Original Article

Application Of The Health Belief Model And Breast Cancer Detection Practices Among Females Belonging To Rural Parts Of India

Nitya Vangala[1], Mummareddi Dinesh Eshwar[2], Saikrishna Dodda[3], Ritik Bhadana[4*], Srivardhan Thota[5] , Shreyaa Rajpal[6] , Prithvi Raghavan[7] , Gulam Saidunnisa Begum[8] , Ayesha Jabeen[9] ,Amtul Rahman Amberina[10]

[1]MBBS, Mahavir institute of medical sciences, VIKARABAD, IND, naganityavangala99@gmail.com
[2]MBBS, Mahavir Institute of Medical Sciences, VIKARABAD, IND, dinesheshwar1997@gmail.com
Medical Student, Navodaya Medical College, Raichur, IND, saikrishnadodda11@gmail.com
[4]MBBS, Mahavir Institute of Medical Sciences, VIKARABAD, IND, ritik243@gmail.com
[5]Medical student, Navodaya medical college, Raichur, IND, srivardhan.janu@gmail.com
[6]Internal Medicine, Osmania Medical College, Hyderabad, IND, rajpalshreyaa@gmail.com
[7]Internal Medicine, Osmania Medical College, Hyderabad, IND, prithvizak@gmail.com
[8]Biochemistry, College of Medicine and Health Sciences, Sohar Campus, OMN, gulambegum1967@gmail.com
[9]Biochemistry, Mahavir Institute of Medical Sciences, VIKARABAD, IND, ayesha2k3@gmail.com
[10]Biochemistry, Mahavir Institute of Medical Sciences, VIKARABAD, IND, dramtull@gmail.com

***Corresponding Author:** Ritik Bhadana

[*]MBBS, Mahavir Institute of Medical Sciences, VIKARABAD, IND, **ritik243@gmail.com**

Doi: 10.47750/pnr.2022.13. S05.185

Abstract

Background:Breast cancer (BC) is the second most common type of cancer and accounts for one-fourth of cases of all kinds of cancers among females. According to the World Health Organization (WHO), BC is the world's most prevalent type of cancer and is responsible for substantial numbers of disability-adjusted life years (DALYs) in women. BC affects all age groups and the incidences show an increasing trend after puberty and with increased age. The mortality rates associated with BC can be considerably minimized with the initiation of treatment at the early stages of the disease. However, due to the lack of awareness of BC and its early symptoms along with the stigma associated with cancers, especially in the rural population, many cases remain undiagnosed. Therefore, this study was carried out to assess the knowledge and awareness of BC among females residing in the rural parts of India

Methods:This was a prospective cross-sectional study that included 100 young female patients attending the outpatient department of Mahavir Institute of Medical Sciences (MIMS), Vikarabad, Telangana, India. Convenience sampling was applied and informed consent was obtained from all participants. A validated questionnaire was used to obtain data from the study subjects. The questionnaire had three parts that included sociodemographic characteristics, knowledge of BC, and the assessment based on the Champion's Health Belief Model Scale (CHBMS). The data collected were entered into Microsoft Excel sheets and were used to prepare tables. The statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) Version 22 software. Chi-square (X 2) and Z test were used to estimate the statistical significance, and a p-value of <0.05 was considered significant.

Results:Out of 100 patients enrolled, 81 (81%) of them were aged <20 years and 19 (19%) belonged to the 20-25 years of age group. The majority (96%) of them were unmarried, and 77% of the participants were students pursuing a degree course. Most (88%) study participants belonged to the middle socioeconomic status. A vast majority (75%) believed that smoking is one of the risk factors for BC. The knowledge of the facts that late menopause (59%) and long-term usage of hormone replacement therapy (54%) could predispose to BC was moderate among the study participants. The presence of breast lumps (49%) and nipple discharge (27%) were considered warning signs of BC. The clinical breast examination (52%) and mammogram (41%) were considered the preferred methods for diagnosing BC. Based on the CHBMS, the average scores noted were susceptibility (2.18±1.01), seriousness (2.91±1.29), benefits (3.90±1.15), motivation levels (3.50±1.52), barrier levels (3.03±1.60), and self-efficacy, (1.87±1-32). The knowledge of the BC risk factors did not correlate with the CHBMS scores (p=0.1). However, the knowledge of BC warning signs and screening methods significantly correlated with CHBMS scores (p-0.006).

