Original Research Article

Effectiveness of intervention on awareness and knowledge of breast self-examination among the potentially at risk population for breast cancer

.

ABSTRACT

.

Aims: The aim of this study was to estimate the effectiveness of intervention on awareness and knowledge of breast cancer (BC) and breast self-examination (BSE) among the potentially, at risk population for breast cancer.

Study design: Descriptive pre-post study.
Place and Duration of Study: Private University students of faculty of pharmacy, AIMST University, Kedah state, Malaysia, between September, 2018 and May, 2019.
Methodology: A pre-validated questionnaire containing socio-demographic details along with awareness and knowledge based items regarding BC and BSE was distributed in class room setting after obtaining informed consent from study participants. Original blooms cut-off grades were used to categorize the scores. Descriptive statistics was computed for categorical variables and numerical data was presented as median (IQR), McNemers test was used for pre- and post-test differences, $P < .05$ considered significant.
Results: The overall response rate of the study population was around 92% (183/200). The awareness score regarding breast cancer was moderate (64%) at baseline. The most identified risk factors (61%) were presence of lumps, followed by smoking (56%). Only 65% and 31% were aware that, breast cancer is most common among women and their age-specific incidence rates. About 64% knew it could lead to death and 69% thought early detection improves survival rates. Upon intervention, there was a significant increase (99%, $p < .001$) in awareness towards all six items. At baseline the knowledge score was poor (51%), only 43% had any knowledge about breast cancer and only 32% were ever taught how to perform BSE. About 33% knew how often the BSE to be performed and 40% knew the best time for performing BSE. Hardly 24% ever practised BSE though 72% accepted performing BSE is good. However, only 38%, 28% and 22% knew the need of mirror, part of hand used and the direction of hand movement for performing BSE. The average knowledge score increased to 99% after intervention which showed statistically significant ($P < .05$) differences between baseline and post intervention studies.
Conclusion: This study results confirm that the study population had a fair awareness and poor knowledge at baseline. Intervention tool such as pamphlet providing clear, precise and required information about breast cancer, its signs and symptoms, risk factors, screening and steps for performing BSE are important to reduce breast cancer mortality. A nation wide reach-out with health education, barrier-specific counseling and community-based interventions are recommended.

Keywords: *Awareness, knowledge, breast self examination, breast cancer*

1. INTRODUCTION

Breast cancer is a global health issue and a leading cause of death among women (1). Data from the National Cancer Registry of Malaysia for 2007-2011 accounted for 32% of breast cancer; the second leading cause and the death rate in fourth place (6-8%) among all female cancers and related death. The global burden of cancer worldwide using the GLOBOCAN 2018 estimates about 11.6% of female breast cancer with a focus on geographic variability across 20 world regions (2). The age pattern in 2007-2011 showed a peak age-specific incidence rate at 50-59 years. However, the rate differs between the three main races and the incidence was highest among Chinese followed by Indian and Malay. The overall Age-Standardized Rate (ASR) was 31.1 per 100,000 populations. The ASR in Chinese was the highest with 41.5 per 100,000, followed by Indians at 37.1 per 100,000. This accounts for 1 in 22 Chinese, 1 in 24 Indians and 1 in 35 Malay women developing breast cancer at some stage in their lives (3).

Breast cancer is distinguished from other types of cancer as it occurs in visible organ and can be detected and treated at an early stage (4). The 5-year survival rate reached to 85% with early detection whereas, late detection decreased the survival rate to 56%. (5) The low survival rates can be attributed to the lack of early detection as well as inadequate diagnosis and treatment facilities in less developed countries (5).

Breast self-examination (BSE), clinical breast examination (CBE) and mammography are the screening methods recommended for breast cancer. BSE is the cost-effective method of early detection especially in resource poor countries. Over 90% of females breast cancer cases, when performed accurately and regularly for differences in breast tissue and lumps at an early stage can detect breast cancer by female themselves, focusing on monthly BSE between the 7th and 10th day of the menstrual cycle for any abnormal lumps or swelling to ensure a better prognosis when treated (6, 7). Therefore, it is important to have adequate awareness and knowledge about regular practice of BSE.

The outcome measures of this study were to estimate the awareness and knowledge of breast cancer and breast self-examination among the potentially, at risk population for breast cancer. The study findings could provide the health care system with a better understanding on the awareness and knowledge status of breast cancer and formulate appropriate strategy to address the national demon.

