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EVALUATING THE EFFECT OF INTERVENTIONS ON BREAST SELF-EXAMINATION KNOWLEDGE AND PRACTICE AMONG ADOLESCENT FEMALE SECONDARY SCHOOL STUDENTS IN DELTA STATE, NIGERIA

Amosu AM, Akpo MO, Akinboye DO

Department of Public Health, Babcock University, Ogun State, Nigeria

ABSTRACT

Background: Adolescent females have reduced ability to self-detect breast abnormalities early. Improving their knowledge and practice of breast self-examination (BSE) will reverse this trend.

Objective: This study evaluated the effect of two interventions on BSE knowledge and practice among in-school adolescent females in Delta State, Nigeria.

Methods: A quasi-experimental research was conducted among ninety female secondary school students selected using a multistage sampling technique from three public secondary schools in the state. There were three groups: two experimental groups and a control. Experimental groups had BSE educational pamphlet alone (BPAM), and a combination of BSE pamphlet and BSE training (BPAME). The control group had a cervical cancer educational pamphlet. Participants were followed-up for eight weeks after the study implementation. Data analysis was done using SPSS version 23.0.

Results: Mean age of respondents was 15.64 ± 1.33 years. There was a significant difference in the respondents' level of BSE knowledge between baseline and 8 weeks follow-up (BPAM= 5.20 ± 2.28 to 21.56 ± 1.85 , $t_{39}=29.44$, $p<.05$; BPAME= 7.03 ± 1.13 to 21.73 ± 1.26 , $t_{39}=31.77$, $p<.05$), and a significant difference in the level of BSE practice between baseline and 8 weeks follow-up (BPAM 0.33 ± 1.21 to 4.90 ± 1.56 , $t_{39}=13.25$, $p<.05$; BPAME= 32.76 ± 4.66 to 63.83 ± 2.80 , $t_{39}=18.99$, $p<.05$). Both interventions had same impact on BSE knowledge (Effect size $ES=0.97$, $p=0.000$) but BPAME had a higher impact on BSE practice [(BPAM: $ES=0.87$, $p=0.000$) and (BPAME: $ES=0.92$, $p=0.000$)].

Conclusion: Both interventions had significant influence on the respondents' knowledge and practice of BSE but combined BSE pamphlet and training had more impact on BSE practice.

Keywords: Adolescents, breast self-examination, pamphlet, BSE training, Delta State

Corresponding author:

Akpo Morenike O

Department of Public Health,
Babcock University, Illisan-Remo,
Ogun State, Nigeria.

Email: debellaakpo@yahoo.ca

Tel.: 08037053551

Introduction

Breast self-examination (BSE) is a visual and manual examination of a woman's breast by herself, used for early detection of breast abnormalities including breast cancer, if done regularly.¹ Breast cancer is a disease of public health concern because of the increasing annual incidence from 1.7 million cases in 2012 to 2.3 million cases in 2020.^{2,3} Aside adults, the incidence of breast cancer among adolescents is also on the rise.⁴ The reason for this is unclear even though some attribute it to the recent adaptation to westernized life-style.⁵ The adolescent female has a more aggressive breast cancer phenotype with the worst prognosis if it occurs.⁶ Therefore, the female adolescent breast health needs more focus in order to detect this disease early.

Across the globe, many adolescents have low awareness of BSE, poor knowledge and inappropriate practice of BSE. Reports from Egypt show that 93% of adolescents have not heard of BSE.⁷ In Ghana, out of 359 adolescents studied, 77% have never heard of BSE.⁸ In a study in Abuja, Nigeria, among 287 adolescents, 75.6% had poor knowledge of BSE and poor practice (10.1%) of BSE.⁹ This trend seems to cut across board among adolescents. Initiating BSE in this age group may therefore, be a consideration to improve early breast disease presentation with attendant reduced mortality. In Nigeria, only 6.1% to 15.5% of secondary school females practice BSE.¹⁰ Most of these adolescents lack adequate knowledge about

breast self-examination, when, how, and the steps involved in performing breast self-examination and so do not engage in BSE practice.^{6,11,12} If these breast changes are identified early, the patient seeks early medical attention resulting in a better prognosis. Women who perform BSE regularly can detect over 80% of cases of breast abnormalities and cancer early by themselves.^{13,14} In a study among women with chronic diseases in Western Massachusetts, the women acknowledged that the knowledge they gained while learning BSE as teenagers was what they have kept till middle age and used regularly.¹⁵