Conclusions:The awareness regarding the risk factors for BC and the significance of breast self-examination practices in early detection were noticeably low among study participants.

Keywords: Breast Self-Examination, Young Female Patients, Knowledge And Awareness, Breast Cancer, Champion's Health Belief Model Scale (CHBMS)

INTRODUCTION

Breast cancer (BC) is the most common variety of cancer encountered in females and accounts for the maximum number of deaths due to cancer [1]. Moreover, there is evidence of increasing rates of BC observed in underdeveloped and developing countries including India. Globally one in 20 women suffer from BC and an increased incidence is observed among developed countries wherein one in eight women suffer from BC. There are both modifiable and non-modifiable risk factors for BC. The non-modifiable risk factors are race, ethnicity, family history, and genetic determinants. The modifiable risk factors for BC include cigarette smoking, alcohol consumption, physical inactivity, hormones, and others [2].

A population-based approach was recently suggested to prevent BC rates. In this approach, the at-risk people are identified, and specific interventions like risk-reducing therapy are implemented to prevent BC [3]. It was also noted that 10% of BC cases have been noted among women below the age of 40 years [4]. More women in their 30s and 40s are being diagnosed with BC in India. This may be attributed to the increased population of the younger age group compared to the older age group. It is important from the public health perspective that large population-based screening methods are used to identify the cases [5]. In the United States of America (USA), after BC diagnosis, there is almost a 90% chance of survival for at least five years. However, in India, the chance for survival is significantly low due to a lack of awareness of earlier symptoms of the disease.

The absence of belief about the need for routine breast self-examination (BSE) has a significant impact on BC screening [6]. Understanding females' sentiments regarding BSE can be employed to develop relevant educational interventions which contribute to improved cancer screening [7]. To enhance the familiarity and knowledge of women regarding BC, it is important to educate and promote cancer-preventive behaviors. The Health Belief Model (HBM) is amongst the best ones that are efficient in studying preventive behaviors in cancer [8].

The Champion's Health Belief Model Scale (CHBMS) was designed by Champion V. in 1984. It is employed to determine the assumptions and conduct of women about BC and BSE [9]. Despite the fact that there are studies that examine women's application of BSE and influencing factors in rural India, the studies that examine the beliefs about BSE are very limited [10].

This study was carried out on young women living in rural India to determine their awareness and knowledge about BC and assess their beliefs and behaviors about BSE.

MATERIALS & METHODS

A prospective and descriptive study was conducted in August and September 2019. The study included 100 young women who were attending the outpatient department of Mahavir Institute Of Medical Sciences (MIMS), Vikarabad, Telangana, India. A convenient sampling method was applied to recruit the study subjects and the study was approved by the institutional ethics committee of MIMS (MIMS/IEC/2019/14). all the participants of the study were duly explained about the procedure and informed consent was taken.

The inclusion criteria included all those females belonging to the age group of 15-25 years who were willing to participate in the study. All the patients with a previous history of breast abnormalities and those who were recently trained on BSE were excluded from the study.

The subjects were informed about the purpose of the study and were assured of confidentiality. The data of the study were collected by using validated questionnaires that included varied items like open and close-ended questions. It took 15 - 20 minutes to fill out the questionnaire. It consisted of three parts; Part 1 consisted of the sociodemographic details of the study participants, Part 2 included the patient's knowledge about the risk factors of breast cancer, and Part 3 contained the CHBMS assessment (see Appendices).

STATISTICAL ANALYSIS

Statistical Package for Social Sciences (SPSS) Version 22 software was used to analyze the data. Descriptive statistics including percentages and frequencies were carried out to interpret the data. Chi-square (X2) and Z tests were used to estimate the statistical significance. A p-value of <0.05 was considered significant.

RESULTS

Out of 100 patients enrolled in our study during the study period, 81 (81%) were less than 20 and 19 (19%) were between the 20-25 years of age group. Among the patients enrolled majority 96% of them were not married, and 77% were studying in their final year of a university degree course. 88% of them belong to moderate socioeconomic status. The demographic details of the study participants are depicted in Table 1.

