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Educational Intervention on Breast Self-Examination among Senior Secondary School Girls in Ibadan North East Area of Oyo State, Nigeria

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Introduction

Background to the study

Breast cancer is the top most cancer in women both in the developed and the developing world. The incidence of breast cancer is increasing in the developing world due to increase life expectancy, increase urbanization and adoption of western lifestyles (WHO 2018). It starts when cells in the breast begin to grow out of control. These cells usually form a tumor that can often be seen on an x-ray or felt as a lump. The tumor is malignant (cancer) if the cells can grow into (invade) surrounding tissues or spread (metastasize) to distant areas of the body (American cancer society 2017).

It is the most common cause of death and the most frequently diagnosed cancer among women in 140 of 184 countries worldwide (Mesfin, Dagne, Roza and Hailu, 2016). Globally, over 1.15million cases of breast cancer are diagnosed every year and about 502,000 women have died from the disease each year, making it the second only to lung cancer as the cause of cancer related deaths among women (WHO 2013). The American Cancer Society in 2015 reported an estimated number of new cases of breast cancer in women in the United States to be 231,840 with an estimated death of 40,290.

In Nigeria, breast cancer Is the leading malignancy among women with an increase of breast cancer recorded annually. Out of the 102079 cases of cancer recorded 27,304 (26.7%) are breast cancer related according to GLOBACON 2012. Also, the World Health Organization (WHO) reported that the world breast cancer incidence and mortality may increase by 50% by the year 2020 with anticipated increase to be highest in the developing countries of which Nigeria is inclusive.

Unless medical care and screening practices are dramatically improved in Africa, breast cancer mortality rates can be expected to remain disproportionately high (Jemal, Bray, Forman, Ferlay, Center and Parkin, 2012).

An international survey organized in the Western world showed poor awareness of risk factors for breast cancer among university students from 23 countries, compared to older women (Peacey, et.al., 2006). This emphasizes the importance of promoting breast cancer awareness among young women. Also educating the youth on breast cancer is a potential strategy for dissemination of such information in society (Hasanthika, et.al., 2013).

Educating young women about early diagnostic methods of breast cancer is critically important to increasing their breast cancer awareness. Acquiring the behaviour and practice of BSE at an early age will also increase the probability of continuing it later (Gürsoy, 2009; Ogletree, et.al., 2004).

Breast self-examination (BSE): Variation in breast tissue occurs during the menstrual cycle, pregnancy and menopause. Therefore, normal changes must be distinguished from those that may signal disease. Most women notice increased tenderness and lumpiness before their menstrual period, therefore, breast self-examination (BSE) is best performed after menses (day 5 to days 7) counting the first day of menses as day 1 when less fluid is retained. Moreover, many women have grainy- textured breast tissue but these areas are usually less nodular after menses. Because women themselves detects breast cancers, priority is given to teaching all women on how and when to examine their breasts. It is estimated that only 25%-30% of women perform breast self-examination proficiently and regularly each month (Aebi, Davidson and Gruber, 2011).

Most times, women who perform BSE and notice any lump delay in seeking medical attention because of fear, economic factors, lack of education, reluctance to act if no pain is involved, psychological factors and modesty (Anderson, Shyyan, Eniu, Smith, Yip and Bese, 2006). Women should practice BSE at the time of their first gynaeeological examination, which usually occurs in their late teens or early 20s. All health care providers, aware of these implications should teach and encourage

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women to examine their breasts in order to recognize early changes that may indicate problem. However, optimal timing for 5-7 days after menses is for pre-menopausal women and once monthly for post-menopausal women (Schoemaker, Folkerd and Jones, 2014).

Breast screening and clinical breast examination

Breast screening refers to tests and examinations used to detect a disease such as cancer in people who do not have any symptoms. Since the degree of success in treating breast cancer is influenced primarily by the stage at which intervention is introduced, secondary prevention (early detection) is the mainstay (Morrison, 1996). Changes in the breasts can be detected early by screening methods such as breast self-examination (BSE) which is also known as breast awareness, clinical breast examination (CBE) and mammography screening.

An ideal screening test would be simple, inexpensive, and effective. Breast self-examination fulfils the first two criteria, but previous results of two randomised trials conducted in Russia and China suggest that it would not be effective in reducing mortality from breast cancer (Thomas, 2010). Despite the varying controversies about the use of BSE, including its sensitivity, specificity in detecting breast cancer as highlighted by Allen et al. (2010), BSE still remains the most readily available methods of screening to rural women especially in most part of the low resource countries where sophisticated diagnostic screening methods are not easily accessible in term of affordability and availability. Therefore, it is still important for women to be breast aware and also to be able to do this simple procedure efficiently to detect any abnormality in their breasts.

Poor participation in breast self-examination has also been linked to lack of confidence in performing the procedure (Ahuja and Chakrabarti, 2010). In the developed countries, the National Breast Screening Programme currently provides routine mammograms every three years for women between 50 and 64 years. For women who are too young or too old to be included in the screening programme, breast awareness has been of great importance to help in the discovery of any early changes in the breast tissues.

Women age 20 and older have been advised to receive clinical breast examination every 3 years; women age 40 and older to receive clinical breast examinations every year.

Research methodology

The study is quasi-experimental interventional using a three-stage sampling technique to select 600 in-school females adolescents in IbNELGA. Data were collected using a pre-tested, semi-structured questionnaire.

