

Awareness of Breast Cancer in the Bhopal Region: A Research Study

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Abstract

Breast cancer is a leading health concern among women worldwide, with increasing incidence in India due to urbanization, lifestyle changes, and limited awareness. This study assesses the level of breast cancer awareness among women in the Bhopal region, identifying key barriers to early detection and healthcare access. A mixed-methods approach was employed, incorporating structured surveys and focus group discussions among 600 participants. The findings reveal a significant lack of knowledge regarding symptoms, risk factors, and screening practices, particularly in semi-urban and rural areas. Socio-cultural stigmas, economic constraints, and inadequate healthcare infrastructure further hinder timely diagnosis and treatment. Statistical analysis, including chi-square tests, highlights associations between awareness levels and demographic factors. The study emphasizes the need for targeted awareness campaigns, improved access to screening services, and community engagement initiatives. Enhancing public education and policy interventions can significantly reduce breast cancer mortality and improve healthcare outcomes in the region.

Keywords: Breast cancer awareness, early detection, screening, Bhopal region, public health, socio-cultural barriers.

Introduction

Breast cancer is one of the most common cancers affecting women globally and a significant public health challenge, particularly in low- and middle-income countries. The incidence of breast cancer in India has been steadily rising due to factors such as urbanization, lifestyle changes, and increased life expectancy. According to the Global Cancer Observatory (GLOBOCAN 2020), breast cancer accounted for 26.3% of all cancers among Indian women, with approximately 178,361 new cases reported annually.

Despite advancements in diagnosis and treatment, awareness about breast cancer remains alarmingly low, especially in semi-urban and rural areas. Early detection through awareness

of symptoms, risk factors, and regular screening significantly improves survival rates. However, socio-cultural stigmas, lack of access to healthcare, and limited knowledge pose significant challenges.

Bhopal, a Tier-2 city in Madhya Pradesh, is no exception to these issues. The region has seen a surge in breast cancer cases over the past decade, driven by lifestyle shifts and a lack of public health infrastructure focused on cancer prevention. Most women in this region are unaware of the symptoms, preventive measures, and the importance of early diagnosis. This ignorance often leads to delayed treatment and poor prognoses.

Efforts by government and non-governmental organizations (NGOs) to promote awareness have shown limited success. Existing programs often fail to address cultural barriers, low health literacy, and the unavailability of affordable screening services. Therefore, there is a pressing need to evaluate current awareness levels, identify gaps, and recommend strategies to improve breast cancer education and outreach in Bhopal.

This study aims to assess breast cancer awareness among women in the Bhopal region, identify the challenges they face, and provide evidence-based recommendations to enhance community engagement and health outcomes. By doing so, it contributes to the broader goal of reducing breast cancer mortality and improving the quality of life for affected women in this area.

Assess Breast Cancer Awareness: To evaluate the knowledge of symptoms, risk factors, and the importance of early detection among women in the Bhopal region. **Identify Barriers to Awareness:** To explore socio-economic, cultural, and infrastructural obstacles preventing adequate awareness and timely diagnosis. **Evaluate Existing Interventions:** To analyse the effectiveness of current breast cancer awareness programs and their reach within the community. **Propose Strategic Interventions:** To recommend actionable measures for improving awareness, accessibility, and utilization of breast cancer screening services.

Literature Review:

C. Voogd, Zsofi Molnar, Joost Nederend , Robert-Jan Schipper, Luc J.A. Strobbe , Lucien E.M. Duijm (2024)Predictors of re-attendance at biennial screening

mammography following a false positive referral: A study among women in the south of the Netherlands Adri; Elsevier

A woman's propensity to return to the screening program may be impacted by a false positive (FP) referral following screening mammography. It was looked into how having an FP result in the first or second screening round affected re-attendance following an FP result. Furthermore, we sought to compare the re-attendance rates of women who received invasive and non-invasive follow-up exams as part of the diagnostic process after an FP referral. Included was a sequential series of 13,597 women in the southern Netherlands who had an FP referral after a biannual screening mammography from 2009 to 2019. After an FP referral, the screening re-attendance rate was 81.2%; when women who had clinical mammography follow-up were also included, the rate was 91.3%.