The adolescent age (10-19 years) which is a transition period from childhood to adulthood, is associated with a lot of changes including mental, physiological, physical including the development of secondary sexual characteristics.¹⁶

Therefore, positive health behaviors formed at this age are likely to persist throughout their lifetime and the adolescent female can be used as an agent of change to spread information on BSE and to teach others early in life. Although BSE has been recommended to begin from 20 years of age, some have advocated that BSE should begin earlier at 18 years and others have recommended that it should start as soon as a girl develops breasts.¹⁷⁻²⁰

BSE is the best option for the adolescent female to get familiar with her breast because clinical breast examination is not routinely done and mammography is recommended for older women. Besides, the breast of the adolescent female is dense and it is

not easily penetrated during the process of a mammogram.²¹ Although breast cancer in adolescents is rare, it is important for them to learn how to perform breast self-examination regularly once a month and this will help them in developing a lifelong breast health practice.

There is therefore the need to assess the BSE intervention method that is most suitable to address BSE knowledge and practice among adolescent females. This study evaluated the effect of two interventions on BSE knowledge and practice among female secondary school students in Delta State, Nigeria.

Material and Method

Study design: This study employed a quasi-experimental design (pretest-posttest) comprising two experimental and one control groups.

Study population: The study population included in-school female students in senior secondary school two (SS2) classes of the selected schools. Students from other arms of senior and junior secondary classes and male students were excluded.

Study setting/area: The study was conducted in three public secondary schools in Delta State which is in the south-south geopolitical zone of Nigeria. One secondary school each was selected from three local government areas (LGA) namely Oginigrama school (Ethiope-West LGA), Hussey college (Warri-South LGA) and Ugboodo secondary school (Okpe LGA).

Sample size determination

The sample size was determined using Power formula²² for computation of sample size with power set at 80% and 95% confidence interval. The formula for the sample size is just for one population, therefore to get the total size required for the study; the computed sample size was multiplied by three.

$$n = \frac{(Z\alpha + Z\beta)^2 \times P_0(1 - P_0)}{(P_1 - P_0)^2}$$

n= Minimum sample size

Z α = Normal standard variate at 95% confidence interval (1.96)

Z β = Power at 80% confidence interval = 0.84

P₀ = Prevalence of BSE practice= 50%

P₁ = 80% (desired level of outcome variable)

$$n = \frac{(1.96 + 0.84)^2 \times 0.5(1 - 0.5)}{(0.8 - 0.5)^2} = \frac{7.84 \times 0.25}{(0.3)^2}$$

$$n = 21.77 \approx 22$$

Attrition rate 20% of sample size = 4.4. Thus n = (22+4.4) = 26.4 $\approx$ 27

The sample size was increased to 30 to minimize the margin of error

The total sample size is (30 x 3) = 90

From the computation, 30 participants were recruited for each group.

Sampling Technique

A multi-stage sampling technique was used to select the required study participants in this study.

Stage 1: Selection of local government areas: Three local governments were selected by simple random sampling using the balloting method from the list of local government areas in Delta State.

Stage 2: Selection of secondary schools: Using balloting method, one secondary school was selected from each local government area.

Stage 3: Randomization: The selected schools were randomly assigned to either an experimental or control group.

Stage 4: Selection of participants: Thirty students each from SS2 classes of the selected schools were randomly selected until the calculated sample size was achieved.

Study Instruments

The instrument for data collection for this study was a self-administered questionnaire. The questionnaire was divided into three sections. Section A comprised questions on the social demographic characteristics of the participants (age, class, tribe, marital status, and religion); Section B comprised questions on knowledge of BSE measured on a 24-point rating scale with Yes, No, or 'I do not know' responses. Section C comprised questions on breast self-examination practice measured on a 6-point rating scale with multiple choice and dichotomous yes or no responses.

Face and content validity was achieved by seeking the opinion of experts in adolescent health, public health and health promotion. The instrument was pilot-tested for its comprehensibility and clarity among a convenience sample of adolescent SS2 students from a non-participating school, who represented 10% of the calculated sample size. The overall reliability score (Cronbach alpha) was 0.74. Modification of the questionnaire was carried out based on the outcome of the pilot-testing before using it for the data collection.

Data collection procedure

Pre-intervention

Data were collected at the baseline with the validated study instrument (questionnaire). The baseline data was to find out the participants' knowledge and BSE practice before the interventions. This defined the beginning and a reference point for the intervention and provided a rationale for comparing all groups at follow-up. It also served as the basis for detecting any changes attributable to the intervention.

