuries, infectious diseases, mental disorders, maternal and nutritional deficiencies, NCDs especially type II diabetes, hypertension, and arthritis.⁶⁶ The other important aspect is that given the low doctor-to-population ratio (1.34 for 1,000 in 2017),⁶⁷ coupled with significant absenteeism of medical doctors and their inadequate distribution, the onus of patient care is principally on the nurses.^{66–68}

Training

Education plays a vital part in raising awareness and efforts to educate the public, as evidenced by a pre- and post-test study that was beneficial in improving women's knowledge of BSE.⁶⁹ The recent findings⁷⁰ confirm the effectiveness of a camp-based, organized training program in increasing awareness, selective screening, and timely referral through the utilization of clinical breast examination⁷⁰ camps with 1,061 ASHA (Accredited Social Health Activist)⁷⁰ workers in Uttarakhand, India.⁷⁰ This is a very important observation because ASHA workers perform the job of linking citizens with the government of India's health initiative and can help propagate breast cancer awareness and importance of screening in the rural and underserved areas of society.

A nurse-guided planned teaching on breast cancer and BSE⁷¹ among peri-menopausal women in a selected urban community of Mumbai, India was performed and the results demonstrated that the program increased the women's knowledge and practice of BSE.⁷¹ A 1-day course-based endeavors to improve knowledge on “Cervical and breast cancer screening” is also reported to have improved awareness and screening knowledge in the nursing students who participated.⁶⁵

Recently, George and Batra evaluated the efficacy of a community-based, multicomponent, nurse-led intervention program to determine an increase in cervical cancer screening behavior and knowledge in a rural community in Idukki, Kerala, India.⁷² The experimental group received small group

education, reinforcement, telephone reminders, Pap smear navigation and counselling, and investigator follow-up, whereas the control group received no intervention.⁷² Before and twice after the intervention, women's knowledge, attitude, and screening behavior regarding cervical cancer prevention were measured. The results suggest that the interventional group had improved their cancer preventive knowledge, attitude, and screening behavior.⁷² A positive relationship between knowledge and screening behavior, as well as a significant correlation between education, age at marriage, and number of pregnancies and knowledge, attitude, and practice regarding cervical cancer prevention was observed.⁷² The study confirmed that the nurse-led intervention program improved women's cervical cancer screening behavior and suggested the need for recurrent incentives and reinforcement to incorporate behavioral change and increase rural women's use of screening programs.⁷²

Novel Teaching

Traditionally, studies on cancer awareness have principally been based on the contact-tracing learning process followed in the didactic teaching of mentor-based module. However, in the recent past, electronic gadgets have been tried for dissemination of the knowledge and the subsequent sections address the aspects. Sharma and colleagues⁷³ conducted a random-sample research study in an Indian rural hospital to investigate the feasibility of smartphone-based cervical cancer screening by nurses and health care professionals (through visual inspection under acetic acid).⁷³ To maintain track of participant information, inspection results, and following care, the nurses in this study used a log of observations and a formal survey at each clinic visit. Concurrently, the cervical area smartphone photographs were forwarded to a specialist for review of the nurse's clinical assessment. The study's findings revealed that nurses with the necessary training can do credible screenings and that timely expert comments can enhance reporting.⁷³

Concomitantly, Bhatt and colleagues⁷⁴ developed a mobile health (mHealth) prototype, performed training

sessions, and initiated a screening intervention to increase cervical and oral cancer screening rates in three impoverished locations of India.⁷⁴ Community health workers used visual inspection with acetic acid and visual oral inspection to test for cervical and oral cancer with the support of nurses.⁷⁴ The mHealth prototype was shown to be quite acceptable and capable of promoting cancer screening in low-income rural populations with low health literacy.⁷⁴

In a recent study, Raj and coworkers reported that a 2-week educational intervention to paramedical staff that also included auxiliary nurse midwives (ANMs) improved understanding of cervical cancer.⁴⁸ The study conducted by Tata Memorial Centre (Mumbai), India's oldest and leading cancer hospital and training center, focused on knowledge, attitude, and behavior and all of which were assessed through the standard pre- and post-test format.⁴³ The training focused in five vital domains: disease awareness, HPV, pre-cancer stage, screening methods, and data management.⁴³ The results indicated that all domains' scores improved except for the pre-cancer domain, confirming that the 2-week intervention was successful in enhancing the knowledge of paramedical professionals and that this approach could be helpful in filling the gaps caused by the lack of human resources in community-based cancer prevention efforts.⁴³

Hitt and coworkers researched into how well telemedicine could help fill the gap in care for rural women in Arkansas, United States, by screening them for cervical cancer. Results from 1,504 patients referred from 68 counties showed that they were consistent with those of conventional exams.⁷⁵ As a result of its low cost and positive patient reception, telemedicine has the potential to increase health care accessibility for marginalized groups.⁷⁵ All these studies indicate that adopting modern electronic-based methods can be useful in creating both cancer education and screening endeavors in hinterlands where the services of cancer specialists are scarce.