Women who were referred for FP in the initial screening round had a lower likelihood of returning to the screening program in the next three years than women who took the FP test in any later round (odds ratio (OR): 0.59, 95%-confidence interval (CI): 0.51–0.69). FP-afflicted women Compared to those who simply received additional imaging, referrals who underwent invasive examinations after being referred had a lower likelihood of returning to the screening program (OR, 0.48; 95% CI 0.36–0.64).

In conclusion, women who receive an FP referral during their initial screening round or during an invasive diagnostic workup are less likely to return to the screening program. Women's education regarding the significance of returning to the program after an FP referral should be a top priority for hospitals and screening organizations.

Laura Pala, Isabella Sala, Eleonora Pagan b, Tommaso De Pas, Emma Zattarin , Chiara Catania , Emilia Cocorocchio , Giovanna Rossi , Daniele Laszlo , Giovanni Ceresoli , Jacopo Canzian , Elena Valenzi, Vincenzo Bagnardi, Fabio Conforti(2024) Heterogeneity of treatment effect on patients long-term outcome according to pathological response type in neoadjuvant RCTs for breast cancer. Elsevier.

We conducted a systematic review and meta-analysis of all RCTs testing neoadjuvant treatments for early-BC and reported the hazard ratio of DFS (HRDFS) for the intervention versus control arm stratified by pathological response type (i.e., pCR yes versus no) in order to provide evidence explaining the poor association between pCR and patients' long-term outcome at trial-level in neoadjuvant RCTs for breast cancer (BC).

Examining how therapy affected DFS differently in patients with and without pCR was the

goal. Using a random-effects model, we computed the pooled HRDFS in the two strata of pathological response (pCR yes versus no), and we used an interaction test to evaluate the difference between these two estimates. The analysis included 8496 people and 10 RCTs.

radically varied depending on the sort of pathogenic reaction. Compared to patients receiving pCR in the control arm, those receiving pCR in the intervention arm had a greater, but not statistically significant, risk of DFS-event: the pooled HRDFS for the experimental versus control arm was 1.23 (95%CI, 0.91–1.65). Conversely, in the group of patients without pCR, the control group had a higher risk of DFS-event than the intervention group: the pooled HRDFS was 0.86 (95%CI, 0.78–0.95).

Depending on the type of pathogenic reaction, the treatment effect on DFS varied significantly (interaction test p: 0.014). In neoadjuvant RCTs for early-BC, we presented fresh data that helps to explain why pCR has a poor surrogacy value at the trial level.

John Loggie, Penelope J. Barnes , Michael D. Carter, Daniel Rayson, Gillian C. Bethune(2024) Is Oncotype DX testing informative for breast cancers with low ER expression? A retrospective review from a biomarker testing referral centre Elsevier.

It is yet unknown if ODX testing is helpful for patients with HER2-negative, low-estrogen receptor (ER-low)-positive early breast cancer (BC). We performed a retrospective analysis of patients (n = 854) from a breast biomarker testing referral center that were referred for ODX testing over a seven-year period. We noted the percentage of ER nuclear positive, staining intensity on immunohistochemistry, and the ODX Recurrence Score (RS) for every patient. $\leq 10\%$ of cells with nuclear positive and/or modest staining intensity met our criterion for ER-low. The stated ODX ER gene scores were noted after reviewing the slides from each ER-low case. A comparison group of 56 patients with ER > 10% positivity and non-weak staining intensity (ER-high) was chosen at random.