Post-intervention

Data was also collected at the immediate post-intervention and at the end of eight (8) weeks follow-up period with the same instrument used for the pre-intervention. This signified the end of the intervention program.

Confidentiality of information and anonymity were assured. The participants were told not to write their names on the questionnaire. Data was collected by one of the authors assisted by research assistants.

Intervention

The intervention was in three phases namely the baseline or pre-intervention phase, implementation phase, and the follow-up phase.

Pre-intervention phase

The pre-intervention phase involved the conceptualization of the study and selection of the participants. Ethical approvals and consent were obtained from relevant authorities.

The Implementation Phase

The actual implementation of the intervention took place in the different groups at this phase. The experimental group 1 participants were given BSE pamphlet only (BPAM) to read by themselves and the pamphlet was left with them throughout the 8 weeks follow-up period.

The experimental group 2 participants were given a BSE pamphlet and BSE education with training (BPAME). The BSE educational training lasted for four weeks. There was one module per week, each lasting for 45-60 minutes. Topics covered in the training manual included; anatomy and physiology of the normal breast tissue, breast screening tools, breast self-examination benefits and limitations, breast cancer risk factors, signs and symptoms of breast cancer including the complications, treatment modalities, and practical demonstration of BSE. Each module ended with a question-and-answer session to clarify the students' doubts.

Participants in the control group received a pamphlet on a different topic other than BSE (cervical cancer). This phase lasted for four weeks.

Follow-up phase

The follow-up lasted for eight-weeks. During this phase, the participants were followed up to ensure that they practiced the breast examination.

Development of the pamphlet

The pamphlet on BSE with the tagline 'Know your Breast' was designed based on a comprehensive literature review on breast cancer, screening tool and especially breast self-examination. The pamphlet had a clear coloured illustration of the steps involved in performing a breast self-examination. The pamphlet was written in simple English language. Before the administration of the pamphlet, professionals in the field of public health and health promotion reviewed the content. The pamphlet was also pre-tested among female adolescent secondary school students with similar characteristics as the participants but from a non-participating school for its comprehensibility and clarity. Modification was based on the feedback from the students and suggestions from the reviewers before it was administered to the actual study participants. The same content of the pamphlet was replicated in the educational training manual.

Data Analysis

The data from the completed instrument was collated, coded, screened, and entered into a pass-worded computer. The analysis was carried out by using the statistical package for social sciences (SPSS) computer software for Windows, version 23.0. Responses from the scale were transformed into weighted aggregate scores to measure levels of the moderating and outcome variables in the study. Descriptive statistics, such as frequency distributions for demographic characteristics of

respondents, mean and standard deviations were computed. Comparison of the mean scores of study participants at baseline, immediate post-intervention, and 8 weeks, was performed using one-way analysis of variance (ANOVA). The statistical significance level was set at $p=0.05$.

Ethical Consideration

Approval for the study was obtained from Babcock University Research and Ethics Committee (reference number BUHREC036/20), Permission to use the public secondary schools was obtained from the Chief Inspector of Education of participating local governments, and the principals of the participating schools. Assent was obtained from the participants below 18 years and informed consent from those who are 18 years and above at the beginning of the study. The pamphlet-only and control groups were taught how to do a BSE at the end of the intervention program after the collection of follow-up data.

Results

Socio-demographic characteristics of the respondents

Ninety respondents participated in this study. The response rate was 100%. The overall mean age of the respondents was 15.64 ± 1.33 . The mean age of the adolescents in the BSE pamphlet-only (BPAM) group was 15.90 ± 1.58 years; BSE pamphlet and education/training (BPAME) intervention group 2 was 15.57 ± 1.13 years; and the control group was 15.43 ± 1.36 years. There was no statistically significant difference in the mean age of the respondents. Majority (46.6%) of the study respondents were Urhobo, followed by other tribes: Itsekiri (14.4%), Ibo (7.7%) and the least represented was Okpe (1.1%). All the respondents recruited in the three groups for this study were single and were predominantly Christians (Table 1).

Knowledge of Breast Examination

The baseline mean knowledge score measured on a 24-point rating scale for control was 4.77 ± 1.63 , BPAM was 5.20 ± 2.28 , and BPAME was 7.03 ± 1.13 (Table 2). The groups showed variations in knowledge at baseline. The variation was statistically significant ($F=7.90$, $p=0.000$). Post hoc test revealed that there was a statistically significant difference in the mean knowledge score between the group that received BPAM and BPAME ($p=0.009$). There was also statistically significant difference in the mean score of BPAME and the control ($p=0.001$).