Study Area: This study was carried Ibadan North East Local Government Area of Oyo state Nigeria. The names of the schools are: Ibadan North-East LGA

1. Queens of Apostle girls' secondary school, Oke-Ofa, Oluyoro Area, Ibadan.
2. St. Clares Secondary School, Oke-Ofa, Oluyoro Area, Ibadan.
3. Community Grammar School, Ola-Ogun Area, Ibadan.
4. Urban day Grammar School, Ola-Ogun Area, Ibadan

Sampling technique

A list of enumeration areas in the local government was obtained and 5 areas (clusters) selected using simple random technique. All schools within the clusters were listed and convenient sampling used for the selection of schools from the clusters. Thereafter, the school was randomized into experimental group (Community Grammar School, Ola-Ogun Area, Ibadan and Urbanday Grammar School, Ola-Ogun Area, Ibadan) and control group (badan North-East LGA Queens of Apostle, Oke-Ofa, Oluyoro Area, Ibadan and St. Clares Secondary School, Oke-Ofa, Oluyoro Area, Ibadan) to prevent information transfer among students.

In the second stage, the heads of selected schools were contacted, briefed about the study objectives and asked for their permission to collect data as well as administer the educational intervention. In order to attain the desired sample size, the number of female senior secondary students were recruited from each school in proportion to the enrollment size determined. Oyo State Ethical Review Committee gave approval to obtain data from the facilities in addition to seeking the informed consent of participants.

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Data Collection: This was done by the administration of questionnaire containing open and close-ended questions, both before and after the educational intervention to both interventions and controls. Post intervention data was collected after one week of intervention and also twelve weeks later in all schools (intervention and control).

Data analysis

Data obtained through the questionnaires were entered into the computer using the Statistical Package for Scientific Solution (SPSS) version 20.0. The data was analyzed using descriptive statistics (i.e. frequency calculations, mean and standard deviation) inferential (i.e. Independent t-test and Chi-square) and logistic regression to assess factors associated with adolescents' knowledge, attitude and practice of the BSE statistical analyses as appropriate at p=0.05. Information obtained was summarized and presented in tables and charts.

Results and discussion

Baseline findings

The section highlights the result findings of the study showing the effect educational intervention has on in -school secondary school female adolescent student's knowledge, perception and practice towards the practice of BSE.

Socio-demographic information

Table 4.1 presents socio-demographic characteristics of the participants in the intervention study areas and the control chosen area which were all located in urban areas of Oyo State. The mean ages of the participants are: intervention (Exp.) (16.1±1.5) and control group was (15.4±1.5) respectively. Majority of participants (53.7%) in Exp. were Senior Secondary Class 2 and the same in the control group Senior Secondary Class 2 students were majority (74.3%). Many of participants in both groups were Muslims (Exp.= 52.0%; Control = 51.3%). Most of participants in the study were Yoruba ethnic groups of which in Exp. - 94.3% and control - 96.3%. Highest educational attainment of both parents in the study was secondary education (Fathers: Exp.= 61.0%; Control = 57.3% and Mothers: Exp.= 68.0%; Control = 58.7%) (Table 4.1). Majority of participants' parents (fathers and mothers) were traders (Fathers: Exp. 43.3% and Control: 32.7%; Mothers: Exp. 74.3% and Control: 69.3%) respectively (Figures 4.1a & b).

Table 4.1. Socio-demographic characteristics of the participants at baseline

Variable	Experimental	Control
	N=350 (%)	N=350 (%)
Age		
10-14	41(13.7)	75(25.0)
15-19	259(86.3)	225(75.0)
Class		
SSS1	139(46.3)	46(15.3)
SSS2	161(53.7)	223(74.3)
SSS3	0(0.0)	31(10.3)
Religion		
Christianity	140(46.7)	146(48.7)
Islam	156(52.0)	154(51.3)
Traditionalist	4(1.3)	0(0.0)
Tribe		
Yoruba	283(94.3)	289(96.3)
Igbo	14(4.7)	9(3.0)
Hausa	3(1.0)	2(0.7)

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Table 4.2. Participants' parents' occupation

Variable	Experimental	Control
	N=350 (%)	N=350 (%)
Fathers' education		
No formal education	5(1.7)	9(3.0)
Primary education	47(15.7)	40(13.3)
Secondary education	183(61.0)	172(57.3)
Post-secondary education	63(21.0)	43(14.3)
No idea	2(0.7)	36(12.0)
Mothers' education		
No formal education	10(3.3)	6(2.0)
Primary education	26(8.7)	33(11.0)
Secondary education	204(68.0)	176(58.7)
Post-secondary education	56(18.7)	41(13.7)
No idea	4(1.3)	44(14.7)

Participants' awareness - and sources information on breast cancer

From the result shown in table 4.3, participants' most important sources of information about breast cancer at post intervention Exp. turned to be seminar (89.7%) (i.e. educational training intervention) while hospital and media remained constant at the control group both at intervention (37.7%) and baseline (31.4%). In the same vein participants who did not responded were so much in the experimental (71.7%) and control group (68.7%) at baseline and control (62.3%) at intervention compare to Exp. at intervention. At baseline, very few participants at both groups (Exp. (1.3%) and Control
(0.7%) and still constant at intervention period for both groups (Table 4.3)