27 cases (3.2%) were found to fit our ER-low criteria. 7.4% of these had an RS of 25, and 92.6% had a high RS (>25). Every instance with an ER nuclear positive of less than 10% had a high RS. While all (100%) ER-high cases had positive ER gene scores, the majority of ER-low cases (85.2%) had ODX quantitative ER gene scores in the negative range. For the majority of patients with ER-low BC, ODX does not seem to provide appreciable further information to help guide therapy choices. About twice as many ER-low patients are identified when weak ER staining intensity and a low proportion of nuclear positive are

combined, albeit with lower specificity for high RS. The idea that the majority of ER-low early BC should be treated similarly to ER-negative BC is supported by our research.

Ataollahi MR, Sharifi J, Paknahad MR, Paknahad A(2015) Breast cancer and associated factors: a review; Journal of Medicine and Life Vol. 8, Special Issue 4

The various aspects of breast cancer and its contributing variables were examined in this article. It showed that during the previous forty years, breast cancer has been and is one of the most common and rapidly increasing malignant diseases among Iranian women. The necessary data for this article was gathered via a review of the literature and keyword searches on reliable scientific websites like SID, Google Scholar, and the Comprehensive Portal of Human Sciences. The keywords included were cancer, breast cancer, cell, gene, life quality, women, prevalence, productivity, age, obesity, alcohol, cigarettes, menopause, genetic, cytokine, and mortality.

Every element of a woman's life—physical, mental, and social—is impacted by this illness. On the other side, elements like family and social support during the sickness can lessen its effects. breast cancer risk factors for the chest. Despite the fact that the [specific] cause of breast cancer is unknown, risk factors for the disease have been found. Breast cancer risk factors include things like age, a family history of breast cancer, certain breast abnormalities, gene alterations, menopause and productivity history, lack of physical activity, alcohol use, obesity, diet, race, and radiation therapy to the chest.

Methodology

1. Study Design

The study employed a mixed-methods approach, combining quantitative and qualitative research methods to gain a comprehensive understanding of the awareness levels and challenges.

2. Study Area and Population

The research focused on the Bhopal region, covering urban and semi-urban areas. The target population included women aged 18-60 years from diverse socio-economic backgrounds.

3. Sampling Technique

A stratified random sampling technique was used to ensure representation across age groups, education levels, and income brackets. A total of 600 participants were surveyed, and 50 women participated in focus group discussions (FGDs).

4. Data Collection Methods

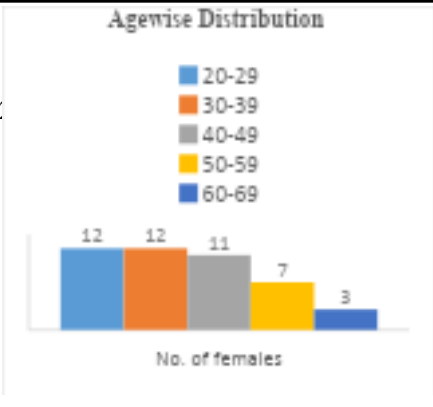
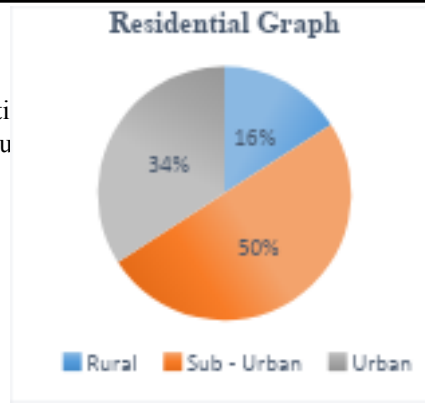
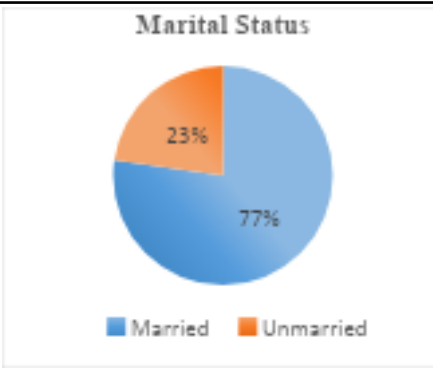
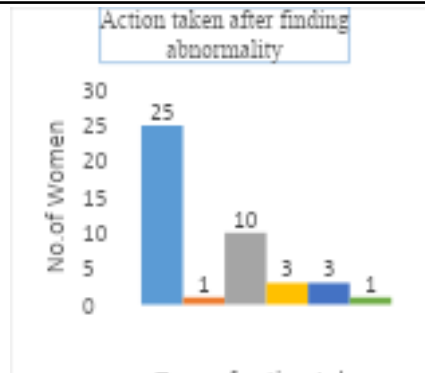
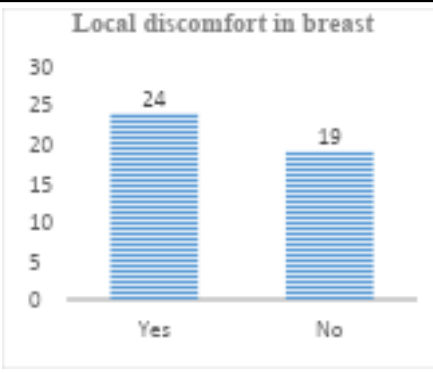
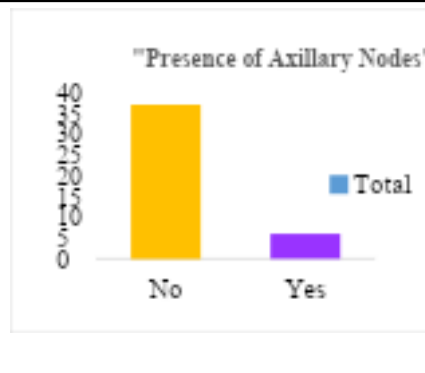
- 1. Structured Questionnaire.**
- 2. Focus Group Discussion.**
- 3. Secondary Data Review.**