At immediate post-intervention, the mean knowledge score for control was 4.77 ± 1.89 , BPAM was 20.27 ± 2.04 , and BPAME was 20.40 ± 1.40 . There was a statistical significant differences in the mean knowledge score across the group ($F=750.8$; $p=0.000$). There was a statistically significant difference in the mean knowledge score between BPAM and BPAME ($p=0.001$) and the control ($p=0.000$).

At eight weeks follow up, the mean knowledge was 4.77 ± 2.37 for the control group, BPAM was 21.56 ± 1.85 and BPAME was 21.73 ± 1.26 (Table 2). There was a statistically significant difference in the mean knowledge across the groups ($F=750.8$; $p=0.000$). Statistically significant difference in the mean knowledge score between BPAM and the control group ($p=0.000$) was observed. However, there was no statistically significant difference between BPAM and BPAME ($p=0.98$).

Practice of breast self-examination

The mean BSE practice score measured at baseline on a 6-point

rating scale for control was 0.2 ± 1.10 , BPAM was 0.33 ± 1.21 and BPAME was 0.67 ± 1.34 . The variation in mean score was not statistically significant.

At immediate post intervention, mean BSE practice score was 0.23 ± 1.04 for the control group, BPAM was 4.53 ± 2.14 and BPAME was 5.43 ± 1.79 . BPAME had the highest score. The control group got the lowest mean score on the scale. There was a statistically significant difference observed in the mean practice score across the groups ($F=81.44$; $p=0.000$). Statistically significant difference in the mean practices was observed between BPAM and the control ($p=0.000$) and BPAME and the control ($p=0.000$). However, there was no statistically significant difference observed in the mean practice score between BPAME and BPAM ($p=0.111$).

At eight weeks follow-up, the mean scores for the control group were 0.23 ± 0.68 , BPAM was 4.90 ± 1.56 , and BPAME was 5.77 ± 0.67 (See Table 2). There was a statistically significant difference observed in the mean practices score across the group as determined by ($F=100.7$; $p=0.000$). Statistically significant difference was observed in the mean practice score between BPAM and BPAME ($p=0.013$) and the mean practice score in BPAME and control ($p=0.000$).

Analysis of the knowledge and practice of some aspects of breast self-examination at baseline, post-intervention and at follow-up showed an increase in the mean knowledge scores at follow up when compared with the baseline scores especially in the experimental groups (Table 3 and 4). Paired t-test was used to examine if the differences observed between baseline and 8 weeks follow-up mean scores for the knowledge and practice of BSE was statistically significant. As reported in Table 5, there was a statistically significant difference in the levels of the knowledge and practice between baseline and follow up ($p=0.000$). However, the control showed no significant difference ($p=1.000$).

Table 1: Socio-demographic characteristics of respondents

Demographics Characteristics	BPAM		BPAME		Control		Total		F	P Value
	No.	%	No.	%	No	%	No.	%		
Age(years)										
10-14	8	26.7	4	13.3	6	20.0	18	20.0	0.66	0.58
15-19	22	73.3	26	86.7	24	80.0	72	80.0		
Mean±SD	15.90±1.58		15.90±1.58		15.67±1.21		15.64 ±1.33			
Class : SS2	30	100	30	100	30	100	90	100	N/A	N/A
Tribe									3.16	0.02
Ibo	0	0.0	4	13.3	3	10.0	7	7.7		
Ijaw	0	0.0	0	0.0	0	0.0	0	0.0		
Itsekiri	4	13.3	6	20.0	3	10.0	13	14.4		
Urhobo	25	83.3	12	40.0	5	16.7	42	46.6		
Isoko	0	0.0	0	0.0	1	3.3	1	4.2		
Okpe	1	3.3	0	0.0	9	30.0	10	1.1		
Others	0	0.0	8	26.7	9	30.0	17	18.8		
Marital status									N/A	N/A
Single	30	100.0	30	100.0	30	100.0	90	100.0		
Religion									0.57	0.67
Christianity	30	100.0	29	96.7	29	96.7	88	97.8		
Islam	0	0.0	1	3.3	1	3.3	2	2.2		

Significant $p < 0.05$

Table 2: Mean Knowledge and Practice score of BSE at baseline, post-intervention and 8 weeks follow-up