2. MATERIAL AND METHODS

2.1 Study Design and Population

A descriptive pre- post-test study using convenience sampling method was conducted among the female respondents from faculty of pharmacy, a private university in kedah state, Malaysia between September, 2018 and May, 2019. The male students, those involved in pilot study and/or not willing to participate in the study were excluded. The estimated

sample size was calculated at 95% CI, 5% margin of error, 50% response distribution and a 10% margin for drop-outs was added and the final recommended sample was rounded off to 165 (8, 9).

2.2 Development and Validation of Questionnaire

The questionnaire was developed in English and contained socio-demographic details such as age, race, year of study, etc., ten awareness related items (breast cancer, risk factors, signs and symptoms, preventive measures and treatment) and 21 knowledge related items of breast self-examination (multiple-choice questions with one or multiple correct answers) (10, 11, 12). One point was given for correct answer and a cumulative higher score indicates better awareness and knowledge. The questionnaire was first content and construct validated among academicians from faculty of medicine, faculty of pharmacy and school of nursing, AIMST University, Malaysia, later face validated among potential respondents (n=23) and reliability tested using Cronbach's alpha coefficient for internal consistency. The questionnaire showed acceptable reliability and stability ($\alpha = .78$) with positive correlations.

2.3 Awareness and Knowledge scores

The scoring grades attributed to each domain and overall was based on the original blooms' cut-off grades. a score < 60% was considered 'poor', 60% - 79% was considered 'moderate', and score ≥ 80% was considered 'good' (13, 14).

2.4 Ethical Considerations

The research proposal along with the study instrument and informed consent form (ICF) was submitted to the institutional review board (IRB), AIMST University human ethical committee (AUHEC) and the ethical clearance was obtained before initiation of study and signed informed consent was obtained from each participant before distribution of survey forms.

2.5 Modality of Obtaining Response

The pre-validated questionnaires were distributed to female students in the class room setting after getting their signed ICF and the completed questionnaires were used for data analysis.

2.6 Statistical Analyses

The analysis was performed using IBM SPSS statistics for windows (version 23). Descriptive statistics for frequency and percentage was computed for categorical variables. Numerical data was not normally distributed and hence presented as median and interquartile range. Differences in awareness and knowledge scores at pre- and post-test were computed using McNemers test. The Chi-square test for independence was used to discover the association / differences between categorical variables and *P*-value < .05 were considered significant. All percentages displayed in text or parentheses are with no decimal places**.**

0. RESULTS

1. Response rate

The overall response rate of the study population was around 92% (183/200).

3.2 Socio-demographic characteristics of the study population

The average age of the respondents were 22±4 years. Table 1 shows the distribution of socio-demographic characteristics among the study population.

Table 1: Socio-demographic characteristics of the study population (N=183)

Variables	N (%)
Age in Years	
18-20	41 (22)
21-23	128 (70)
24-26	14 (8)
Race	
Malay	3 (2)
Chinese	150 (82)
Indian	26 (14)
Others	4 (2)
Year of Study	

Year 1	42 (23)
Year 2	47 (26)
Year 3	40 (22)
Year 4	54 (30)
Marital Status	
Single	165 (90)
In a relationship	18 (10)
Smoking History	
*Yes	1 (1)
No	182 (99)
Family History of Breast Cancer	
Yes	22 (12)
No	161 (88)
Family Relationship with Breast Cancer	
Mother	3 (14)

*Siblings	1 (4)
Aunts	11 (50)
Relative	7 (32)
Native Location	
City	70 (38)
Town	83 (45)
Rural	30 (17)

3.3 Awareness of the Respondents towards Breast Self-Examination

A total of ten awareness-based items were used, of which six with one correct answer and '1' score was given for each correct response. The proportion of correct responses is summarized in Table 2 with statistically significant differences in awareness levels at two time points, baseline and post intervention.