Participants were surveyed on their knowledge of breast cancer symptoms, risk factors, and screening practices. Conducted to explore cultural attitudes and barriers to seeking medical help. Analysed government and NGO reports on breast cancer awareness programs in the region

Questions related to Breast cancer can also affect men, though it is much rarer. Both sexes should be aware of the symptoms, Breast cancer is not contagious, A family history of breast cancer, especially in close relatives, increases the likelihood of developing the disease due to genetic predispositions like BRCA mutations, Breast cancer occurs more commonly in old people, Option for traditional healing, How does breast cancer awareness/diagnosis affect your mental health and many more were surveyed.

Data Analysis

- Quantitative data were analysed using statistical tools such as SPSS to determine awareness levels and demographic patterns.
- Qualitative data from FGDs were analysed thematically to identify recurring barriers and perceptions.

 Age-wise Distribution 20-29: 12 30-39: 12 40-49: 11 50-59: 7 60-69: 3 No. of females	 Residential Graph Rural: 16% Sub - Urban: 50% Urban: 34%
As from the above bar diagram it can be found that after collection it was observed that the age group that maximum women was detected was 20 to 40 followed by age group 40 to 50.	For checking the area near or within the city Bhopal, it was observed that 50% of the collected data trend to be from sub urban while urban shows 34% and 16% rural.
 Marital Status Married: 77% Unmarried: 23%	 Action taken after finding abnormality No. of Women 25, 1, 10, 3, 3, 1
The survey and collected data from Bhopal showed that breast cancer among married women were more as compared to unmarried one. After getting this result more question that is what is the reason for it was checked.	On identifying an abnormality in breast most of the women responded that they went to doctors rather than trying remedies at home and some told that they informed and discussed about it with their mother and mother in law and then approached to doctors.
 Local discomfort in breast Yes: 24 No: 19	 "Presence of Axillary Nodes" No: 38 Yes: 5 Total

After getting the questioner we found that there was local discomfort in breast and most of the females observed presence of axillary nodes.

Perform the Chi-square Test

1) Hypothesis

Null Hypothesis (H₀): There is no association between **Nipple Retraction** and **Exercise** habits.