Variable		Number of cases n (%)
Age group (years)	<20	81 (81)
	20-25	19 (19)
Marital status	Single	96 (96)
	Married	04 (04)
Education status	University first year	23 (23)
	University second year	00 (00)
	University third year	77 (77)
Socioeconomic status	Low (<1000$ per annum)	11 (11)
	Middle (1000-35000$ per annum)	88 (88)
	High (≥36000$ per annum)	01 (01)

Table 1: Demographic characteristics of the study population

The knowledge and awareness regarding BC revealed that 78% of patients considered smoking and 65% said having never breastfed were the two major risk factors. Whereas 63% said larger breast size and 62% believed that early menarche (<12 years) was not considered the risk factor for BC. A significant number of patients don't know late menopause (59%) and the use of HRT (54%) for a long duration were risk factors. The details of the participant's knowledge and awareness of the risk factors for BC are shown in Table 2.

Risk factors	Yes	No	Don't know
Advanced age	25	41	34
Family history of breast cancer	34	48	18
Early menarche	09	62	29
Late menopause	15	26	59
Obesity	24	53	23
Smoking	78	16	06
Never breastfed	65	22	13
Lack of physical exercise	25	54	21
Larger breast size	06	63	31
Eating food rich in fat	35	45	20
Use of HRT for a long duration	25	21	54
Hormonal Contraceptive methods	22	29	49
Mean±SD	30.25±21.29	40±16.64	29.75±16.60

Table 2: Knowledge and awareness of risk factors for breast cancer among the study participants

HRT: HORMONE REPLACEMENT THERAPY

The knowledge and awareness about the warning signs and screening methods for BC among the study subjects revealed that 47% of them considered breast lumps and 27% believed nipple charge as the most common warning signs of BC. Conversely, 52% considered clinical breast examination and 41% felt a mammogram was the earliest method of detection. However, 63% didn't know that mammogram could discover a lump earlier than a clinical breast examination and 49% were unaware that a mammogram is a method of early detection of BC. The details of the knowledge and awareness of warning signs and screening methods for BC among the study participants are detailed in Table 3.

Warning signs of breast cancer	Yes	No	Don't Know
Breast lump	47	24	29
Bloody nipple discharge	27	19	54
Nipple retraction	14	28	58
Pain in breast	22	45	33
Change in breast shape and/or size	17	44	39
Redness of breast skin	18	32	50
Mean±SD	24.16±12.05	32±10.60	43.83±11.85
Screening methods for breast cancer			
A mammogram is a method of early detection	41	10	49
Clinical breast examination is an early method to detect cancer	52	31	17
A mammogram could discover a lump earlier than a clinical breast examination	28	09	63
A mammogram is recommended at the age of twenty years	38	05	57
Mean±SD	39.75±9.87	13.75±11.70	46.50±20.48

Table 3: Knowledge and awareness of warning signs and screening methods for breast cancer among the study participants

The CHBMS scores of the study participants with reference to the susceptibility and severity of BC and perceived beliefs regarding BSE are presented in Table 4.

