

Assessing Breast Cancer Literacy and Its Sociodemographic Correlates: A Tertiary Hospital-Based Survey in Northern India

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ABSTRACT

Background: Among women worldwide and in India, breast cancer (BC) continues to be the primary cause of cancer-related morbidity and mortality. Despite the well-documented advantages of early detection, awareness regarding BC risk factors, symptomatology, and the practice of Breast Self-Examination (BSE) remains suboptimal, particularly in resource-constrained regions. **Objective:** This study aims to evaluate the level of knowledge, awareness, and perceived barriers regarding BC and BSE among women attending a tertiary care hospital in Uttar Pradesh, India. **Methodology:** A hospital-based, cross-sectional survey was conducted between June 2023 and July 2024 at a 500-bed teaching hospital in Uttar Pradesh, India. Following STROBE guidelines, a structured, validated questionnaire in both English and Hindi were administered to 469 adult female participants using convenience sampling. The survey assessed socio-demographic profiles, general BC awareness, knowledge of symptomatology, and BSE practices. Descriptive and inferential statistics were performed using SPSS version 24.0. **Results:** Out of 469 participants, 90.6% reported having heard of BC. However, comprehensive knowledge concerning specific signs and symptoms varied significantly. While 75.3% correctly identified a breast lump as a primary symptom, only 47.7% recognized breast asymmetry, and 52.8% identified nipple morphological changes as warning signs. Crucially, a significant knowledge gap was observed regarding BSE; 61.8% of participants lacked any knowledge of the procedure. Furthermore, misconceptions persisted regarding the optimal frequency of BSE, with only 46.3% correctly identifying a monthly interval. Socio-demographic variables, including age, marital status, and educational attainment, were significantly associated with the participants' overall awareness levels. **Conclusion:** Although rudimentary awareness of BC is prevalent among Indian women, specific knowledge regarding clinical symptomatology and BSE practices remains critically deficient. The findings underscore an urgent need for targeted, culturally tailored health education interventions to bridge knowledge gaps, demystify screening protocols, and ultimately facilitate early diagnostic pathways in resource-limited settings.

Keywords: Breast Cancer, Breast Self-Examination (BSE), Health Awareness, Early Detection, Preventive Oncology, Women's Health, India

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1. INTRODUCTION

Breast cancer (BC) represents a critical and escalating global public health crisis [1]. Accounting for over two million new diagnoses annually, it has surpassed lung cancer as the most frequently diagnosed malignancy worldwide and remains the leading cause of cancer-related mortality among women [1,2]. The epidemiological transition occurring within developing nations has resulted in a marked surge in both the incidence and mortality rates of BC [2]. In India, BC currently occupies the foremost position among female malignancies, representing nearly 27% of all female-centric cancers and having definitively outpaced cervical cancer [3,4]. The National Cancer Registries highlight an alarming prevalence in metropolitan zones, yet an

equally concerning, insidious rise is documented in rural and semi-urban populations across states like Uttar Pradesh [3,5].

The paradox of breast cancer in lower-middle-income countries (LMICs) lies in the disparity between the availability of early detection modalities and late-stage clinical presentations [6]. In developed nations, robust prognostic outcomes are heavily reliant on institutionalized screening programs, such as routine mammography, which systematically identify pre-clinical

anomalies [2,7]. Conversely, LMICs are frequently encumbered by infrastructural inadequacies, profound socio-cultural barriers, and strict financial constraints that preclude the feasibility of widespread mammographic screening [6,8]. Consequently, nearly

60% of breast cancer diagnoses in India occur at advanced clinical stages (Stage III and IV), which exponentially diminishes the probability of long-term survival and severely exacerbates the economic burden of oncological care on patients and healthcare infrastructure alike [4,9].

Early identification remains the cornerstone of BC management and survival [10]. The World Health Organization (WHO) delineates two principal early detection strategies: systematic screening and early clinical diagnosis [11]. Given the impracticality of universal mammography in resource-constrained settings, clinical down-staging—achieved through Clinical Breast Examination (CBE) and Breast Self-Examination (BSE)—assumes paramount importance [12]. While ongoing academic discourse debates the efficacy of BSE as an isolated tool for reducing mortality, overwhelming consensus recognizes its profound utility in fostering "breast awareness" [13]. BSE empowers women to recognize morphological or physiological deviations in their breast tissue, acting as a crucial catalyst for timely medical consultation [13,14].