Variables	Control	Intervention 1	Intervention 2	F	P value
(Rating scale)	n=30	(BPAM) n=30	(BPAME), n=30		
Baseline					
Knowledge of BSE	4.77 $\pm$ 1.63	5.20 $\pm$ 2.28	7.03 $\pm$ 1.13	7.90	0.00
BSE Practice	0.2 $\pm$ 1.10	0.33 $\pm$ 1.21	0.67 $\pm$ 1.34	0.36	0.89
Post intervention					
Knowledge of BSE	4.77 $\pm$ 1.89	20.27 $\pm$ 2.04	20.40 $\pm$ 1.40	632.3	0.000
BSE Practice	0.23 $\pm$ 1.04	4.53 $\pm$ 2.14	5.43 $\pm$ 1.79	81.43	0.000
Eight weeks follow up					
Knowledge of BSE	4.77 $\pm$ 2.37	21.56 $\pm$ 1.85	21.73 $\pm$ 1.26	750.8	0.000
BSE Practice	0.23 $\pm$ 0.68	4.90 $\pm$ 1.56	5.77 $\pm$ 0.67	100.8	0.000

Significant $p < 0.05$

Impact evaluation of intervention 1 on the adolescents' knowledge of BSE between baseline and eight weeks follow-up revealed that there was a significant difference in the level of knowledge of the respondents with effect size (ES) = 0.97, $p < 0.05$. There was also a significant difference in the practice of respondents in intervention group 1, ES=0.87, $p=0.000$. Impact evaluation of intervention 2 (pamphlet, educational

Table 3: Knowledge of some aspect of BSE at baseline, post-intervention and at 8 weeks follow-up

Items	BPAM			BPAME			Control		
	N=30 (%)			N=30 (%)			N=30 (%)		
	BL	PI	FU	BL	PI	FU	BL	PI	FU
BSE is self -examination of one's own breast	10(33.3)	24(80.0)	29(96.7)	19(63.3)	28(93.3)	26(86.7)	11(36.7)	8(26.7)	1(3.3)
At what age should BSE start (from 20yrs)	7(23.3)	27(90.0)	27(90.0)	1(100)	26(86.7)	29(96.7)	1(3.3)	2(6.7)	3(10)
BSE is done (monthly)	4(13.3)	24(80.0)	29(96.7)	4(13.3)	26(86.7)	30(100)	3(10.0)	4(13.3)	2(6.7)
BSE is performed 2 days after menstruation	4(13.3)	26(86.7)	27(90.0)	0(100)	27(90)	26(86.7)	1(3.3)	3(10.0)	1(3.3)
Regarding position during BSE, it is done by lying down on the bed	0(100)	27(90.0)	23(76.7)	0(100)	24(80.0)	26(86.7)	1(3.3)	2(6.7)	1(3.3)
Regarding position during BSE, it is done by standing in front of the mirror	7(23.3)	23(76.7)	27(90.0)	12(40.0)	25(83.3)	26(86.7)	2(6.7)	2(6.7)	2(6.7)

BL= baseline, PI=post-intervention, FU= Eight weeks follow-up

training) on the adolescents' knowledge of BSE between baseline and 8 weeks follow-up revealed a significant difference in the level of knowledge of the respondents with ES= 0.97, $p=0.000$; and BSE practice ES=0.92, $p=0.000$. Pamphlet alone; pamphlet and training had same effect on the respondents' level of knowledge but they both had a significant impact on the adolescents' knowledge and BSE practice (See Table 6).

For the control group, there was no significant variation over baseline, immediate post-intervention, and follow-up scores for knowledge of BSE, ES=0.000, $p>0.05$. There was no effect size difference between baseline and eight weeks follow-up on BSE knowledge, ES=0.000; $p=1.000$ and BSE practice ES=0.002, $p=0.97$ (Table 6). Significant increase in the respondents' BSE practice by 85.01%; $p=0.000$ between baseline and follow-up for BPAME and 76.17%; $p=0.000$ for BPAM were also observed.

Discussion

The findings from this study showed that the respondents in the control group, and those in the two intervention groups, showed variations in their baseline knowledge of BSE but none in their BSE practice. However, the knowledge of BSE was poor, and the practice was low at baseline for both control

and the intervention groups. This did not come as a surprise, especially among secondary school adolescents. The same finding has been reported in similar studies on BSE knowledge and practice across Nigeria.²³⁻²⁵