Alternative Hypothesis (H_a): There is an association between **Nipple Retraction** and **Exercise** habits.

Nipple Reaction/ Exercise	No	Not Regularly	Regularly	Total
No	3	20	4	27
Yes	8	6	2	16
Total	11	26	6	43

The test results for the data on **Nipple Retraction** and **Exercise** are as follows:

Expected

Nipple Reaction/ Exercise	No	Not regularly	Regularly
No	6.91	16.33	3.77
Yes	4.09	9.67	2.23

frequencies:

Chi-square statistic (χ^2)=8.20 p-value=0.0166 Degrees of freedom (df) =2

Interpretation

Since the p-value (0.0166) is less than the significance level ($\alpha = 0.05$), we **reject the null hypothesis**. This suggests that there is a significant association between **Nipple Retraction** and **Exercise** habits.

2) Hypothesis

Null Hypothesis (H0): There is no association between **auxiliary Nodes** and **Exercise** habits.

Alternative Hypothesis (Ha): There is an association between **auxiliary Nodes** and **Exercise** habits.

auxiliary Nodes / Exercise	No	Not Regularly	Regularly	Total
No	9	24	4	37
Yes	2	2	2	06
Total	11	26	6	43

The test results for the data on **auxiliary Nodes** and **Exercise** are as follows:

Expected

Nipple Reaction/ Exercise	No	Not regularly	Regularly
No	9.47	22.37	5.16
Yes	1.53	3.63	0.84

frequencies:

Chi-square statistic (χ^2) = 2.89 p-value = 0.236 Degrees of freedom (df) = 2

Interpretation

Since the p-value (0.236) is greater than the significance level ($\alpha = 0.05$), we fail to **reject the null hypothesis**. This suggests that there is a no significant association between **auxiliary Nodes** and **Exercise** habits.

3) Hypothesis

Null Hypothesis (H₀): There is no significant association between age group and the variable in question based on this data.

Alternative Hypothesis (H_a): There is significant association between age group and the variable in question based on this data.

Age wise Local discomfort in breast

Age/ Local discomfort in breast	No	Yes	Grand Total
20-29	7	2	9
30-39	6	7	13
40-49	5	7	12
above 50	6	3	9
Grand Total	24	19	43

Expected frequencies:

Age wise Local discomfort in breast

Age/ Local discomfort in breast	No	Yes	Grand Total
20-29	5.02	3.98	9
30-39	7.26	5.74	13
40-49	6.70	5.30	12
above 50	5.02	3.98	9

Grand Total	24	19	43
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Chi-square statistic=**3.66** P-value=**0.301** Degrees of freedom (df) =**3**

Interpretation:

Since the p-value (0.301) is greater than the significance level of 0.05, we **fail to reject the null hypothesis**. This suggests that there is no significant association between age group and the variable in question based on this data.

Null Hypothesis (H₀): There is no association between marital status and the presence of a lump in the breast.

Alternative Hypothesis (H_a): There is association between marital status and the presence of a lump in the breast.

Marital Status	Lump in Breast (No)	Lump in Breast (Yes)	Total
Married	17	17	34
Unmarried	6	4	10
Total	23	21	44

Expected frequencies:

Marital Status	Lump in Breast (No)	Lump in Breast (Yes)	Total
Married	17.77	16.23	34
Unmarried	5.23	4.77	10
Total	23	21	44

Chi-Square statistic: **0.0386** p-value: **0.8443** Degrees of freedom: **1**

Interpretation:

Since the p-value (0.8443) is much greater than the common significance level of 0.05, **we fail to reject the null hypothesis**. This suggests that there is no statistically significant association between marital status and the presence of a lump in the breast in this dataset.

Null Hypothesis (H₀): To check if there is no an association between marital status and nipple retraction.

Alternative Hypothesis (H_a): To check if there is an association between marital status and nipple retraction.