Despite the theoretical advantages of BSE, empirical literature reveals a pervasive lack of awareness and utilization among Indian women [14,15]. The deficiency is multifactorial. Sociocultural paradigms heavily influence health-seeking behaviours; fatalism, stigmatization of reproductive health, and modesty often deter women from discussing breast abnormalities with healthcare providers, particularly male physicians [14]. Furthermore, pervasive myths attributing cancer to supernatural forces or conceptualizing mastectomy as a loss of femininity heavily obstruct proactive diagnostic engagement [15]. Recent surveys emphasize that while general recognition of the term "breast cancer" is increasing, actual functional knowledge regarding risk factors (e.g., age of menarche, parity, genetic predisposition) and precise symptomatology (e.g., skin dimpling, bloody discharge, asymmetry) remains alarmingly deficient [4,16].

Research Gap and Significance There is a clear gap in our understanding of the knowledge, attitudes, and practices (KAP) of women living in semi-urban and socioeconomically different regions of Northern India due to the literature's strong focus on metropolitan Indian populations. Granular data describing the specific awareness deficiencies of these populations are necessary to develop effective, culturally appropriate public health programs.

Study Objectives and Hypotheses The objective of this study is to determine how well-informed female patients at a large tertiary care hospital in Uttar Pradesh, India, are concerning BC and the use of BSE. Evaluating screening barriers and identifying specific sociodemographic factors that impact medical literacy are secondary objectives. We estimate that although there will be a high level of superficial awareness of BC, there will be a lack of accurate clinical symptomatology and practical understanding of BSE, which will be significantly influenced by educational and occupational backgrounds.

2. MATERIALS AND METHODS

2.1 Study Design and Setting A hospital-based, cross-sectional descriptive survey was executed between June 2023 and July 2024. The study setting was Government Institute of Medical Sciences, a 500-bed tertiary care teaching institution located in, Greater Noida, Uttar Pradesh, India. The selection of this facility provided a representative cross-section of women from varied socio-economic and educational backgrounds spanning the Northern Indian demographic. The study protocol was developed and reported in strict accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

2.2 Study Population and Sampling Technique The target population comprised adult females visiting the hospital either as

outpatients, inpatient attendants, or non-clinical staff. Using a convenience sampling methodology, participants were recruited based on accessibility and their willingness to participate during the specified data collection timeframe.

Inclusion Criteria: Women who are at least 18 years old, speak Hindi or English fluently, and give their free and informed consent.

Exclusion Criteria: Patients with an existing or prior diagnosis of breast cancer, debilitating psychiatric illnesses precluding informed consent, or an inability to comprehend the survey instruments.

2.3 Sample Size Determination Sample size estimation was calculated utilizing standard epidemiological formulas for cross-sectional surveys. Assuming a 50% prevalence of adequate BC awareness to yield the maximum sample size, with a 95% confidence interval and a 5% margin of error, the minimum required sample was approximately 384. To account for potential non-responses or incomplete questionnaires, an oversampling strategy was employed, resulting in a final analytical sample of $N = 469$ participants.

2.4 Data Collection Tool Data were acquired utilizing a pre-validated, structured questionnaire. The instrument was synthesized from established literature and reviewed by an expert panel comprising oncologists, public health specialists, and clinical researchers to ensure face and content validity. The questionnaire was first written in English and then translated into Hindi utilizing a precise forward-backward translation methodology in order to get around language problems. The questionnaire was partitioned into distinct domains:

Socio-demographic Profile: Age, marital status, education level, occupation, and personal lifestyle habits (smoking and alcohol consumption).

General BC Knowledge: Awareness of the disease, incidence, risk factors, and perceived curability.

Symptomology Knowledge: Identification of specific clinical signs (e.g., localized pain, skin discoloration, lump formation, nipple discharge, structural asymmetry).

BSE Awareness and Practice: Knowledge of the BSE procedure and perceived optimal frequency of performance.

2.5 Confidentiality Considerations: Every participant provided written informed consent. Strict confidentiality and data anonymization protocols were maintained throughout the study lifecycle.

2.6 Statistical Analysis Raw data were codified, entered into Microsoft Excel, and imported into IBM SPSS Statistics (Version 24.0, Trial Edition) for comprehensive analysis. Individual variables were summarized using descriptive statistics, such as percentages and frequencies. Bivariate analyses, encompassing Chi-square tests and ANOVA, were utilized in the broader study to investigate associations between socio-demographic covariates and awareness domains.