Table 4.3. Participants' awareness- and sources information on breast cancer

Variable	Baseline/pre-test		Intervention/follow-up	
	Experimental	Control	Experimental	control
Ever heard about breast cancer				
Yes	85(28.3)	94(31.3)	173(57.7)	113(37.7)
No	215(71.7)	206(68.7)	127(42.3)	187(62.3)
Sources of your information				
Hospital	35(41.2)	29(30.9)	5(2.9)	50(44.2)
Seminar	50(58.8)	65(69.1)	142(82.1)	39(34.5)
Radio/TV	0(0.0)	0(0.0)	26(15.0)	24(21.2)
Have relative with breast cancer				
Yes	4(1.3)	2(0.7)	5(1.7)4(1.3)	8(2.7)
No	295(98.3)	298(99.3)	296(98.7)	292(97.3)
My friend's mother	1(25.0)	1(50.0)	2(40.0)	2(25.0)
my aunt	1(25.0)	0(0.0)	0(0.0)	2(25.0)
My mummy	2(50.0)	0(0.0)	0(0.0)	4(50.0)
My mummy's friend	0(0.0)	1(50.0)	3(60.0)	0(0.0)

Obviously in frequencies, changes occurred in the knowledge of the participants at post-intervention in Exp (91.3%) accepted the statement that most common cancer among women compared to its baseline result in Exp (23.3%) and control (23.3%) as well as in interventional control group (54.7%). Participants who fault breast cancer as disease of white women only were high at post-intervention in Exp (92.0%) compared to baseline result in Exp (19.7%); Control (22.0%) and at intervention control (26.7%). In the same vein, participants' knowledge about breast cancer as a disease of women was high at post-intervention in Exp (92.3%) compared to baseline Exp (11.7%); Control (17.3%) and constant in intervention control (17.0%). Acknowledged that breast cancer is caused by putting money between breast brassier was reported high at intervention in Exp group (94.0%) compared to baseline Exp

(17.3%); Control (16.3%) and no different in intervention control result (30.3%). Accepting that breast cancer could be prevented was high in Exp (95.0%) at intervention compared to baseline Exp (17.0%); Control (13.7%) and in intervention control result (22.0%) (see table 4.4a).

Comparison of the overall knowledge of breast cancer in baseline, and follow – up was shown in table 4.4b. Following the intervention, there was great significant change in knowledge of breast cancer at Exp (98.7%) compared to both baseline Exp (0.0%) and control (0.3%) and intervention control (7.3%) (Table 4.4b).

Table 4.4b. Knowledge grade of breast cancer

Variable	Baseline/pre-test		Intervention/follow-up	
	Experimental (n=300)	Control (n=300)	Experimental (n=300)	Control (n=300)
Knowledge				
Poor	300(100.0)	299(99.7)	4(1.3)	278(92.7)
Good	0(0.0)	1(0.3)	296(98.7)	22(7.3)

Knowledge of breast cancer's risk factors

Majority (94.0%) of participants knew that multiple sexual partners is a risk factor of breast cancer at post intervention Exp. compared to Control (30.3%) of same period; baseline Exp. (15.0%) and Control (27.0%). Most participants (94.7%) at post intervention Exp. laid claimed that early exposure of sexual intercourse can predispose to breast cancer compared to baseline Exp. (13.3%); baseline control group (20.7%) and post-intervention period (23.7%). Those who understood that family history of breast cancer is a risk factor of breast cancer were majority at post intervention Exp (95.7%) compared to Exp, (22.3%) at baseline and in both baseline control (26.0%) and post-intervention (31.7%). There was great percentage of participants that acknowledged that high parity/multiparty (giving birth to many children) can predispose to breast cancer at post-intervention Exp, (94.7%) against baseline in Exp, (15.3%) and baseline Control (27.0%); post intervention (17.7%). Good knowledge responses on smoking predispose women to cancer of the breast were increases in Exp. (95.0%) at post intervention compared to baseline Exp (16.3%) and both baseline control (18.7%) and post-intervention (22.7%) which remain constant. Rating the students' knowledge on late menopause as predisposing factors to breast cancer was great at Exp, (95.7%) against baseline in Exp. (14.7%) and in Control at baseline (17.3%) and post-intervention (19.3%). Participants who assumed that early menarche as predisposing factors at post intervention; Exp, (95.0%) increased compared to baseline Exp, (16.7%); control (18.7%) and Control (24.0%) at post-intervention (Table 4.6a).

Students' knowledge grade of breast cancer risk' factors highly increased in experimental group (98.3%) at post-intervention compared to control group (10.3%) of same period and both Exp (0.3%) and Control (3.3%) at baseline (see Table 4.5b).

Table 4.6a. Knowledge of breast cancer's risk factors

Statement	Baseline/pre-test		Intervention/follow-up	
	Experimental	Control	Experimental	Control
Multiple sexual partners are a risk factor of breast cancer				
False*	45(15.0)	81(27.0)	282(94.0)	91(30.3)
True	255(85.0)	219(73.0)	18(6.0)	209(69.7)
Early exposure of sexual intercourse can predispose to breast cancer				
False	260(86.7)	238(79.3)	16(5.3)	229(76.3)
True*	40(13.3)	62(20.7)	284(94.7)	71(23.7)
Family history of breast cancer is a risk factor of breast cancer				
False	233(77.7)	222(74.0)	13(4.3)	205(68.3)
True*	67(22.3)	78(26.0)	287(95.7)	95(31.7)
High parity/multiparty (giving birth to many children) can predispose to breast cancer				
False*	46(15.3)	81(27.0)	284(94.7)	53(17.7)