Following both interventions, there was a significant increase in the mean scores of respondents' knowledge and practice of BSE in both intervention groups contrary to the result in the control group. This is consistent with reports from similar studies among secondary school students in South-West, Nigeria.^{26, 27} This study showed that both interventions involving the use of a BSE pamphlet alone and a pamphlet with educational training were effective in increasing the adolescent knowledge and practice of BSE. This is consistent with an earlier report by Sembilan.²⁸ The intervention study using a combined method of pamphlets and BSE education/training and demonstration was effective in impacting the secondary school students' BSE knowledge. The mean scores of knowledge of BSE before and after the educational intervention program were 20.8 ± 10.1 and 33.8 ± 6.9 respectively ($p < 0.001$). Another study corroborated the effect and impact of combined educational methods in improving BSE knowledge and practice among secondary school students in Biratnagar, Nepal.²⁹ They reported a significant increase in the mean score of BSE knowledge from 33.07 (16.66) at baseline to 85.11 (23.4) at

Table 4: Practice of some aspect of BSE at baseline, post-intervention and at 8 weeks follow-up

Items	BPAM			BPAME			Control		
	N=30 (%)			N=30 (%)			N=30 (%)		
	BL	PI	FU	BL	PI	FU	BL	PI	FU
Have you ever performed BSE?	3(10.0)	24(80.0)	28(93.3)	8(26.7)	27(90.0)	30(100.0)	2(6.7)	2(6.7)	2(6.7)
How often do you perform BSE (Monthly)?	1(3.3)	23(76.7)	20(66.7)	2(6.7)	26(86.7)	26(86.7)	1(3.3)	1(3.3)	1(3.3)
When do you perform BSE (After Menstruation)	1(3.3)	18(60.0)	27(90.0)	1(3.3)	26(86.7)	30(100)	1(3.3)	1(3.3)	1(3.3)

BL= baseline, PI=post-intervention, FU= Eight weeks follow-up

Table 5: Paired Sample T-test analysis showing the level of knowledge of respondents and BSE practice of breast self-examination between baseline and 8 weeks follow-up

Variables	Groups	Mean Diff	SD	SE	df	t	p-value
Level of BSE Knowledge	BPAM	16.36	0.56	0.56	29	29.44	0.000*
	BPAME	14.70	0.46	0.69	29	31.77	0.000*
	Control	0.00	0.42	0.14	29	0.000	1.000
Level of BSE Practice	BPAM	4.57	1.89	0.34	29	13.25	0.000*
	BPAME	5.10	1.47	0.27	29	18.99	0.000*
	Control	0.00	0.98	0.18	29	0.00	1.000

Significance at <0.05

Table 6: Impact evaluation of variables at baseline and 8 weeks follow-up

	Variables	Mean difference	Effect Size	P-value
Intervention 1 (BPAM) N=30	Knowledge	16.36	0.97	0.000* *
	Practice	4.57	0.87	0.000**
Intervention 2 (BPAME) N=30	Knowledge	14.70	0.97	0.000**
	Practice	5.10	0.92	0.000**
Control N=30	Knowledge	0.000	0.000	1.000
	Practice	0.003	0.002	0.972

post-intervention ($p < 0.001$). In contrast, no statistically significant difference in knowledge score was found between the experimental and control groups at baseline and post-intervention among college students in Malaysia although a statistically significant increase in BSE knowledge and practice ($p < 0.001$) was observed post-intervention using pamphlets and BSE training.³⁰

The findings from the present study support a previous study involving the use of pamphlet alone among university students in Malaysia that aimed to find out if the use of pamphlet was effective in improving respondents' knowledge.³¹ Upon intervention, their findings showed a significant increase in knowledge score from baseline to that which was obtained at post-intervention (51%→95%, $P < .001$). This study also agrees with previous studies on the effect of both interventions in increasing the students' perception.²²⁻³⁴

Conclusion

It has been established from this study that educational interventions, irrespective of the method, are capable of impacting the knowledge and improving practice of BSE among adolescent females. Although the combined method had a greater impact, both methods were found to be effective.

Recommendation

School authorities and the ministry of education should organize regular seminars, talks and training for adolescent females to ensure they have regular update about their breast health and ensure that they practice breast self-examination on regular basis. Either combined methods of the pamphlet

and educational training or a standalone method can influence BSE knowledge and practice and is recommended.

Strength of the study

These include the use of simple language in teaching the students, well-illustrated pamphlets, practical demonstration of BSE and the use of simple language in wording the questionnaire for ease of understanding.

Limitations of the study

The participants in the study were restricted to female students in public secondary schools only. This may restrict the generalization of the results to other females in the state. There will be a need for further studies to include students in private secondary schools.