3. RESULTS

3.1 Socio-Demographic Characteristics The study included a total of 469 female participants. The demographic distribution revealed a relatively young cohort, with 33.0% ($n=155$) aged 18–23 years, and 23.8% ($n=112$) aged over 35 years. The majority of the respondents were married (61.5%, $n=289$). Regarding educational attainment, the highest proportion comprised undergraduates (36.4%, $n=171$), while 16.6% ($n=78$) had only primary-level education. The occupational profile indicated that 53.4% ($n=251$) belonged to non-medical/miscellaneous professions, with medical staff comprising 13.8% ($n=65$). Behavioural risk factors were minimally reported; 91.7% and 96.0% of the cohort denied smoking and alcohol consumption, respectively.

Figure 4: Knowledge and Frequency of BSE

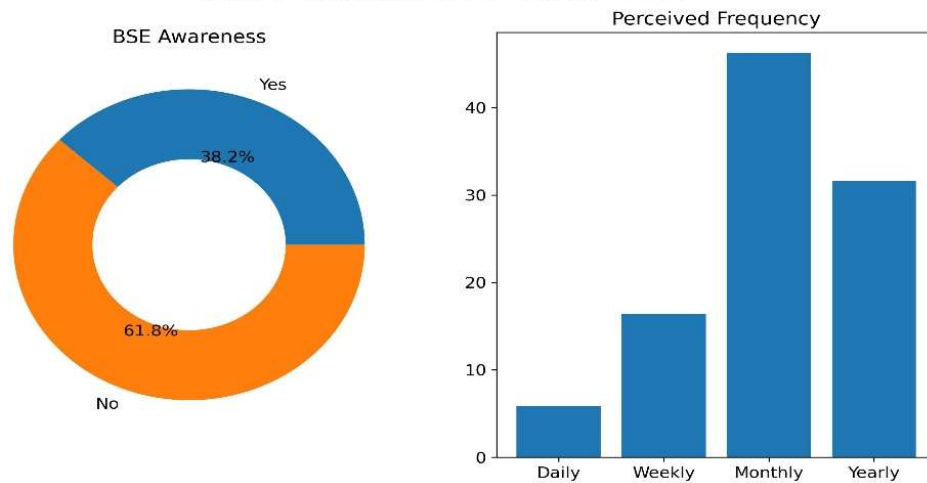


Figure 1 -Socio-Demographic Profile

Table 1: Socio-Demographic Profile of Participants (N = 469)

Variable	Category	Frequency (n)	Percentage (%)
Age Group	18–23 years	155	33.0
	24–29 years	98	20.9
	30–35 years	104	22.1
	>35 years	112	23.8
Marital Status	Married	289	61.5
	Unmarried	181	38.5
Education Level	Primary	78	16.6
	High School	140	29.8
	Undergraduate	171	36.4
	Postgraduate	77	16.4
Occupation	Medical Staff	65	13.8
	Non-Medical Staff	81	17.2
	Worker	73	15.5
	Others	251	53.4

3.2 General Knowledge and Perceptions of Breast Cancer

Awareness regarding the existence of breast cancer was exceptionally high, with 90.6% (n=426) of participants reporting having heard of the disease, and 78.5% (n=368) recognizing it as a globally common malignancy. However, risk stratification knowledge was mixed: 42.3% (n=199) correctly identified the 30–40-year age bracket as carrying elevated risk, while a substantial 23.4% incorrectly believed peak risk occurred between 20–30 years. A family history of BC was reported by 23.2% of the participants. Regarding disease prognosis, 71.9%

(n=337) recognized that BC could be fatal. Conversely, a promising 73.8% (n=347) were aware that medical treatments are available, and an overwhelming 76.8% (n=360) acknowledged that early detection significantly improves health outcomes.

3.3 Knowledge of Breast Cancer Symptomatology Participant awareness of varied clinical presentations of BC revealed distinct knowledge gaps. While the classic symptom of a palpable breast lump was highly recognized (75.3%, n=353), knowledge of other critical signs was notably diminished.