Perceived Susceptibility	**SA**	**A**	**N**	**D**	**SD**	**Mean±SD**
My chances of getting breast cancer are great	2	5	48	22	23	2.41±0.96
My physical health makes it more likely that I will get breast cancer	1	8	29	37	25	2.23±0.94
I feel that my chances of getting breast cancer in the future are good.	4	16	39	22	19	2.64±1.08
I worry a lot about getting breast cancer.	6	7	22	18	47	2.07±1.22
Within the next year, I will get breast cancer.	2	2	10	22	64	1.56±0.89
Perceived severity						
The thought of breast cancer scares me	15	21	18	19	27	2.78±1.42
When I think about breast cancer, I feel nauseous	4	35	12	23	26	2.68±1.29
If I had breast cancer my family and future would be concluded	4	11	12	24	49	1.97±1.18
When I think about breast cancer my heart beats faster	12	23	20	14	31	2.71±1.41
Breast cancer would endanger my relationship	18	37	16	14	15	3.29±1.32
Breast cancer is a hopeless disease	7	20	21	21	31	2.51±1.29
My feelings about myself would change if I got breast cancer	14	17	22	17	30	2.68±1.41
I am afraid to even think about breast cancer	18	28	25	8	21	3.14±1.37
My financial security would be endangered if I got breast cancer	20	32	20	10	18	3.26±1.36
Problems I would experience from breast cancer would last a long time	17	31	34	6	12	3.35±1.18
If I got breast cancer, it would be more serious than other diseases	12	37	35	9	7	3.38±1.04
If I had breast cancer, my whole life would change	21	23	29	15	12	3.26±1.27
Perceived benefits						
Doing breast self-exams prevents future problems for me	50	14	10	6	20	3.68±1.59
I have a lot to gain by doing breast self-exams	55	19	5	2	19	3.89±1.54
Breast self-examination can help me find the lumps	47	19	9	4	21	3.67±1.58
If I do monthly breast exams, I may find a lump before it is discovered by regular health exams	27	20	8	2	43	2.86±1.73
I would not be so anxious about breast cancer if I did monthly breast exams.	56	14	7	6	17	3.86±1.54
Having breast exams performed by a physician prevent future problems for me	61	18	8	2	11	4.16±1.31
I have a lot to gain by having breast exams performed by a physician	71	19	4	2	4	4.51±0.96
Breast exams performed by a physician can help me find lumps in my breast	60	25	5	3	6	4.31±1.10
If I have a breast exam performed by a physician every three years, I may find a lump before it is discovered by breast self-examination	57	15	14	5	9	4.06±1.31
I would not be so anxious about breast cancer if I had a breast exam performed by a physician every three years.	53	26	8	3	10	4.09±1.27

Table 4: Champion's Health Belief Model Scale (CHBMS) scores of perceived susceptibility and severity of breast cancer and beliefs regarding breast self-examination
SA: Strongly agree; A: Agree; N: Neutral; D: Disagree; SD: Strongly disagree

The CHBMS scores of the study participants with reference to barriers to BSE and cues to motivation are presented in Table 5.

Perceived barriers	SA	A	N	D	SD	Mean±SD
I am afraid I would not be able to do a breast self-examination	21	18	5	7	49	2.55±1.68
It is embarrassing for me to have a breast exam performed by a physician	44	15	14	6	21	3.55±1.58
In order to have a breast exam performed by a physician every three years, I have to give up quite a bit	37	17	7	7	32	3.2±1.72
Breast exams performed by a physician can be painful	42	20	9	5	24	3.51±1.62
Breast exams performed by a physician are time-consuming	47	22	14	3	14	3.85±1.40
My family/friends would make fun of me if I have a breast exam performed by a physician	25	5	8	14	48	2.45±1.67
The practice of breast exams performed by a physician interferes with my activities	16	12	17	10	45	2.44±1.53
Having breast exams performed by a physician would require starting a new habit, which is difficult	15	16	8	9	52	2.33±1.57
I am afraid I would not be able to go for a breast exam performed by a physician	27	18	10	6	39	2.88±1.69
Having breast exams performed by a physician are expensive	42	25	5	6	22	3.59±1.58
Cues to action (motivation)						
I eat a well-balanced diet	64	14	12	2	10	4.16±1.30
I always follow medical orders because I believe they will benefit my state of health	65	21	2	2	10	4.29±1.25
I frequently do things to improve my health	60	19	11	2	8	4.21±1.21
I take vitamins when I don't eat good meals	36	15	10	6	33	3.15±1.71
I search for new information related to my health	51	12	2	7	28	3.51±1.75
I have the recommended yearly physical exams in addition to visits related to illness	25	1	32	4	38	2.71±1.57
I have the recommended periodic dental exams in addition to visits for a specific problem	31	23	8	6	32	3.15±1.66
I exercise regularly- at least three times a week.	33	6	14	8	39	2.86±1.73

Table 5: Champion's Health Belief Model Scale (CHBMS) scores of barriers to breast self-examination and cues to motivation among the study participants

SA: Strongly agree; A: Agree; N: Neutral; D: Disagree; SD: Strongly disagree

The CHBMS scores of the study participants with reference to self-efficacy about BSE are presented in Table *6*.