Table 2: Proportion of Correct Responses towards Awareness of BSE (Pre- Vs. Post-test)

Q. No.	Awareness Items	Pre intervention			Post intervention		
		Correct N (%)	Incorrect N (%)	*p value	Correct N (%)	Incorrect N (%)	*P value
1.	Have you heard of breast cancer?	182 (99)	1 (1)	<.001	183 (100)	0	-

2.	Worldwide, breast cancer is most common cancer among women.	118 (65)	65 (35)	<.001	183 (100)	0	-
3.	What is the age at which breast cancer risk is highest?	57 (31)	126 (69)	<.001	183 (100)	0	-
4.	Do you think breast cancer could lead to death?	118 (65)	65 (35)	<.001	178 (97)	5 (3)	<.001
5.	Is there any treatment for breast cancer?	107 (58)	76 (42)	.02	179 (98)	4 (2)	<.001
6.	Do you think early detection of breast cancer improves survival rate?	126 (69)	57 (31)	<.001	183 (100)	0	-
Total Mdn (IQR) score			4 (2)			6 (0)	
Percentage of correct answers			64%			99%	

*Chi Square Test, *P* < .05 is statistically significant, Q = Question

Table 3 summarizes the multiple responses to each awareness based items. Most respondents came to know about breast cancer through news or multimedia (76%), whereas, 78% respondents ascertained BSE as the tool for early breast cancer detection, 69% thought healthy diet prevents breast cancer, whereas 50% conferred alcohol abstinence. The most identified risk factors (61%) were presence of lumps, followed by smoking (56%).

Table 3: Multiple responses towards awareness items

Qn. No.	Awareness Items with multiple response	Response N (%)	*P value
7.	**What is the source of your information about breast cancer?**		
	i. Newspaper/TV/Internet	138 (76)	<.001

ii.	Family doctor	6 (4)	
iii.	Family/ Friends	39 (20)	
8.	**The tools utilized for early detection of breast cancer.**		
i.	self-examination (BSE)	143 (78)	
ii.	Physical examination (PBE)	86 (47)	<.001
iii.	mammography	80 (44)	
iv.	ultrasound	35 (19)	
9.	**Preventive measures against breast cancer.**		
i.	alcohol abstinence	92 (50)	
ii.	Increase physical activity	118 (65)	
iii.	healthy diet	126 (69)	<.001
iv.	ideal body weight	93 (51)	
v.	avoid hormonal therapy	103 (56)	
10.	**Which of the following are risk factors for breast cancer?**		
i.	Decrease with increase in age	35 (19)	
ii.	Increase with smoking	102 (56)	
iii.	Increase with alcohol consumption	92 (50)	
iv.	Increase in obesity	89 (49)	
v.	Increase with lack of exercise	86 (47)	
vi.	Increase with early menstruation (< 12 years)?	32 (18)	<.001
vii.	Decrease in breast feeding?	46 (25)	
vii.	Increase with late pregnancy (> 30 years)	71 (39)	
ix.	Increases with contraceptive pills use	105 (57)	
x.	Increase in women never given birth	50 (27)	
xi.	Increase with presence of lump	112 (61)	
xii.	Increase with bloody discharge from nipple	115 (63)	

*Chi Square Test; $P < .05$ is considered statistically significant.

3.4 Knowledge of the respondents towards BSE

Out of 21 knowledge-based items, 17 items with '1' score for each correct answer were used to test the knowledge domain. All correct responses were summed-up to obtain the total knowledge score. Table 4 depicts the responses of the

respondents towards knowledge-based items regarding BSE. Among the 17 knowledge-based items, Q2, Q8 and Q11 had the maximum percentage of correct responses (91%, 72 % and 72%) respectively.

Table 4: Proportion of Correct Responses towards BSE Knowledge

Q. No.	Knowledge Items	Pre intervention			Post intervention		
		Correct N(%)	Incorrect N(%)	*p value	Correct N(%)	Incorrect N(%)	*P value
1.	Do you know what breast self-examination (BSE) is?	78 (43)	105 (57)	.05	176 (96)	7 (4)	<.001
2.	Have you heard of Breast Self-Examination (BSE)?	132 (72)	51 (28)	<.001	182 (99)	1 (1)	<.001
3.	Do you know that BSE is a useful tool for early detection of breast cancer?	113 (62)	70 (38)	.001	183 (100)	0	-
4.	Have you been taught how to do BSE?	59 (32)	124 (68)	<.001	183 (100)	0	-
5.	At what age do you think BSE should be started?	108 (59)	75 (41)	.02	183 (100)	0	-
6.	How often should BSE be done?	60 (33)	123 (67)	<.001	183 (100)	0	-
7.	What is the best time to carry out BSE?	73 (40)	110 (60)	.02	183 (100)	0	-
8.	Who should perform BSE?	166 (91)	17 (9)	<.001	183 (100)	0	-
9.	What are the major benefits of BSE?	87 (47)	96 (53)	.50	183 (100)	0	-
10.	Do you practice BSE?	44 (24)	139 (76)	<.001	68 (37)	115 (63)	<.01