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References

- Shah TA, Guraya SS. Breast cancer screening programs: Review of merits, demerits, and recent recommendations practiced across the world. *J Microsc and Ultrastruct*, 2017;5(2):59–69. <http://doi.org/10.1016/j.jmau.2016.10.002>
- Torre LA, Bray F, Siegel RL, Ferlay J, Lortet-Tieulent J, Jemal A. Global cancer statistics, 2012. *CA Cancer J Clin*. 2015 Mar;65(2):87-108. doi: 10.3322/caac.21262.
- Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, Bray F. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin*. 2021 Feb 4. doi: 10.3322/caac.21660
- Scott AR, Stoltzfus KC, Tchalebi LT, Trifiletti DM, Lehrer EJ, Rao P, et al. Trends in Cancer Incidence in US Adolescents and Young Adults, 1973-2015. *JAMA Netw Open*. 2020 Dec 1;3(12):e2027738. doi: 10.1001/jamanetworkopen.2020.27738.
- Azubuike SO, Muirhead C, Hayes L, McNally R. Rising global burden of breast cancer: the case of sub-Saharan Africa (with emphasis on Nigeria) and implications for regional development: a review. *WJSO*, 2018;16(1):63. <https://doi.org/10.1186/s12957-018-1345-2>.
- Tichy JR, Lim E, Anders CK. Breast cancer in adolescents and young adults: a review with a focus on biology. *J Natl Compr Canc Netw*, 2013;11(9):1060-9. doi: 10.6004/jnccn.2013.0128.
- Ibrahim EE, Ibrahim S, Mohamed S. Effect of Health Educational Intervention regarding Breast Self-Examination on knowledge and Practices of Female Adolescent ' Students. *Int. J. Novel Res. Healthc. Nurs*, 2019; 6 (1), 361-375.
- Fondjo LA, Owusu-Afriyie O, Sakyi SA, Wiafe AA, Amankwaa B, Acheampong E et. al Comparative Assessment of Knowledge, Attitudes, and Practice of Breast Self-Examination among Female Secondary and Tertiary School Students in Ghana. *Int. J. Breast Cancer* 2018;2018:1-10. <https://doi.org/10.1155/2018/7502047>.
- Isara AR, Ojedokun CI. Knowledge of breast cancer and practice of breast self-examination among female secondary school student. *J Prev Med and Hyg* 2011;52 (4), 186-190.
- Ifediora CO. Re-thinking breast and cervical cancer preventive campaigns in developing countries: the case for interventions at high schools. *BMC Public Health* 2019;19 (503): 2-8. <https://doi.org/10.1186/s12889-019-6890-2>
- Ohaeri BM, Achilonu BO. Nigerian students' awareness of breast self-examination. *AJM*, 2019; 13(1):34-38. <https://doi.org/10.12968/ajmw.2019.13.1.34>
- Ifediora CO, Azuik E. Tackling breast cancer in developing countries:

- Insights from the knowledge, attitudes and practices on breast cancer and its prevention among Nigerian teenagers in secondary schools. *J. Prev. Med. and Hyg.* 2018;59(4): 282-300. <https://doi.org/10.15167/2421-4248/jpmh2018.59.4.964>
13. Sani AM, Yau SL. Relationship between knowledge and practice of breast self-examination among female workers in Sokoto, Nigeria. *Obstet Gynecol Int J.* 2018;9(3):157-162. doi: 10.15406/ogij.2018.09.00323
 14. Ibrahim S, Abdullah W, Ahmed H, Al-Banna D. Impact of education program on breast self-examination among a group of women in the Kurdistan Women Union, Erbil city. *Zanco J. Medical Sciences*, 2016; 20(3):1450-1457. <https://doi.org/10.15218/zjms.2016.0044>
 15. Armin J, Torres CH, Vivian J, Vergara C, Shaw SJ. Breast self-examination beliefs and practices, ethnicity, and health literacy: Implications for health education to reduce disparities. *HEJ*, 2014;73(3):274-284. doi:10.1177/0017896912471048.
 16. World Health Organization. Adolescent health. Available at: <https://www.who.int/cancer/prevention/diagnosis-screening/breast-cancer/en/>. Accessed on 04/01/2021.
 17. Sama CB, Dzekem B, Kehbila J, Ekabe CJ, Vofo B, Abua NL. et al. Awareness of breast cancer and breast self-examination among female undergraduate students in a higher teachers training college in Cameroon. *Pan Afr Med J*, 2017;28:91. <https://doi.org/10.11604/pamj.2017.28.91.10986>
 18. Obaji N, Elom H, Agwu U, Nwigwe C, Ezeonu P, Umeora O. Awareness and Practice of Breast Self-Examination among Market Women in Abakaliki, South East Nigeria. *AMHSR*, 2013;3(1):7-12. <https://doi.org/10.4103/2141-9248.109457>.
 19. American Cancer Society. Cancer Prevention & Early Detections Facts and Figures. Available at: <http://www.cancer.org/research/cancerfacts/figures/cancerpreventionearlydetectionfactsfigures/cancer-prevention-early-detection-facts-figures-2013>. Accessed on 05/01/2021
 20. American Society of Breast Surgeons Foundation. Breast self-examination. Available at: <https://breast360.org/topics/2015/02/03/breast-self-examination-bse/>. Accessed on 05/01/2021.
 21. Lee CI, Chen LE, Elmore JG. Risk-based Breast Cancer Screening: Implications of Breast Density. *Med Clin North Am*, 2017;101(4):725-741. doi:10.1016/j.mcna.2017.03.005.
 22. Amosu AM, Kukoyi BO. Knowledge and attitude of Nigerian undergraduates on healthy diet: outcome of a nutrition education and mobile phone communication intervention. <https://www.texilajournal.com/public-health/article/1652-knowledge-and-attitude>. Accessed 03/05/2020.
 23. Usman IN, Olarenwaju SO, Usman S. Breast Self-Examination Practice among Female Secondary School Students in Oshogbo, Western Nigeria. *EJMED*, 2020;2(2):173-180. <https://doi.org/10.24018/ejmed.2020.2.2.173>
 24. Adetule YC. Breast Self-Examination (BSE): A strategy for early detection of breast cancer in Nigeria. *Annals of Oncology*, 2016;27(9): 919-929. doi:10.1093/annonc/mdw575.020
 25. Irurhe NK, Raji SB, Olowoyeye OA, Adeyomoye AO, Arogundade RA, Soyebi KO, et al. Knowledge and Awareness of Breast Cancer among Female Secondary School Students in Nigeria. *Academic J. Cancer Res.*, 2012;5(1):01-05.
 26. Ogun MI. Educational Intervention on Breast Self-Examination among Senior Secondary School Girls in Ibadan North East Area of Oyo State, Nigeria. *Texila International Journal of Public Health*, 2019;7(4):1-17. <https://doi.org/10.21522/TIJPH.2013.07.04.Art002>
 27. Ibitoye FO, Tshwenegae GT. The Impact of Education on Knowledge Attitude and Practice of Breast Self-Examination among Adolescents Girls at the Fiwasaye Girls Grammar School Akure. *J Cancer Edu*. 2019. <https://doi.org/10.1007/s13187-019-01595-2>
 28. Sembilan N. The Effectiveness of Educational Intervention Program on Knowledge of BSE among Secondary School Girls in Seremban. *MJMHS*, 2019;17(2): 73-79. <http://dx.doi.org/10.17576/JSKM-2019-1702-08>
 29. Sapkota D, Parajuli P, Kafle TK. Effectiveness of educational intervention programme on knowledge regarding breast self-examination among higher secondary school girls of Biratnagar. *BJHS*, 2016;1(1): 13-19. <https://doi.org/10.3126/bjhs.v1i1.17091>
 30. Yong NT, Soon, LKI. The effects of educational intervention on knowledge and practice of breast self-examination among female college students. *IJPHCS*, 2019;5 (1):120-131.
 31. Ali AN, Yuan FJ, Ying CH, Ahmed NZ. Effectiveness of Intervention on Awareness and Knowledge of Breast Self-Examination among the Potentially at Risk Population for Breast Cancer. *AORJ*, 2019;2(1):1-13.
 32. Kissal A, Kartal, B. Effects of Health Belief Model-Based Education on Health Beliefs and Breast Self-Examination in Nursing Students. *Asia Pac J Onc Nurs*. 2019;6:403-10. doi: 10.4103/apjon.apjon_17_19.
 33. Khiyali Z, Aliyan F, Kashfi SH, Mansourian M, KhaniJeihooni A. Educational Intervention on Breast Self-Examination Behavior in Women Referred to Health Centers: Application of Health Belief Model. *APJCP*, 2017;18(10):2833-2838. doi: 10.22034/APJCP.2017.18.10.2833.
 34. Moustafa DG, Abd-Allah ES, Taha NM. Effect of a Breast-Self Examination (BSE) Educational Intervention among Female University Students. *AJNS*, 2015;4(4):159-165. doi: 10.11648/j.ajns.20150404.13.