Table 2: Knowledge of Specific Breast Cancer Signs and Symptoms (N = 469)

Clinical Sign/Symptom	Recognized as a Sign: Yes (n, %)	Not Recognized: No (n, %)
Lump in the breast	353 (75.3%)	116 (24.7%)
Change in skin colour	294 (62.8%)	174 (37.2%)
Bloody discharge from nipple	287 (61.2%)	182 (38.8%)
Pain in the breast	279 (59.6%)	189 (40.4%)
Lump in neck/armpit	274 (58.3%)	196 (41.7%)
Change in nipple shape/colours	248 (52.8%)	222 (47.2%)
Breast asymmetry	224 (47.7%)	246 (52.3%)

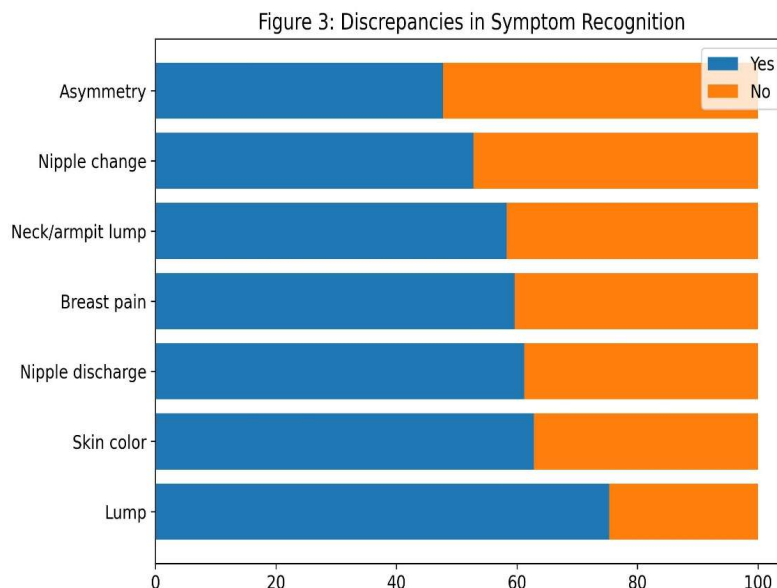


Figure 2-Discrepancies in Symptoms Recognition

3.4 Awareness and Practice of Breast Self-Examination (BSE)
Despite the relatively high superficial awareness of BC, knowledge regarding BSE was alarmingly deficient. A significant majority, 61.8% (n=289), reported having absolutely no knowledge of the BSE procedure. Among the 38.2% (n=179) who had heard of BSE, massive discrepancies existed regarding

the correct temporal frequency of the examination. Only 46.3% (n=217) accurately stated that BSE should be performed on a monthly basis, whereas 31.6% (n=148) believed it was a yearly requirement, 16.4% suggested a weekly routine, and 5.8% incorrectly believed it should be done daily.

Figure 2: Socio-Demographic Profile

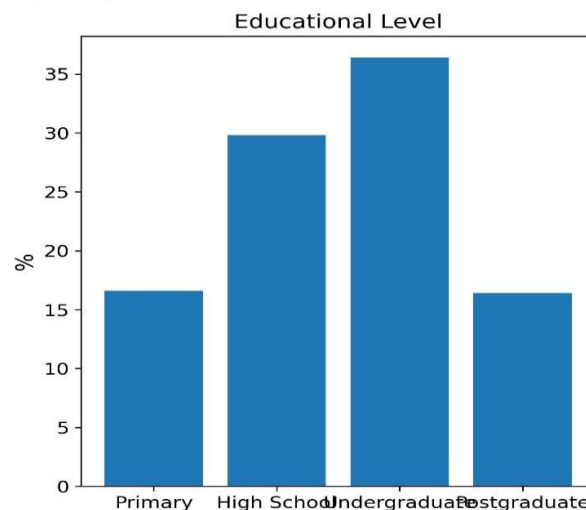
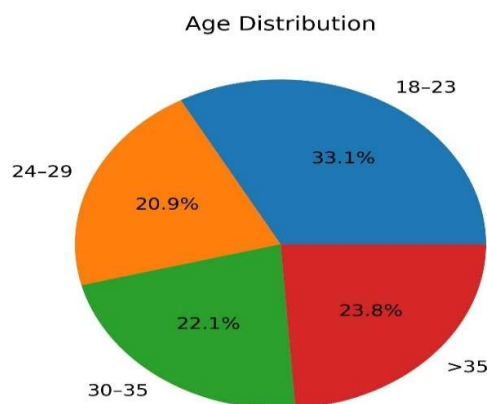


Figure 3-Knowledge and Frequency of BSE

4. DISCUSSION

The main objective of this research was to assess the awareness matrix of an extensive Northern Indian tertiary hospital's ethnically and socioeconomically varied female population regarding breast cancer and BSE. The information obtained reveals a crucial imbalance in public health literacy: widespread awareness of the disease's existence is highly prevalent, yet there are significant gaps in practical, predictive knowledge.