87	Table	11.	Do you think BSE is a good practice?	132 (72)	51 (28)	<.001	178 (97)	5 (3)	<.001	5
		12.	Is BSE the most commonly used method for breast cancer detection?	98 (54)	85 (46)	.34	179 (98)	4 (2)	<.001	
		13.	What are the postures for performing BSE?	129 (70)	54 (30)	<.001	170 (93)	13 (7)	<.001	
		14.	Is a mirror required for performing BSE?	69 (38)	114 (62)	.001	183 (100)	0	-	
		15.	Which part of the hand is used for performing BSE?	52 (28)	131 (72)	<.001	180 (98)	3 (2)	<.001	
		16.	What is the direction of hand movement during BSE procedure?	41 (22)	142 (78)	<.001	180 (98)	3 (2)	<.001	
		17.	How should one respond if any abnormality is detected?	131 (72)	52 (28)	<.001	181 (99)	2 (1)	<.001	
		Total median score			9 (3)			16 (1)		
		Percentage of correct answers			51(%)			95(%)		

*Chi Square Test, $p < .05$ is statistically significant,

88 summarizes the multiple responses to each knowledge items and not included in total score calculation. Most
89 respondents (55%) came to know about steps to perform BSE through brochures or internet sources. The area to
90 examine when performing BSE, mostly all respondents ascertained armpit, whereas, 61% determined looking for lumps,
91 nipple discharge and/or pain in breast during BSE that need a doctors visit.

Table 5: Response of Knowledge towards performing BSE

Q. No.	Knowledge Items	Response N (%)	*P value

3.5	18. **Source of BSE performing knowledge**		
	i. Mother	22 (12)	
	ii. *Sister	1 (1)	
	iii. Teacher	15 (8)	
	iv. Doctor	15 (8)	<.001
	v. Nurse	25 (14)	
	vi. Friend	5 (3)	
	vii. Others	100 (55)	
	19. **Areas to examine when performing BSE**		
	i. Breast	112 (61)	
	ii. Armpit	183 (100)	<.001
	iii. Between breast and collar bone	63 (34)	
	20. **What should be looked for during BSE?**		
	i. Breast skin colour/texture	62 (34)	
	ii. Lumps	112 (61)	<.001
	iii. Nipple discharge	78 (43)	
	21. **What are the abnormalities that need a doctor visit?**		
	i. Fixed or mobile mass	102 (56)	
	ii. Difference between breasts	77 (42)	
	iii. Changes in size during menstruation	25 (14)	<.01
	iv. Change in breast skin colour/texture	103 (56)	
	v. Nipple discharge	111 (61)	
	vi. Pain in breast	112 (61)	

*Chi Square Test; *P* < .05 is considered statistically significant. *Ignored for results interpretation

Comparison of median scores between Pre- and Post-intervention studies

Table 6 shows the median and IQR scores of the study participants at the two different phases of the study.

Table 6: Score of Awareness and Knowledge among the Respondents

Variable	Median	IQR	Min	Max
Baseline study Awareness	4	2	1	6

Baseline study Knowledge	9	3	1	15
Post-intervention Awareness	6	0	5	6
Post-intervention Knowledge	16	1	14	19

3.6 Comparison of Awareness scores at Pre and Post intervention

The awareness regarding breast cancer was good at baseline, whereas only 64% were aware, breast cancer is most common among women and 31% knew the age-specific incidence rate. About 64% were aware, breast cancer could lead to death, 58% knew their was any treatment and 69% thought early detection improves survival rates. Upon intervention, there was a significant increase (99%, p <.001) in awareness towards all six items (Table 7).

Table 7: Comparison of Awareness scores at Pre and Post intervention

Qn. No.	Awareness Item	Pretest N (%)	Post-test N (%)	*P value
1.	Have you heard of breast cancer?	182 (99)	183 (100)	<.001
2.	Worldwide, breast cancer is most common cancer among women.	118 (64)	183 (100)	<.001
3.	What is the age at which breast cancer risk is highest?	57 (31)	183 (100)	<.001
4.	Do you think breast cancer could lead to death?	118 (64)	178 (97)	<.001
5.	Is there any treatment for breast cancer?	107 (58)	179 (98)	<.001
6.	Do you think early detection of breast cancer improves survival rate?	126 (69)	183 (100)	<.001
	Average Total Score	64%	99%	
	Average Median (IQR) Score	4(2)	6(0)	