Self-efficacy	SA	A	N	D	SD	Mean±SD
I know how to perform a breast self-examination	14	4	6	9	67	1.89±1.46
I have performed a breast self-exam	9	6	3	8	74	1.68±1.31
I have performed a breast self-exam in the past year	9	4	7	7	73	1.69±1.29
I have performed a breast self-exam in the past three months	7	4	5	8	76	1.58±1.19
I have performed a breast self-exam in the past month	9	2	8	8	73	1.67±1.28
I feel confident that if I perform a breast self-exam, I could feel any abnormalities in my breast.	41	3	9	6	41	2.97±1.83
I know how to get a breast exam performed by a physician	15	2	4	8	71	1.82±1.46
I have had a breast exam performed by a physician	6	1	8	9	76	1.52±1.09
I have had a breast exam performed by a physician in the past year	6	3	5	8	78	1.51±1.11
I have had a breast exam performed by a physician in the past two years	4	4	6	6	80	1.46±1.04
I have had a breast exam performed by a physician in the past three years	4	3	5	9	79	1.43±1.0
I feel confident that if I get a breast exam performed by a physician, any abnormalities in my breast will be detected	51	3	6	5	35	3.30±1.85

Table 6: Champion's Health Belief Model Scale (CHBMS) scores regarding breast self-examination among the study participants

SA: Strongly agree; A: Agree; N: Neutral; D: Disagree; SD: Strongly disagree

There was no significant correlation (p=0.1) between knowledge regarding the risk factors of BC and CHBMS as depicted in Table **7.**

Parameters	Mean	SD	Pearson correlation ‘r’ value	p-value
Knowledge about breast cancer risk factors	3.62	1.67	0.162	0.1
CHBMS score	100.10	17.42		

Table 7: Correlation between knowledge regarding the risk factors of breast cancer and CHBMS
CHBMS: Champion's Health Belief Model Scale; p>0.05 indicates no statistical significance

A significant correlation was observed between knowledge about warning signs and screening methods of BC and CHBMS scores as shown in Table 8.

Parameter	Mean	SD	Pearson correlation ‘r’ value	p-value
Knowledge about the warning signs and screening methods of breast cancer	3.04	1.73	0.275	0.006*
CHBMS score	100.10	17.42		

Table 8: Correlation of the knowledge of warning signs and screening methods for breast cancer with CHBMS
*Statistically significant; CHBMS: Champion's Health Belief Model Scale

DISCUSSION

According to the global cancer project (GLOBOCAN 2012), BC accounts for 25.1% of all cancers in females globally. Moreover, the incidence of BC is more in developed countries as compared to developing countries. Conversely, the mortality rates are higher in less developed countries. Given the lack of awareness and knowledge about the disease, people present late at the hospitals that in turn minimizes the chances of recovery. Therefore, it is extremely important to educate women at an early age to improve cancer detection rates and reduce mortality [11].

Aggressive screening and BC detection could facilitate early diagnosis and improved prognosis. More importantly, such interventions are increasingly essential in developing and poor countries including India [12]. BC is a heterogenous disease and is extremely invasive in nature. Therefore, early diagnosis of BC improves the survival rates and late diagnosis leads to cancer metastasis and reduces survival rates [13].

It has been observed that the incidence, prognosis, and mortality of BC could be influenced by the race, ethnicity, and socioeconomic status of the population [14]. Further, it was noted that the rates of cancers correlate with the human development index and higher cancer rates can be seen among people belonging to countries that are experiencing economic transformation. Moreover, the World Health Organization has taken the initiative that aims to improve survival across the world through health promotion and timely diagnosis, among others [15].

Results from the present study indicate that the CHBMS scores do not correlate with the knowledge about the risk factors of BC among the study population. Moreover, the women in this study registered inferior scores for vulnerability to BC, gravity, and belief in favor of not conducting BSE. However, elevated scores were observed regarding the usefulness, stimulus, trust levels, and lower barrier levels that were in favor of performing BSE.

Smoking (78%), larger breast size (63%), early menarche (62%), and having never breastfed (65%) were the significant risk factors for BC in our study. Whereas, most of them were unaware of the fact that late menopause and the use of HRT for a long duration could predispose to BC. A similar amount of knowledge about risk factors, warning signs, symptoms, and BSE was noted among university students belonging to the United Arab Emirates (UAE) and Ethiopia [16, 17].