Marital Status	Nipple Retraction (No)	Nipple Retraction (Yes)	Total
Married	19	13	32
Unmarried	8	2	10
Total	27	15	42

Expected frequencies:

Marital Status	Nipple Retraction (No)	Nipple Retraction (Yes)	Total
Married	20.57	11.43	32
Unmarried	6.43	3.57	10
Total	27	15	42

Chi-Square statistic: **0.6563** p-value: 0.4179 Degrees of freedom: 1

Interpretation:

Since the p-value (0.4179) is greater than the significance level of 0.05, we fail to reject the null hypothesis. This suggests there is no statistically significant association between marital status and nipple retraction in this dataset.

Null Hypothesis (H₀): To check if there is no an association between nipple discharge and exercise habits.

Alternative Hypothesis (H_a): To check if there is an association between nipple discharge and exercise habits.

Nipple Discharge	No Exercise	Not Regularly	Regularly	Total
No	6	19	4	29
Yes	5	7	2	14
Total	11	25	6	43

Nipple Discharge	No Exercise	Not Regularly	Regularly	Total
No	7.42	17.53	4.05	29
Yes	3.58	8.47	1.95	14
Total	11	25	6	43

Chi-Square statistic: 1.211 p-value: 0.5459 Degrees of freedom: 2

Interpretation:

Since the p-value (0.5459) is greater than the significance level of 0.05, we fail to reject the null hypothesis. This suggests there is no statistically significant association between nipple discharge and exercise habits in this dataset

Association Between	Chi-square statistic (χ^2):	p-value:	Degrees of freedom (df):	Hypothesis Testing	Result
Nipple Retraction and Exercise	8.20	0.0166	2	p-value (0.0166) is less than the significance level ($\alpha = 0.05$), we reject the null hypothesis	Significant
Auxiliary Nodes and Exercise	2.89	0.236	2	P-value (0.236) is greater than the significance level ($\alpha = 0.05$), we fail to reject the null hypothesis.	Not significant
Age and Local discomfort in breast	3.66	0.301	3	P-value (0.301) is greater than the significance level ($\alpha = 0.05$), we fail to reject the null hypothesis.	Not significant
Marital status and Lump in breast	0.0386	0.8443	1	P-value (0.8443) is much greater than the common significance level of 0.05, we fail to reject the null hypothesis	Not Significant
Marital status and nipple retraction	0.6563	0.4179	1	P-value (0.4179) is greater than the significance level of 0.05, we fail to reject the null hypothesis.	Not Significant

Conclusion:

Knowing someone with breast cancer increases awareness of the disease and may motivate individuals to adopt preventive measures or seek screening. Being a caregiver provides insight into the emotional and physical challenges faced by patients and caregivers alike. Screening mammograms are essential for detecting breast cancer early, especially for women over 40 or those with a higher risk. Inherited gene mutations, such as BRCA1 and BRCA2, account for a small percentage of cases but significantly increase the risk of breast cancer. A painless lump in the breast is the most common initial symptom. Early detection of such changes can improve treatment outcomes. Risk factors include smoking, alcohol, obesity, and lack of exercise, early menstruation, late pregnancies, and no breastfeeding. Symptoms include lumps, nipple discharge, and breast changes. Some prefer clinical exams by healthcare professionals, while others may feel comfortable with self-exams at home. A diagnosis can lead to anxiety, fear, depression, or hopelessness. Support from loved ones and mental health professionals is vital in coping.

Suggestions:

Encouraging screening can help in early detection, improving survival rates and allowing for more effective treatment. Globally, breast cancer is the most frequently diagnosed cancer in women, emphasizing the need for awareness and prevention efforts. : Early detection through screening or self-examination allows for more effective treatments and higher survival rates. BSE helps individuals become familiar with their breasts, making it easier to detect unusual changes and seek timely medical advice. Early detection tools include BSE, clinical breast exams, mammography, and ultrasounds. Mammography is particularly effective for population-level screening. : Prevention includes maintaining a healthy lifestyle—avoiding alcohol, staying active, eating well, and reducing exposure to hormonal therapies when possible.

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