*McNemar's Test, *P* < .05 is significant

.7 Comparison of Knowledge scores at Pre- and Post-Intervention

At baseline, only 43% knew about breast cancer whereas 72% have heard about BSE and only 32% were ever taught how to perform BSE. About 33% knew how often the BSE to be performed and 40% knew the best time for performing BSE. Hardly 24% ever practised BSE though 72% accepted performing BSE is good. However, only 38%, 28% and 22%

knew the need of mirror, the part of hand used and the direction of hand movement for performing BSE. The average knowledge score was 51% at base line which increased to 95% after intervention (Table 8)**.**

Table 8: Comparison of Knowledge scores at Pre- and Post-intervention

Qn. No.	Knowledge Item	Pretest N (%)	Post-test N (%)	*P value
1.	Do you know what breast self-examination (BSE) is?	78 (43)	176 (96)	<.001
2.	Have you heard of Breast Self-Examination (BSE)?	131 (72)	182 (99)	<.001
3.	Do you know that BSE is a useful tool for early detection of breast cancer?	113 (62)	183 (100)	<.001
4.	Have you been taught how to do BSE?	59 (32)	183 (100)	<.001
5.	At what age do you think BSE should be started?	108 (59)	183 (100)	<.001
6.	How often should BSE be done?	60 (33)	183 (100)	<.001
7.	What is the best time to carry out BSE?	73 (40)	183 (100)	<.001
8.	Who should perform BSE?	166 (91)	183 (100)	<.001
9.	What are the major benefits of BSE?	87 (48)	183 (100)	<.001
10.	Do you practice BSE?	44 (24)	68 (37)	<.01
11.	Do you think BSE is a good practice?	132 (72)	178 (97)	<.001
12.	Is BSE the most commonly used method for breast cancer detection?	98 (54)	179 (98)	<.001
13.	What are the postures for performing BSE?	129 (70)	170 (93)	<.001
14.	Is a mirror required for performing BSE?	69 (38)	183 (100)	<.001
15.	Which part of the hand is used for performing BSE?	52 (28)	180 (98)	<.001
16.	What is the direction of hand movement during BSE procedure?	41 (22)	180 (98)	<.001
17.	How should one respond if any abnormality is detected?	130 (71)	181 (99)	<.001
Average Total Score		51%	95%	

Average Median (IQR) Score	9(3)	16(1)

*McNemar Test, $P < .05$ is significant

4. DISCUSSION

4.1 Differences in awareness towards BSE

Person et al., 1995 recommended girls at school age to be started education about BSE in order to make BSE a habit (15). However, over the years, there has been some debate over just how valuable breast self-examination is in detecting breast cancer early and increasing the likelihood of survival. Due to some ongoing uncertainty, the American Cancer Society no longer recommends breast self-exam as a screening tool for women with average risk of breast cancer. (16)

The U.S. Preventive Services Task Force "supports all patients being aware of changes in their bodies about breast self-awareness and discussing these changes with their clinicians" based on the frequent incidence of self-detected breast cancer. (17) This study found significant differences in distribution of age, race, relationship status, smoking history, family history and native location. In general, the respondents' awareness of breast cancer was poor. It was also evident through earlier studies by Montazeri et al., 2008 and Karayurt et al., 2008, the most common risk factor was poor knowledge for breast cancer. (18, 19) The percentage of correct answers to awareness based questions was only 64%, with moderate awareness level probably due to the lack of breast health care programs in Malaysia. (20)

In a study done by Adebamowo & Adekunle, 1999, it was observed that patients with positive family history tend to present early for screening and management. (21) The study results reported breast cancer (65%) was the commonest cancer among women worldwide which was slightly higher than 56% reported by Alwan et al., 2012 among the Iraqi population. (22) This study reported a better percentage of awareness (65%) about the possibility of death by breast cancer when compared to the study reported (46%) by Abdallah et al., 2015. (23)

A study by Marzouni et al. (2013) states that family history of breast cancer is significantly correlated with higher awareness, its screening and prevention. (24) It reported that women with positive family history had better information about preventing programs ($p > .001$). (24) In this study, respondents with family history of breast cancer have a slightly higher level of awareness regarding BSE. About 28% of respondents with family history had good awareness level compared to respondents with no family history (27%). Regardless of family history, women still need to be "breast aware" and accurately identify breast symptoms in order to receive timely treatment as quickly as possible. (25)

Most of the study respondents came to know about breast cancer through multimedia which was consistent (76%) with the study reported by Milaat (2000). (25) These findings indicated that multimedia continued to be one of the most

important resources of information about breast cancer and BSE and highlighted the coordination between public health educators and the multimedia in dissemination of breast cancer related information.