A low level of awareness regarding the knowledge about BC and BSE was noted among the rural women belonging to Karnataka, South India [18]. Despite better knowledge of BC, a low level of awareness regarding best practices of BSE was noted among university students belonging to Gaza, State of Palestine [19]. The knowledge about risk factors of BC and BSE was considerably low at the community level and among healthcare professionals [20].

The presence of breast lumps (47%) and bloody nipple discharge (27%) were the most common warning signs of BC. Clinical breast examination and mammogram were considered the earliest methods for BC detection. Most study participants didn’t know that a mammogram could discover a lump earlier than a clinical breast examination.

Among those women who seemed to be aware of BSE, the majority had a low understanding of the proper practice of the procedure. The reason is it requires self-efficacy, which is regarded as a dispensable requirement to perform BSE.

In the present study, self-efficacy was noted to be low indicating the subjects lacked the required skills for BSE. These findings highlight the necessity to improve self-efficacy in performing BSE, which can be achieved through the female staff in health care centers who could assist in educating the women regarding the methods of BSE. This in turn helps in increasing the effectiveness of early BC detection.

Earlier identification of BC could contribute to effective treatment and increase survival. Hence, it is suggested that healthcare educational interventions be formulated based on the HBM. This may improve perceived susceptibility to BC and self-efficacy and barriers to BSE.

The results of this study noted that perceived advantages and self-efficacy were the main predictors of BSE. Perceived benefits mean positive results by avoiding disease exposure. For example, the most negligible and doubtful mass can be detected by regular BSE. Self-efficacy is a person's belief in her capacity to perform successful and precise BSE and early suspicion of the tumor. The educational activities should be concentrated on appropriate planning and training to boost women's self-efficacy and relieve the barriers to BSE.

CONCLUSIONS

Based on the results obtained, the knowledge and awareness about risk factors for BC and the importance of BSE in early detection were considerably lower among women. Thus, it is important to raise the levels of awareness and knowledge of risk factors among the study population. Moreover, sensitization about the practice of BSE and its benefits appears extremely crucial. The application of the CHBMS could be effective in the development of BC screening interventions and in devising health education programs. It can be concluded that BC screening behaviors need an optimistic mindset towards it. Therefore, it is advisable to design and implement awareness/educational programs like workshops that contribute to changes in the attitudes of women toward promoting health and preventing cancer-related morbidity and mortality.