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True	254(84.7)	219(73.0)	16(5.3)	247(82.3)
Smoking predispose women to cancer of the breast				
False	251(83.7)	244(81.3)	15(5.0)	232(77.3)
True*	49(16.3)	56(18.7)	285(95.0)	68(22.7)
Late menopause				
False	256(85.3)	248(82.7)	13(4.3)	242(80.7)
True*	44(14.7)	52(17.3)	287(95.7)	58(19.3)
Early menopause				
False	250(83.3)	244(81.3)	285(95.0)	228(76.0)
True*	50(16.7)	56(18.7)	15(5.0)	72(24.0)

* Correct response

Table 4.6b. Knowledge grade of cancer's risk factors

Variable	**Baseline/pre-test**		**Intervention/follow-up**	
	Experimental (n=300)	**Control (n=300)**	**Experimental (n=300)**	**Control (n=300)**
Knowledge				
Poor	299(99.7)	290(96.7)	5(1.7)	269(89.7)
Good	1(0.3)	10(3.3)	295(98.3)	31(10.3)

Table 4.7a. Knowledge of breast self-examination

Variable	**Baseline/pre-test**		**Intervention/follow-up**	
	Experimental	**Control**	**Experimental**	**Control**
Breast cancer screening detects precancerous lesson				
Yes*	53(17.7)	37(12.3)	291(97.0)	68(22.7)
No	247(82.3)	263(87.7)	9(3.0)	232(77.3)
Breast cancer screening prevents advancement precancerous lessons to advanced stage of cancer				
Yes*	29(9.7)	37(12.3)	288(96.0)	63(21.0)
No	171(57.0)	263(87.7)	12(4.0)	237(79.0)
Breast cancer screening should be done				
Once in time	48(16.0)	27(9.0)	19(6.3)	35(11.7)
Once in 3 years*	24(8.0)	42(14.0)	281(93.7)	45(15.0)
No idea	228(76.0)	231(77.0)	0(0.0)	220(73.3)
Breast screening is done by doctor or trained Nurse				
Yes*	19(6.3)	51(17.0)	285(95.0)	68(22.7)
No	281(93.7)	249(83.0)	15(5.0)	232(77.3)
How many times have you been screened				
1-2 times*	40(13.3)	18(6.0)	182(60.7)	29(9.7)
3 times	29(9.7)	7(2.3)	114(38.0)	16(5.3)
None	231(77.0)	275(91.7)	4(1.3)	255(85.0)

* Correct response

Table 4.7b. Knowledge grade of breast self-examination

Variable	**Baseline/pre-test**		**Intervention/follow-up**	
	Experimental (n=300)	**Control (n=300)**	**Experimental (n=300)**	**Control (n=300)**
Knowledge				
Poor	282(94.0)	289(96.3)	300(100.0)	281(93.7)
Good	18(6.0)	11(3.7)	0(0.0)	19(6.3)

Students' perception of breast self-examination

Participants' perception on breast self-examination BSE revealed that greater percentages in Exp., (96.3%) rightly perceived that Breast daily self-examination is not only for commercial sex workers compared to control (21.3%) in the same period post-intervention and at baseline Exp. (22.3%) and Control (14.3%). In the same manner, perception that the instrument use for the procedure could not cause severe injury to reproductive organ was high in Exp. (92.7%) compared to Control (21.3%) at post-intervention and baseline Exp. (19.0%) and Control (12.0%). Majority (96.3%) of participants in Exp. at post-intervention disagreed the statement that they don't need to be examining their breast since they are not sick compared to Control (31.7%) at post-intervention and baseline Exp. (18.0%) and Control (23.7%). In the same vein, post-intervention result on believe that breast daily self-examination is not only for the married women was great in Exp. (97.0%) than baseline results in Exp. (18.3%) and Control (31.3%). Perception of nobody has ever had cancer in my family, so I don't need breast self-examination so as to prevent myself from being infected was totally disagreed with among the participants in Exp. (96.0%) than in Exp. (20.0%) at post-intervention and baseline results Exp. (20.0%) and control (22.7%) (Table 4.9a).

Perception grade of breast self-examination revealed that the whole (100.0%) participants in Exp. Group at post-intervention had good perception of breast self-examination compared to Control group (44.7%) at same period and baseline Exp. (33.3%) and Control (30.3%) (Table 4.9b)

Table 4.10a. Students' perception of breast self-examination

Perception statement	**Pre-test**		**Post-test**	
	Experimental	**Control**	**Experimental**	**Control**
	N=300(%)	N=300(%)	N=300(%)	N=300(%)
Breast daily self-examination is only for commercial sex workers				
Undecided	63(21.0)	55(18.3)	1(0.3)	42(14.0)
Agree	170(56.7)	202(67.3)	10(3.3)	194(64.7)
Disagree*	67(22.3)	43(14.3)	289(96.3)	64(21.3)
The instrument use for the procedure can cause severe injury to my reproductive organ				
Undecided	74(24.7)	56(18.7)	4(1.3)	42(14.0)
Agree	169(56.3)	208(69.3)	18(6.0)	194(64.7)
Disagree*	57(19.0)	36(12.0)	278(92.7)	64(21.3)
I don't need to be examining my breast since am not sick				
Undecided	59(19.7)	119(39.7)	0(0.0)	102(34.0)
Agree	187(62.3)	110(36.7)	11(3.7)	103(34.3)
Disagree*	54(18.0)	71(23.7)	289(96.3)	95(31.7)
Breast daily self-examination is only for the married women				
Undecided	93(31.0)	64(21.3)	2(0.7)	44(14.7)
Agree	152(50.7)	162(54.0)	7(2.3)	162(54.0)
Disagree*	55(18.3)	74(24.7)	291(97.0)	94(31.3)
Nobody has ever had cancer in my family, so I don't need breast self-examination so as to prevent myself from being infected				
Undecided	78(26.0)	29(9.7)	3(1.0)	22(7.3)
Agree	162(54.0)	203(67.7)	9(3.0)	198(66.0)
Disagree*	60(20.0)	68(22.7)	288(96.0)	80(26.7)