Cancer Education in Nursing Syllabus in India

Structured teaching during academic teaching through curriculum design is the most appropriate means to inculcate right knowledge on cancer cause, signs, awareness, and good health practice for self as well as to propagate right information to family and others. The Indian Nursing Council has introduced modules on breast, oral, and cervical cancer in the revised syllabus 2020 for undergraduate curriculum for Baccalaureate in Nursing (in Medical Surgical and Community Health Nursing courses). In addition to structured mentor-led didactic class room teaching, emphasis is also placed on practical training to develop necessary clinical skills in performing, assisting, and providing after care for patients undergoing diagnostic procedures like BSE, clinical examination, mammogram, Pap smear, colposcopy, oral examination, and swab taking under the supervision of trained nursing teachers and medical doctors.^{18,76}

Concerted efforts are also directed in developing soft skills in the students to contribute as nurse educators in the society and through structured community visit posting in

both urban and rural areas. Students are taught to address cancer causes, signs, symptoms, and treatment to the general population in an attempt for them to be health ambassadors in the community. They must be taught the right way to address stigma, fear, and apprehensions and that most cancers are curable if detected early in general public. Special emphasis should be placed in inculcating ethical way of presenting aspects on cancer signs in breast and cervix with cartoons or diagrammatic pictures in a culturally appropriate way. Student's competencies in cancer screening are evaluated through clinical performance assessment, objective structured clinical examination, and effective patient care in practical examinations. The students should also be taught on the ethical aspects and on how to handle moral dilemma in accordance with the bioethics principles.^{76,77}

Barriers Nursing Educators Face and How It Can Be Improved

Today, oncology is a highly specialized branch in health care sciences and needs knowledge and training in diverse subspecialties. Considering this, in most developed countries, concerted attempts are directed in training interested individuals in onco-nursing and oncology nurse educator programs through specialized training and mentor-guided teaching in both subject and patient care aspects. However, in India emphasis is on training a larger number of general nurses rather than experts, to satisfy the high demands of the population and specializing advanced nursing training (post basic diploma programs in nursing) is still in its infancy. One of the important reasons for this is that there is scarcity of suitable job prospects for nursing experts and the negligible difference in financial compensation between general and specialist nurses, which discourages many nurses from undertaking specialization.⁷⁶

In India, cancer screening is mostly performed by medical doctors (oncologists, gynecologists, surgeons, and otorhinolaryngologists) and dentists. Studies from both India and abroad have shown that nurses when trained and encouraged can perform the initial cancer screening and refer them to medical doctors for confirmation and advanced care. In the recent past, mobile screening vans for Pap, mammogram, and oral screening along with well-equipped tele-medicine are being used for cancer screening in the society. A well-trained nurse can lead the initial screening endeavors in the community and refer people with possible cancer symptoms to professionals for further confirmation and treatment to medical doctors and tertiary care centers. Concerted and deliberate efforts should be directed toward training nursing students in their academic curriculum by experts in the field to serve the community on graduation.⁷⁶

Challenges in Education, Research, and Training in Cancer Nursing

The Government of India has introduced training module for staff nurses serving at primary health centers on population-based screening of common NCDs. However, this module is

underutilized and efforts should be toward nurses' enrolling and getting trained in cancer screening for oral, breast, and cervix. Periodic knowledge and skill update are essential for nurses and should be attempted through continuing education programs by online or offline methods. Specific efforts should also be directed toward training practicing nurses by organizing credit-based refresher courses and deputing them in oncology care units to get trained under experts and return to serve the community. In the absence/shortage of medical doctors in the rural areas, this re-orientation of nurses' training can be very useful in timely detection of cancer and help patient direct to advanced medical care in tertiary care centers. Efforts are needed to consider these aspects and bridging the gaps.^{76,77}

Conclusion

This review offers a succinct summary of the current deficiencies, the contributing factors, and strategies for addressing the gap in cancer education and awareness. It also discusses the different ways in which nurses in India can contribute to the efforts of preventing and detecting cancer in themselves, the community, and clinics. Future research should focus on intentionally prioritizing curriculum development and implementation of cancer prevention programs at both the national and regional levels. To gain a more comprehensive understanding and classification of the duties and tasks performed by nurses in cancer prevention, it is imperative to gather supplementary information from relevant stakeholders and educational resources, as well as provide practical training for the nursing workforce. Additional study will be required to measure the results of nurse education and other treatments for primary and secondary prevention. Efforts to improve cancer screening and prevention should involve utilizing the expertise of nurses in community health and cancer health care systems, both within hospitals and in the community. In conclusion, nursing students and professionals can play a highly significant role in encouraging the widespread adoption of cancer screening guidelines by actively participating in clinical practice, academia, and advocacy after the existing gaps are addressed. Efforts should be focused on supporting and promoting this, as it will provide great benefits to nursing professionals, the fraternity, the community, humanity, and the nation.

Patient Consent

This article is a review of previously published literature and does not involve any studies with human participants or animals conducted by the authors. Hence, patient consent is not required.

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Conflict of Interest

None declared.

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