A study conducted among female nursing college students in Riyadh, Saudi Arabia reported 66% of study population perform BSE, and another study among female medical students in Taif reported only 17% perform BSE regularly and 89% knew BSE should be carried out every month. Similar results were reported among women in Al-Qassim region (19%) perform BSE regularly; whereas, 70% had never heard of BSE. (26, 27) This study identified 24% of the respondents practice BSE regularly, 54% accepted BSE as the most commonly used method for early detection and 72% were aware of what to do if any abnormality was detected.

Regarding risk factors for breast cancer, about 63% and 61% respectively knew that bloody discharge from nipple and presence of lump are risk factors, while 57% and 56% knew, use of contraceptive pills and smoking are also implicated risk factors. Most of the respondents in this study didn't know the association between breast cancer and short periods of breast feeding (25%), early menstruation (18%) and advanced age (19%). Also, around 49%, 50% and 39% of respondents realized the effect of obesity, alcohol consumption and delivery of first child after the age of 30 years respectively has risk factors of breast cancer. Respondents showed poor understanding about major breast cancer risk factors. The perception of the use of contraception by 57% might reflect the religious appreciation that encourages natural methods of birth control. (28, 29)

This study outcomes are closely associated with the studies reported a decade ago by Adebamowo & Ajayi, 2000; Odusanya, 2001 and Adebamowo & Adekunle, 1997, that the incidence of breast cancer was slightly higher in persons with: history of first degree relatives with breast cancer; early menarche; late menopause; oral contraceptive use; does not breast feed; first birth after age 35 or nulliparous women. (29, 30) The incidence is also increased with increasing age, smoking, obesity, physical inactivity, radiation exposure, intake of alcohol and high fat. Thus, further health education was recommended on associated and protective risk factor.

4.2 Differences in knowledge towards BSE

In general, the respondents' knowledge on BSE was poor. The outcome is supported by reports from earlier studies (Haji et al., 2002).The study reported the knowledge and behaviors of female health care workers concerning breast cancer is relatively poor and it needs to be improved. (31) Considering the role that health care workers may play in communicating health behaviors to the general public, planning health education interventions for females is essential. (32) The percentage of correct answers to knowledge questions was only 51% and poor.

In this study, 20% of year four students had good knowledge level. A study from Gurdal et al. (2012) reported that higher educational levels were positively associated with BSE performance. Overall, the results suggest that Turkish women, regardless of their education level, need better education on BSE. (33) Most of the respondents have been thought about BSE through internet and pamphlets which including 55% of respondents. However, the print medium has been found to be commonest source of information in other studies. (34) Other studies from developed societies reported television and radio as the most popular media and can reach a wide audience. (34, 35, 36, 37) A study among female medical students in Nigeria reported that 97% were aware of BSE mainly through television/radio, (36) while in another survey from the same country, the electronic media were found to be the major resource among female secondary-school teachers. (37) This emphasizes that source of information varies by setting, which needs to be considered when promoting health education.

5. CONCLUSION

In conclusion, the results presented in this study give an insight into the effects of pamphlet as an intervention tool among university female students regarding BSE focused on awareness and knowledge. This study results confirm that the awareness and knowledge levels in the study population was quite poor at baseline. Hence, intervention tool such as pamphlet given in addition to providing clear, precise and required information about breast cancer sign and symptoms, risk factors , its screening, its prevention and steps of BSE which is important has been found to be useful. There was an increase in awareness and knowledge score levels among the respondents between pretest and post-intervention test. This study revealed that pamphlet education was equally effective in reaching the aims of increased knowledge about and frequency of BSE.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

REFERENCE

1. Hortobagyi GN, de la Garza Salazar J, Pritchard K, Amadori D, Haidinger R, Hudis CA, et al. The global breast cancer burden: variations in epidemiology and survival. Clin Breast Cancer. 2005;6:391-401. doi:: https://doi.org/10.3816/CBC.2005.n.043

2. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA: a cancer journal for clinicians. 2018;68(6):394-424. doi: 10.3322/caac.21492
3. Azizah AM, Nor Saleha IT, Noor Hashimah A, Asmah ZA, Mastulu W. Malaysian national cancer registry report 2007–2011. Malaysia cancer statistics, data and figure. Putrajaya: National Cancer Institute, Ministry of Health. 2016.
4. Taşçı A, Usta YY. Comparison of knowledge and practices of breast self examination (BSE): a pilot study in Turkey. **Asian Pac J Cancer Prev**: APJCP. 2010;11(5):1417-20. PMID: 21198303
5. Hallal JC. The relationship of health beliefs, health locus of control, and self concept to the practice of breast self-examination in adult women. **Nurs. Res** 1982;31:137-42. PMID: 6918918
6. Meijer-van Gelder ME, Look MP, Bolt-de Vries J, Peters HA, Klijn JG, Foekens JA. Clinical relevance of biologic factors in male breast cancer. Breast cancer research and treatment. 2001;68(3):249-60. PMID: 11727961; doi: 10.1023/a:1012221921416
7. Memis S, Balkaya NA, Demirkiran F. Knowledge, attitudes, and behaviors of nursing and midwifery students regarding breast self-examination in Turkey. In oncology nursing forum 2009; 36(1), E39-46. doi: 10.1188/09.ONF.E39-E46
8. Raosoft. Sample Size Calculator. Available from: http://www.raosoft.com/samplesize.html.
9. Cohen J. Statistical power analysis for the behavioral sciences. 2nd.edition
10. Gursoy AA, Hindistan S, Nural N, Kahriman I, Yilmaz F, Yigitbas Ç, Erdol H, Bulut HK, Çalik KY, Mumcu HK. Comparison of three educational interventions on breast self-examination knowledge and health beliefs. Asian Pacific Journal Cancer Prevention. 2009;10(5):765-2. PMID: 20104966
11. Jahan S, Al-Saigul AM, Abdelgadir MH. Knowledge, attitudes and practices of breast self examination among women in Qassim region of Saudi Arabia. Saudi medical journal. 2006;27(11):1737-41. PMID: 17106553
12. Chioma C, Asuzu S. Knowledge, attitude and practice of self-breast examination among the female students of the University of Ibadan, Nigeria. Pakistan Journal Social Science 2007;2007;4 Suppl 3: 400-2. doi:pjssci.2007.400.402
13. Kaliyaperumal KI. Guideline for conducting a knowledge, attitude and practice (KAP) study. AECS illumination. 2004;4(1):7-9.
14. John J. The knowledge, attitude, practice and perceived barriers towards screening for premalignant cervical lesions among women aged 18 years and above, in Songea urban, Ruvuma (Doctoral dissertation, Muhimbili University of Health and Allied Sciences); 2011.

15. Persson K, Johansson I, EK AC. Breast self- examination among Swedish women: A survey of frequency, knowledge, and attitudes. Journal of Cancer Education. 1995;10(3):163-7. PMID: 8534603; doi: 10.1080/08858199509528360
16. Oeffinger KC, Fontham ET, Etzioni R, Herzig A, Michaelson JS, et al., Breast cancer screening for women at average risk: 2015 guideline update from the American Cancer Society. Jama. 2015;314(15):1599-614. doi: 10.1001/jama.2015.12783
17. Siu AL. Screening for breast cancer: US Preventive Services Task Force recommendation statement. Annals of internal medicine. 2016;164(4):279-96. doi: 10.7326/M15-2886
18. Montazeri A, Vahdaninia M, Harirchi I, Harirchi AM, Sajadian A, Khaleghi F, Ebrahimi M, Haghighat S, Jarvandi S. Breast cancer in Iran: need for greater women awareness of warning signs and effective screening methods. Asia Pacific family medicine. 2008;7(1):6. doi: 10.1186/1447-056X-7-6
19. Karayurt O, Ozmen D, Çetinkaya AÇ. Awareness of breast cancer risk factors and practice of breast self examination among high school students in Turkey. BMC Public Health. 2008;8(1):359. doi: 10.1186/1471-2458-8-359.
20. Budden L. Young women's breast self-examination knowledge and practice. Journal of Community Health Nursing. 1995;12(1):23-32. PMID:7897468; doi:10.1207/s15327655jchn1201_3
21. Adebamowo CA, Adekunle OO. Case- controlled study of the epidemiological risk factors for breast cancer in Nigeria. British Journal of Surgery. 1999;86(5):665-708. PMID: 10361191. doi:10.1046/j.1365-2168.1999.01117.x
22. Alwan NA, Al Attar WM, Eliessa RA, Madfaic ZA, Tawfeeq FN. Knowledge, attitude and practice regarding breast cancer and breast self-examination among a sample of the educated population in Iraq. 2012; EMHJ, Vol 18. PMID:22768695
23. Abdallah AS, El-Gharabawy RM, Al-suhaibany HO. Knowledge, attitude and practice about breast cancer among women in Saudi Arabia. International Archives of Medicine. 2015; 248(8):1-13. doi: 10.3823/1847. doi: http://dx.doi.org/10.3823/1847
24. Marzouni HZ, Lavasani Z, Shalilian M, Najibpour R, Fakhr MS, Nazarzadeh R, Farshad A, Bahrami N. Women's awareness and attitude toward breast self-examination in dezful city, Iran, 2013. Iranian Red Crescent Medical Journal. 2015;17(1). e17829. doi:10.5812/ircmj.17829. doi: 10.5812/ircmj.17829
25. Millat WA. Knowledge of secondary-school female students on breast cancer and breast self-examination in Jeddah, Saudi Arabia. Eastern Mediterranean Health Journal, 2000;6 (2-3), 338-344. PMID: 11556021