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Table 4.10b. Perception grade of breast self-examination

Variable	Baseline/pre-test		Intervention/follow-up	
	Experimental (n=300)	Control (n=300)	Experimental (n=300)	Control (n=300)
Perception				
Poor	200(66.7)	209(69.7)	0(0.0)	166(55.3)
Good	100(33.3)	91(30.3)	300(100.0)	134(44.7)

Students' practices of breast self-examination

Practicing of breast self-examination (BSE) was greatly pronounced among participants in Exp (95.3%) at post-intervention compared to baseline Exp. (15.7%); Control (22.0%) and Control (27.3%) at post-intervention. Majority among the participants who practices BSE regularly emerged from Exp (once in a day or everyday - 95.7%) at post-intervention compared to baseline Exp. (4.0%); Control (3.0%) and Control (3.3%) at post-intervention. Participants who followed right method were majority at post-intervention Exp. (66.3%) against baseline Exp. (4.0%); Control (10.7%) and Control (13.3%) at post-intervention. Among factors affecting students' practices of BSE included: Time (36.0%); Procrastination (20.0%); Forgetfulness/Laziness (18.7%) and No trust in my ability to perform it (11.7%) which were more pronounced at post-intervention Exp. (see Table 4.14a, b & c).

Table 4.14a. Students' practices of breast self-examination

Variable	Baseline/pre-test		Intervention/follow-up	
	Experimental n=300(%)	Control n=300(%)	Experimental n=300(%)	Control n=300(%)
Ever examined your breast				
No	47(15.7)	66(22.0)	286(95.3)	82(27.3)
Yes	253(84.3)	234(78.0)	14(4.7)	218(72.7)
At what time of your menstrual cycle do you examine your breast?				
Third day	1(0.3)	3(1.0)	51(17.0)	3(1.0)
None	10(3.3)	37(12.3)	0(0.0)	46(15.3)
first day	0(0.0)	1(0.3)	116(38.7)	2(0.7)
End of the month	3(1.0)	3(1.0)	0(0.0)	4(1.3)
Every month	2(0.7)	1(0.3)	0(0.0)	1(0.3)
Everyday	1(0.3)	3(1.0)	0(0.0)	4(1.3)
Second day	1(0.3)	2(0.7)	0(0.0)	3(1.0)
After menstruation	13(4.3)	12(4.0)	0(0.0)	0(0.0)
Friday	7(2.3)	0(0.0)	0(0.0)	14(4.7)
Once in a year	0(0.0)	1(0.3)	0(0.0)	2(0.7)
Two times a week	10(3.3)	1(0.3)	0(0.0)	1(0.3)
After three months	0(0.0)	2(0.7)	48(16.0)	2(0.7)
No	252(84.0)	234(78.0)	0(0.0)	218(72.7)
How often do you do BSE				
Once in a day	5(1.7)	3(1.0)	192(64.0)	3(1.0)
Once in a year	0(0.0)	1(0.3)	0(0.0)	1(0.3)
None	10(3.3)	23(7.7)	0(0.0)	28(9.3)
Everyday	6(2.0)	5(1.7)	95(31.7)	6(2.0)
Every week	0(0.0)	2(0.7)	0(0.0)	3(1.0)
Once in a week	6(2.0)	5(1.7)	0(0.0)	7(2.3)
Once in a month	0(0.0)	18(6.0)	0(0.0)	25(8.3)
2 time	2(0.7)	2(0.7)	0(0.0)	2(0.7)
Three times a week	2(0.7)	1(0.3)	0(0.0)	1(0.3)
Once in three years	6(2.0)	2(0.7)	0(0.0)	2(0.7)

Once in two years	7(2.3)	3(1.0)	0(0.0)	3(1.0)
Three times a day	1(0.3)	1(0.3)	0(0.0)	1(0.3)
No	253(84.3)	234(78.0)	13(4.3)	218(72.7)