REFERENCES

1. Fahad Ullah M: Breast cancer: current perspectives on the disease status. Adv Exp Med Biol. 2019:51-64. 10.1007/978-3-030-20301-6_4
2. Coughlin SS: Epidemiology of breast cancer in women. Adv Exp Med Biol. 2019, 1152:9-29. 10.1007/978-3-030-20301-6_2
3. Britt KL, Cuzick J, Phillips KA: Key steps for effective breast cancer prevention. Nat Rev Cancer. 2020, 20:417-436. 10.1038/s41568-020-0266-x
4. Rossi L, Mazzara C, Pagani O: Diagnosis and treatment of breast cancer in young women. Curr Treat Options Oncol. 2019, 20:86. 10.1007/s11864-019-0685-7
5. McDonald JA, Rao R, Gibbons M, et al.: Symposium report: breast cancer in India-trends, environmental exposures and clinical implications. Cancer Causes Control. 2021, 32:567-575. 10.1007/s10552-021-01428-y
6. Pippin MM, Boyd R: Breast self examination. StatPearls Publishing, Treasure Island (FL); 2022.
7. Husna PH, Marni, Nurtanti S, Handayani S, Ratnasari NY, Ambarwati R, Susanto T: Breast self-examination education for skill and behavior. Educ Health (Abingdon. 2019, 32:101-102. 10.4103/efh.EfH_226_18
8. Saei Ghare Naz M, Simbar M, Rashidi Fakari F, Ghasemi V: Effects of model-based interventions on breast cancer screening behavior of women: a systematic review. Asian Pac J Cancer Prev. 2018, 19:2031-2041. 10.22034/APJCP.2018.19.8.2031
9. Liu N, Wang J, Chen DD, Sun WJ, Zhang W: Tools for the assessment of breast cancer screening beliefs in women: a literature review. J Comp Eff Res. 2019, 8:645-655. 10.2217/cer-2018-0142
10. Grunfeld EA, Kohli N: Beliefs about breast cancer and help-seeking intentions for the disease among women in India. Women Health. 2010, 50:327-41. 10.1080/03630242.2010.498752
11. Ghoncheh M, Pournamdar Z, Salehiniya H: Incidence and mortality and epidemiology of breast cancer in the world. Asian Pac J Cancer Prev. 2016, 17:43-6. 10.7314/apjcp.2016.17.s3.43
12. Ahmad A: Breast cancer statistics: recent trends. Adv Exp Med Biol. 2019:1-7. 10.1007/978-3-030-20301-6_1
13. Houghton SC, Hankinson SE: Cancer progress and priorities: breast cancer. Cancer Epidemiol Biomarkers Prev. 2021, 30:822-844. 10.1158/1055-9965.EPI-20-1193
14. Grabinski VF, Brawley OW: Disparities in breast cancer. Obstet Gynecol Clin North Am. 2022, 49:149-165. 10.1016/j.ogc.2021.11.010
15. Wilkinson L, Gathani T: Understanding breast cancer as a global health concern. Br J Radiol. 2022, 95:20211033. 10.1259/bjr.20211033
16. Rahman SA, Al-Marzouki A, Otim M, Khalil Khayat NEH, Yousuf R, Rahman P: Awareness about breast cancer and breast self-examination among female students at the University of Sharjah: a cross-sectional study. Asian Pac J Cancer Prev. 2019, 20:1901-1908. 10.31557/APJCP.2019.20.6.1901
17. Getu MA, Abebe M, Tlaye KG, Goshu AT: Breast self-examination knowledge and its determinants among female students at Addis Ababa University, Ethiopia: an institution-based cross-sectional study. Biomed Res Int. 2022, 2022:2870419. 10.1155/2022/2870419
18. Baburajan C, Pushparani MS, Lawenya M, Lukose L, Johnson AR: Are rural women aware of breast cancer and do they practice breast self-examination? a cross-sectional study in a rural hospital in South India [Ahead of print]. Indian J Cancer. 2021, 10.4103/ijc.IJC_799_19
19. Abo Al-Shiekh SS, Ibrahim MA, Alajerami YS: Breast cancer knowledge and practice of breast self-examination among female university students, Gaza. ScientificWorldJournal. 2021, 2021:6640324. 10.1155/2021/6640324
20. Gupta R, Gupta S, Mehrotra R, Sodhani P: Risk factors of breast cancer and breast self-examination in early detection: systematic review of awareness among Indian women in community and health care professionals. J Public Health (Oxf). 2020, 42:118-131.

Appendices Questionnaire

Please provide information or tick against the correct option wherever required

Variables	
Age group (by years)	
<20	
20–25	
Marital status	
Single	
Married	
Education status	
Higher education	
First year	
Second year	
Third year	
Level of economic status	
Low	
Moderate	
High	

Table 9: Demographic information of the female patients

S.NO	Risk factors	Yes	NO	Don't Know
1.	Advanced age			
2.	Family history of breast cancer			
3.	Early menarche<12			
4.	Late menopause			
5.	Obesity			
6.	Smoking			
7.	Never breast fed			
8.	Lack of physical exercise			
9.	Larger breast size			
10.	Eating food rich in fat			
11.	Use of HRT for a long duration			
12.	Hormonal Contraceptive methods			

Table 10: Knowledge about breast cancer risk factors

S.NO	Warning signs of breast cancer	Yes	No	Don't Know
1.	Breast lump			
2.	Bloody nipple discharge			
3.	Nipple retraction			
4.	Pain in breast			
5.	Change in breast shape and/or size			
6.	Redness of breast skin			
	Screening methods of breast cancer			
1.	Mammogram is a method of early detection			
2.	Clinical breast examination is a method of early detection			
3.	Mammogram could discover a lump earlier than Clinical breast examination			
4.	Mammogram recommended to start at the age of twenty			