26. Alsaif AA. Breast self-examination among Saudi female nursing students in Saudi Arabia. Saudi Medical Journal. 2004;25(11):1574-8. PMID:15573181

27. Nemenqani DM, Abdelmaqsoud SH, Al-Malki AH, Oraija AA, Al-Otaibi EM. Knowledge, attitude and practice of breast self examination and breast cancer among female medical students in Taif, Saudi Arabia. Open Journal of Preventive Medicine. 2014;4(02):69-77. doi: 10.4236/ojpm.2014.42011

28. Paul C, Barratt A, Redman S, Cockburn J, Lowe J. Knowledge and perceptions about breast cancer incidence, fatality and risk among Australian women. Australian and New Zealand Journal of Public Health. 1999;23(4):396-400. PMID: 10462863; doi: 10.1111/j.1467-842x.1999.tb01281.x

29. Adebamowo CA, Ajayi OO. Breast cancer in Nigeria. West African journal of medicine. 2000;19(3):179-91.

30. Odusanya OO. Breast cancer: knowledge, attitudes, and practices of female schoolteachers in Lagos, Nigeria. The breast journal. 2001;7(3):171-205. PMID:11469930; doi:10.1046/j.1524-4741.1998.410062.x-i1

31. Haji- Mahmoodi M, Montazeri A, Jarvandi S, Ebrahimi M, Haghighat S, Harirchi I. Breast Self- Examination: Knowledge, Attitudes, and Practices Among Female Health Care Workers in Tehran, Iran. The breast journal. 2002;8(4):222-5. PMID: 12100114; doi: 10.1046/j.1524-4741.2002.08406.x

32. Ceber E, Turk M, Ciceklioglu M. The effects of an educational program on knowledge of breast cancer, early detection practices and health beliefs of nurses and midwives. Journal of Clinical Nursing. 2010;19(15- 16):2363-71. PMID:20659208; doi: 10.1111/j.1365-2702.2009.03150.x

33. Gurdal SO, Saracoglu GV, Oran ES, Yankol Y, Soybir GR. The effects of educational level on breast cancer awareness: a cross-sectional study in Turkey. Asian Pacific Journal of Cancer Prevention. 2012;13(1):295-300. doi: 10.7314/APJCP.2012.13.1.295

34. Dundar PE, Ozmen D, Ozturk B, Haspolat G, Akyıldız F, Çoban S, Çakıroglu G. The knowledge and attitudes of breast self-examination and mammography in a group of women in a rural area in western Turkey. BMC cancer. 2006;6(1):43. doi: 10.1186/1471-2407-6-43

35. Irurhe NK, Olowoyeye OA, Arogundade RA, Bassey RB, Onajole AT. Knowledge, attitude and practice of breast Self-Examination among female medical students in the University of Lagos. The Internet Journal of Health. 2011;12(1).

36. Kayode FO, Akande TM, Osagbemi GK. Knowledge, attitude and practice of breast self examination among female secondary school teachers in Ilorin, Nigeria. European journal of scientific research. 2005;10(3):42-47.

37. Uche EE. Cancer awareness among a Nigerian population. Tropical doctor. 1999 Jan;29(1):39-40. doi.org/10.1177/004947559902900114