Table 4.14b. Students' practices of breast self-examination

Variable	**Baseline/pre-test**		**Intervention/follow-up**	
	Experimental n=300(%)	**Control n=300(%)**	**Experimental n=300(%)**	**Control n=300(%)**
Methods used				
None	252(84.0)	234(78.0)	0(0.0)	218(72.7)
In front of the mirror	12(4.0)	32(10.7)	199(66.3)	40(13.3)
During shower	25(8.3)	18(6.0)	38(12.7)	21(7.0)
Lying shower	10(3.3)	13(4.3)	63(21.0)	18(6.0)
Others	1(0.3)	3(1.0)	199(66.3)	3(1.0)
Step taken				
None	252(84.0)	234(78.0)	0(0.0)	218(72.7)
Stand or sit with arm at sides	10(3.3)	12(4.0)	68(22.7)	14(4.7)
Raise the arm above or behind the head	15(5.0)	12(4.0)	79(26.3)	14(4.7)
Place hand on hip, press down and make the chest muscle tense	18(6.0)	22(7.3)	127(42.3)	29(9.7)
Squeeze each nipple gently for any discharge	4(1.3)	7(2.3)	26(8.7)	8(2.7)
Others	0(0.0)	13(4.3)	0(0.0)	17(5.7)
Steps followed during shower				
None	252(84.0)	234(78.0)	0(0.0)	218(72.7)
Start by raising an arm behind the head	16(5.3)	9(3.0)	131(43.7)	13(4.3)
Use soapy hand to press firmly on the breast against the chest wall	13(4.3)	21(7.0)	0(0.0)	25(8.3)
Use the pad of the hand to examine the breast	15(5.0)	18(6.0)	65(21.7)	22(7.3)
Others	4(1.3)	18(6.0)	104(34.7)	22(7.3)
Steps followed while lying down				
None	253(84.3)	234(78.0)	0(0.0)	218(72.7)
Lie down on the back and be comfortable	11(3.7)	12(4.0)	89(29.7)	15(5.0)
Place a pillow under the shoulder of the side to be examined	9(3.0)	25(8.3)	89(29.7)	31(10.3)
Use the pad of the hand to examined the breast	16(5.3)	18(6.0)	43(14.3)	22(7.3)
Use the lip of the hand to examined the breast	10(3.3)	7(2.3)	79(26.3)	10(3.3)
Others]	1(0.3)	4(1.3)	0(0.0)	4(1.3)

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Table 4.14c. Factors affecting students' practices of BSE

Variable	Baseline/pre-test		Intervention/follow-up	
	Experimental n=300(%)	Control n=300(%)	Experimental n=300(%)	Control n=300(%)
Factors				
None	253(84.3)	243(81.0)	0(0.0)	229(76.3)
Time	10(3.3)	19(6.3)	108(36.0)	24(8.0)
Procrastination	6(2.0)	6(2.0)	60(20.0)	8(2.7)
Forgetfulness Laziness	4(1.3)	10(3.3)	56(18.7)	11(3.7)
Fear of Discovering Lump	13(4.3)	7(2.3)	26(8.7)	10(3.3)
No trust in my ability to perform it	6(2.0)	2(0.7)	35(11.7)	(0.7)2
No available specific training programmes	6(2.0)	2(0.7)	13(4.3)	2(0.7)
Anxiety	1(0.3)	2(0.7)	2(0.7)	3(1.0)
Others	1(0.3)	9(3.0)	0(0.0)	11(3.7)

Overall means of knowledge of breast cancer between experimental group and control group

The ANOVA table below revealed the significance level of knowledge of breast cancer between Experimental group and control group. It was shown that there was great improvement in the knowledge of the participants after the intervention as there was significance difference between participants' mean knowledge of breast cancer between pre-test (4.43±2.51) and post-test (20.50±1.53) at experimental group (F=4634.031; p=0.000). Although, there was slight significant difference comparing pre intervention of both experimental (4.43±2.51) and control groups (5.47±2.06) (F=30.620; p=0.000) (p<0.05) (Table 4.15).

Table 4.15. Comparison of overall mean knowledge of breast cancer between experimental and control group

Variable	N	Mean±(SD)	X(SE)	*F*	Significance level
Pre-test					
Control	300	5.47±2.06	0.119	30.620	0.000
Experimental	300	4.43±2.51	0.145		
Total	600	4.95±2.35	0.096		
Post-test					
Control	300	6.97±3.09	0.178	4634.031	0.000*
Experimental	300	20.50±1.53	0.088		
Total	600	13.73±7.20	0.294		

*Significant at p-value is <0.05

The ANOVA table below revealed the significance level of mean knowledge of breast self-examination between intervention groups and control group at post-intervention, from which it was shown that there was significance difference between the pre-test (1.31±1.40) and post-test (7.43±0.60) at experimental group (F=1738.682; p=0.000) while slight significant difference occurred at pre intervention of both experimental (1.31±1.40) and control groups (1.42±1.66) (F=0.820; p=0.036) (p>0.05) (Table 4.16).

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Volume 7, Issue 4, Dec 2019

Table 4.16. Comparison of overall mean knowledge of breast self-examination between experimental and control group

Variable	N	Mean±(SD)	X(SE)	*F*	Significance level
Pre-test					
Control	300	1.42±1.66	0.096	0.820	0.366
Experimental	300	1.31±1.40	0.081		
Total	600	1.36±1.53	0.063		
Post-test					
Control	300	2.06±2.15	0.124	1738.682	0.000*
Experimental	300	7.43±0.60	0.035		
Total	600	4.74±3.12	0.127		

*Significant at p-value is <0.05

Students' practices of breast self-examination

Participants' practice of BSE is presented in table 4.15. Practicing of breast self-examination (BSE) was greatly pronounced among participants in the experimental group (95.3%) at post-intervention compared to controls (27.3%). The reverse was the case at baseline where controls had a higher proportion (22.0%) compared to intervention group (15.7%).