Table 11: Knowledge about breast cancer warning signs and screening methods

S.NO	Perceived Susceptibility	SA	A	N	D	SD
1.	My chances of getting breast cancer are great					
2.	My physical health makes it more likely that I will get breast cancer					
3.	I feel that my chances of getting breast cancer in the future are good.					
4.	I worry a lot about getting breast cancer.					
5.	Within the next year I will get breast cancer.					
	Perceived Severity					
1.	The thought of breast cancer scares me.					
2.	When I think about breast cancer, I feel nauseous.					
3.	If I had breast cancer my family and future would be concluded.					
4.	When I think about breast cancer my heart beats faster.					
5.	Breast cancer would endanger my significant relationship.					
6.	Breast cancer is a hopeless disease.					
7.	My feelings about myself would change if I got breast cancer.					
8.	I am afraid to even think about breast cancer.					
9.	My financial security would be endangered if I got breast cancer.					
10.	Problems I would experience from breast cancer would last a long time.					
11.	If I got breast cancer, it would be more serious than other diseases.					
12.	If I had breast cancer, my whole life would change.					
	Perceived Benefits					
1.	Doing breast self-exams prevents future problems for me.					
2.	I have a lot to gain by doing breast self-exams.					
3.	Breast self-exams can help me find lumps in my breast.					

4.	If I do monthly breast exams, I may find a lump before it is discovered by regular health exams					
5.	I would not be so anxious about breast cancer if I did monthly breast exams.					
6.	Having breast exams performed by a physician prevents future problems for me					
7.	I have a lot to gain by having breast exams performed by a physician.					
8.	Breast exams performed by a physician can help me find lumps in my breast.					
9.	If I have a breast exam performed by a physician every three years, I may find a lump before it is discovered by self breast exams.					
10.	I would not be so anxious about breast cancer if I had a breast exam performed by a physician every three years.					
	Perceived Barriers					
1.	I am afraid I would not be able to do breast self exams.					
2.	It is embarrassing for me to have a breast exam performed by a physician					
3.	In order to have a breast exam performed by a physician every three years, I have to give up quite a bit.					
4.	Breast exams performed by a physician can be painful.					
5.	Breast exams performed by a physician are time consuming.					
6.	My family/ friends would make fun of me if I have a breast exam performed by a physician.					
7.	The practice of breast exams performed by a physician interferes with my activities.					
8.	Having breast exams performed by a physician would require starting a new habit, which is difficult.					
9.	I am afraid I would not be able to go to a breast exam performed by a physician.					
10.	Having breast exams performed by a physician are expensive.					
	Cues to Action (Motivation)					
1.	I eat a well-balanced diet.					
2.	I always follow medical orders because I believe they will benefit my state of health.					
3.	I frequently do things to improve my health.					
4.	I take vitamins when I don't eat good meals.					
5.	I search for new information related to my health.					
6.	I have the recommended yearly physical exams in addition to visits related to illness.					
7.	I have the recommended periodic dental exams in addition to visits for a specific problem.					
8.	I exercise regularly- at least three times a week.					
	Self-Efficacy					
1.	I know how to perform a breast self-exam.					
2.	I have performed a breast self-exam.					
3.	I have performed a breast self-exam in the past year.					
4.	I have performed a breast self-exam in the past 3 months.					
5.	I have performed a breast self-exam in the past month.					
6.	I feel confident that if I perform a breast self-exam, I could feel any abnormalities in my breast.					
7.	I know how to get a breast exam performed by a physician					
8.	I have had a breast exam performed by a physician.					
9.	I have had a breast exam performed by a physician in the past year.					
10.	I have had a breast exam performed by a physician in the past 2 years.					
11.	I have had a breast exam performed by a physician in the past 3 years					
12.	I feel confident that if I have a breast exam performed by a physician, any abnormalities in my breast will be detected.					

Table 12: Champion's Health Belief Model Scale (CHBMS)

ETHICS STATEMENT AND CONFLICT OF INTEREST DISCLOSURES

Human subjects:

Consent was obtained or waived by all participants in this study. Institutional ethics committee of Mahavir Institute of Medical Sciences, Vikarabad issued approval MIMS/IEC/2019/14.

Animal subjects:

All authors have confirmed that this study did not involve animal subjects or tissue.

Conflicts of interest:

In compliance with the ICMJE uniform disclosure form, all authors declare the following:

Payment/services info:

All authors have declared that no financial support was received from any organization for the submitted work.

Financial relationships:

All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work.

Other relationships:

The Indian Council of Medical Research (ICMR) ShortTerm Research Studentship (STS) program was awarded to MBBS student Naga Nithya (Reference ID: 2019-04576).

.