Interpretation of Findings and Comparative Analysis

According to our findings, an unbelievable 90.6% of participants were aware of breast cancer. This is in line with recent epidemiological research in India, which reflects the widespread use of mass media and widespread public health initiatives. However, clinical awareness is not the same as merely superficial

awareness. The participants' knowledge fell down when questioned about particular signs and symptoms. Less than half (47.7%) recognized structural asymmetry, and only a marginal majority (52.8%) recognized nipple retraction or morphological abnormalities as pathogenic signs, but 75.3% classified a breast lump as an identification symptom. Previous research involving medical and paramedical populations in North India have reported similar knowledge asymmetries, highlighting the fact that a failure to recognize mild symptoms often causes significant delays in obtaining oncological evaluation.

However, a significant assumption regarding BSE is revealed by our data: 61.8% of participants were unaware that BSE was an early detection approach. Even among those who acknowledged

it, there was a significant gap in their understanding of the procedure's application protocol; the majority were unable to identify the proper monthly period for examination. These results closely resemble studies done among younger populations and college students in developing countries, where structured medical integration in primary curriculum prevents the widespread adoption of certain preventative oncological practices, such as BSE, despite having high educational levels.

Sociocultural and Educational Implications

According to our data, breast health literacy is significantly influenced by age, marital status, and levels of education. The finding that younger participants (18–23 years) exhibited marginally better rudimentary knowledge but lacked practical screening insight confirms that the current educational framework imparts theoretical awareness without behavioural translation. In a similar vein, a cross-sectional study conducted in conflict areas around the world showed that although people who live near to healthcare facilities have a theoretical understanding of cancer, practical screening participation is hampered by sociocultural barriers like modesty, radiation fear, and negative opinions on illness. In the Indian context, the mark surrounding female reproductive anatomy is closely linked to the unwillingness to perform self-examinations or seek clinical Validation.

Clinical Down-staging in Resource-Constrained Settings

In instances where mammography is not economically possible, the WHO is a strong supporter of clinical down-staging. The approach is shifted from extensive radical mastectomies and palliative chemotherapy to breast-conserving operations and curative therapies as a result of early identification. Thus, a systematic failure in basic preventative healthcare is represented by the severe lack of BSE awareness found in this study. This gap could be successfully filled by using community health workers (ASHAs) and training non-medical staff.

5. STRENGTHS AND LIMITATIONS

Strengths: This study provides robust, primary data from a heavily populated, under-researched geographic and socio-economic demographic (Uttar Pradesh). The use of a validated, bilingual questionnaire minimized interpretation biases, and the substantial sample size provides a high degree of statistical power.

Limitations: The cross-sectional nature of the study precludes the establishment of temporal causality between socio-demographic factors and awareness levels. Additionally, relying on self-reported data introduces the potential for social desirability bias and recall bias. Furthermore, convenience sampling within a hospital setting may skew the population toward individuals with baseline health-seeking behaviours, potentially overestimating the general population's true awareness level.

6. CONCLUSION

Breast cancer constitutes an escalating health emergency in India. This study decisively demonstrates that while widespread, generalized awareness of breast cancer has permeated the Northern Indian populace, precise knowledge regarding its varied clinical manifestations and the critical early-detection technique of Breast Self-Examination remains drastically inadequate. The chasm between knowing about the disease and actively participating in preventative screening pathways severely undermines the potential for early clinical intervention. In a nation where advanced mammographic screening is not universally accessible, maximizing the diagnostic utility of BSE and community-level clinical breast examinations is not merely an option, but an absolute clinical necessity.

7. RECOMMENDATIONS

Culturally Tailored Awareness Campaigns: Public health authorities must transition from generalized "cancer awareness" toward targeted, visually explicit campaigns that educate women

on the diverse physical signs of BC beyond isolated lumps (e.g., asymmetry, skin dimpling).

Integration into Primary Care: Healthcare professionals, particularly primary care physicians and nursing staff, should routinely instruct female patients on the correct BSE techniques during standard gynaecological or general wellness consultations.

Educational Curriculum Updates: Implementing fundamental preventative oncological education, including BSE simulation, into higher secondary and collegiate curriculums.

Community Health Worker Mobilization: Expanding the scope of Anganwadi and ASHA workers to conduct localized, stigma-free breast health workshops in rural and semi-urban vicinities.

Future Research: Longitudinal studies utilizing randomized sampling frameworks are required to evaluate the pre- and post-intervention efficacy of structured breast health educational programs in these specific geographic regions.

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