Majority among the participants who practices BSE regularly belonged to the experimental group (once in a day or everyday - 95.7%) at post-intervention compared to baseline Exp. (4.0%); Control (3.0%) and Control (3.3%) at post-intervention. Participants who followed right method were majority at post-intervention Exp. (66.3%) against baseline Exp. (4.0%); Control (10.7%) and Control (13.3%) at post-intervention. Among factors affecting students' practices of BSE included: Time (36.0%); Procrastination (20.0%); Forgetfulness/Laziness (18.7%) and No trust in my ability to perform it (11.7%) which were more pronounced at post-intervention Exp. (see Table 4.15a, b & c).

Table 4.15a. Students' practices of breast self-examination

Variable	Baseline/pre-test		Intervention/follow-up	
	Experimental n=300(%)	Control n=300(%)	Experimental n=300(%)	Control n=300(%)
Ever examined your breast				
No	47(15.7)	66(22.0)	286(95.3)	82(27.3)
Yes	253(84.3)	234(78.0)	14(4.7)	218(72.7)
At what time of your menstrual cycle do you examine your breast?				
Third day	1(0.3)	3(1.0)	51(17.0)	3(1.0)
None	10(3.3)	37(12.3)	0(0.0)	46(15.3)
first day	0(0.0)	1(0.3)	116(38.7)	2(0.7)
End of the month	3(1.0)	3(1.0)	0(0.0)	4(1.3)
Every month	2(0.7)	1(0.3)	0(0.0)	1(0.3)
Everyday	1(0.3)	3(1.0)	0(0.0)	4(1.3)
Second day	1(0.3)	2(0.7)	0(0.0)	3(1.0)
After menstruation	13(4.3)	12(4.0)	0(0.0)	0(0.0)
Friday	7(2.3)	0(0.0)	0(0.0)	14(4.7)
Once in a year	0(0.0)	1(0.3)	0(0.0)	2(0.7)
Two times a week	10(3.3)	1(0.3)	0(0.0)	1(0.3)
After three months	0(0.0)	2(0.7)	48(16.0)	2(0.7)
No	252(84.0)	234(78.0)	0(0.0)	218(72.7)
How often do you do BSE				
Once in a day	5(1.7)	3(1.0)	192(64.0)	3(1.0)

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Once in a year	0(0.0)	1(0.3)	0(0.0)	1(0.3)
None	10(3.3)	23(7.7)	0(0.0)	28(9.3)
Everyday	6(2.0)	5(1.7)	95(31.7)	6(2.0)
Every week	0(0.0)	2(0.7)	0(0.0)	3(1.0)
Once in a week	6(2.0)	5(1.7)	0(0.0)	7(2.3)
Once in a month	0(0.0)	18(6.0)	0(0.0)	25(8.3)
2 time	2(0.7)	2(0.7)	0(0.0)	2(0.7)
Three times a week	2(0.7)	1(0.3)	0(0.0)	1(0.3)
Once in three years	6(2.0)	2(0.7)	0(0.0)	2(0.7)
Once in two years	7(2.3)	3(1.0)	0(0.0)	3(1.0)
Three times a day	1(0.3)	1(0.3)	0(0.0)	1(0.3)
No	253(84.3)	234(78.0)	13(4.3)	218(72.7)

Table 4.15b. Students' practices of breast self-examination

Variable	**Baseline/pre-test**		**Intervention/follow-up**	
	Experimental n=300(%)	**Control n=300(%)**	**Experimental n=300(%)**	**Control n=300(%)**
Methods used				
None	252(84.0)	234(78.0)	0(0.0)	218(72.7)
In front of the mirror	12(4.0)	32(10.7)	199(66.3)	40(13.3)
During shower	25(8.3)	18(6.0)	38(12.7)	21(7.0)
Lying shower	10(3.3)	13(4.3)	63(21.0)	18(6.0)
Others	1(0.3)	3(1.0)	199(66.3)	3(1.0)
Step taken				
None	252(84.0)	234(78.0)	0(0.0)	218(72.7)
Stand or sit with arm at sides	10(3.3)	12(4.0)	68(22.7)	14(4.7)
Raise the arm above or behind the head	15(5.0)	12(4.0)	79(26.3)	14(4.7)
Place hand on hip, press down and make the chest muscle tense	18(6.0)	22(7.3)	127(42.3)	29(9.7)
Squeeze each nipple gently for any discharge	4(1.3)	7(2.3)	26(8.7)	8(2.7)
Others	0(0.0)	13(4.3)	0(0.0)	17(5.7)
Steps followed during shower				
None	252(84.0)	234(78.0)	0(0.0)	218(72.7)
Start by raising an arm behind the head	16(5.3)	9(3.0)	131(43.7)	13(4.3)
Use soapy hand to press firmly on the breast against the chest wall	13(4.3)	21(7.0)	0(0.0)	25(8.3)
Use the pad of the hand to examine the breast	15(5.0)	18(6.0)	65(21.7)	22(7.3)
Others	4(1.3)	18(6.0)	104(34.7)	22(7.3)
Steps followed while lying down				
None	253(84.3)	234(78.0)	0(0.0)	218(72.7)
Lie down on the back and be comfortable	11(3.7)	12(4.0)	89(29.7)	15(5.0)
Place a pillow under the shoulder of the side to be examined	9(3.0)	25(8.3)	89(29.7)	31(10.3)
Use the pad of the hand to examined the breast	16(5.3)	18(6.0)	43(14.3)	22(7.3)

Use the lip of the hand to examined the breast	10(3.3)	7(2.3)	79(26.3)	10(3.3)
Others	1(0.3)	4(1.3)	0(0.0)	4(1.3)

Table 4.15c. Factors affecting students' practices of BSE

Variable	**Baseline/pre-test**		**Intervention/follow-up**	
	Experimental n=300(%)	**Control n=300(%)**	**Experimental n=300(%)**	**Control n=300(%)**
Factors				
None	253(84.3)	243(81.0)	0(0.0)	229(76.3)
Time	10(3.3)	19(6.3)	108(36.0)	24(8.0)
Procrastination	6(2.0)	6(2.0)	60(20.0)	8(2.7)
Forgetfulness Laziness	4(1.3)	10(3.3)	56(18.7)	11(3.7)
Fear of Discovering Lump	13(4.3)	7(2.3)	26(8.7)	10(3.3)
No trust in my ability to perform it	6(2.0)	2(0.7)	35(11.7)	(0.7)2
No available specific training programmes	6(2.0)	2(0.7)	13(4.3)	2(0.7)
Anxiety	1(0.3)	2(0.7)	2(0.7)	3(1.0)
Others	1(0.3)	9(3.0)	0(0.0)	11(3.7)

Comparing participants overall mean knowledge score of breast cancer between the experimental and control groups at baseline and post-intervention

Table 4.16 shows the comparison of participants mean knowledge score of breast cancer at baseline and post intervention testing null hypothesis one - There is no significant difference in students' knowledge of breast cancer between the experimental and control group.

At baseline, participants in the control group had a significantly higher mean knowledge score (5.47±2.06) compared to those in the experimental group (4.43±2.51). The reverse was however the case post intervention where the experimental group had a higher knowledge score compared to the control (20.5±1.5 and 7.0±3.1) respectively. These were statistically significant at $p<0.001$.

The null hypotheses were therefore rejected.

Table 4.16. Comparison of overall mean knowledge of breast cancer between Experimental and control group

Variable	**N**	**Mean±(SD)**	**X(SE)**	***T***	**P value**
Pre-test					
Control	300	5.47±2.06	0.119	5.534	<0.001*
Experimental	300	4.43±2.51	0.145		
Total	600	4.95±2.35	0.096		
Post-test					
Control	300	6.97±3.09	0.178	-68.074	<0.001*
Experimental	300	20.50±1.53	0.088		
Total	600	13.73±7.20	0.294		

*Significant at p-value is <0.05

Discussion of findings

All respondents were female with majority belonging to the Yoruba ethnic group. This is expected since the study was carried out in Ibadan, located in the south western part of the country where most of the population belong to the Yoruba ethnic group.

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The study also revealed that participants' parents majorly had secondary school education and were mainly traders. This may give an indication into the socio-economic status of the participants which is more likely to be low.

Prior to the intervention, only about one third of the participants had heard of breast cancer with the major sources of information been the hospital and seminars. Almost all had a poor knowledge of breast cancer, its signs and symptoms and risk factors prior to the intervention. However, following the intervention, almost all participants in the experimental group had good knowledge of breast cancer, its signs and symptoms and risk factors with mean knowledge scores been significantly higher than those in the control group.

This is expected considering the wide range and of topics on breast cancer covered during the educational intervention. A similar study by Gursoy et al., (2009) compared the effects of three methods of individual training, group training, and training through educational pamphlets on female student knowledge and belief about BSE. The results showed that all three types of educational interventions were effective in raising awareness of participants in this area. These findings show that proper intervention can increase the level of awareness among women about breast cancer and ways of its early diagnosis.

The study revealed the potential impact educational interventions have on in school female students' knowledge of BSE and breast cancer screening methods. Prior to the intervention, only about a quarter of the study population had ever heard of BSE. Knowledge of its use and practice was equally low among both the intervention and control groups. However, following the intervention about half of the participants in the experimental group had good knowledge of BSE and its use which was evident by their significantly higher mean knowledge scores.

Also, the knowledge of breast screening methods was poor among study participants prior to the intervention. There was however a great improvement as all participants in the experimental were knowledgeable in all the breast cancer screening methods post intervention. Based on previous studies, female student who deem breast cancer as a serious illness and think they are susceptible to it, are more likely to do breast examination on a regular basis (Abolfotouh et al., 2015). Also, a finding which underlines the need for a public awareness campaigns highlighting the rational and effectiveness of BSE. However, the role of education in the uptake of preventive services such as BSE has been reported repeatedly (Salaudeen et al.,

The study also revealed the prospects for educational interventions on BSE to improve the practice among in-school female students. This is evident in the trends in breast examination at baseline and post intervention for the experimental and control groups. At baseline, the practice of BSE was reported by only 15.7% and 22.0% of the participants in the experimental and control group respectively. This increased to 95.3% and 27.3% following the intervention. The increase in practice of BSE can be attributed to the intervention and the study in general as respondents in the control group also had a slight increase in proportion reporting BSE which may be as a result of knowledge gained following administration of questionnaires at baseline.

Participants in the experimental group identified various factors that hindered the practice of BSE ranging from time (36.0%); procrastination (20.0%); forgetfulness/laziness (18.7%) and no trust in my ability to perform it (11.7%) and the lack of availability of specific training programmes.

Conclusion

There is therefore the need to increase knowledge of adolescent females on the risks of breast cancer and benefits of early detection through Breast Self-Examination. There is also the need for inclusion of BSE education in the curriculum of secondary schools to increase its knowledge and practice among female adolescents from an early age. This will make it a life style practice and ultimately lead to early detection of breast irregularities and breast cancer in the long run.

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