Promoting breast health among female adolescents: a comparative analysis of the effects of two didactic tools on knowledge and practice regarding breast self-examination in Southwest Nigeria

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Abstract

Background Teaching effective methods for breast self-examination (BSE) to adolescent females is essential for promoting early detection and improving outcomes in breast cancer management. This study therefore aimed to compare two pedagogical tools for teaching BSE among adolescent females.

Methods A quasi-experimental design with a group for pre- and post-intervention tests was adopted. The sample included 970 female senior secondary school class I-III students. The Yamane formula was used to determine a sample size of 276. Pre- and post-intervention data were collected using an observation checklist for practice and a validated questionnaire with a Cronbach's alpha coefficient of 0.76 for knowledge of BSE. A proportionate stratified random sampling technique was used to determine the number of participants for each group. Among the 276 participants, 161 were taught the traditional method (TM), i.e., a lecture, and 115 were taught using the modern method (MM) by watching a podcast that contained BSE lessons. Post-intervention data were collected after six weeks. The data were analysed using descriptive and inferential statistics at a 5% level of significance to compare the effectiveness of the methods.

Results The findings of this study showed that the participants' mean ages across the two methods were 15.49 ± 1.65 and 15.43 ± 1.40 years for the traditional method (TM) and modern method (MM), respectively. Pre-intervention mean BSE knowledge scores in both the TM and MM groups were 8.19 ± 3.17 and 8.31 ± 2.39, respectively, and BSE practice scores were 7.17 ± 2.48 and 6.44 ± 2.75, respectively. Post-intervention knowledge mean scores in both the TM and MM groups increased to 13.75 ± 4.09 and 16.92 ± 2.91, respectively, and post-intervention practice scores increased to 13.06 ± 2.74 and 15.68 ± 3.12, respectively.

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Conclusion This study revealed that both teaching methods were effective at teaching breast self-examination among female adolescents; nevertheless, modern methods are more effective at teaching breast self-examination among female adolescents.

Keywords Breast health, Female, Adolescent, Breast self-examination, Didactic tools, Health education, Nigeria

Introduction

Breast cancer (BC) remains a leading cause of cancer-related deaths among women globally, with a rising incidence among younger populations [1, 2]. It is the most frequent cause of death among women and estimated that 70% of all breast cancer cases worldwide were reported in low and middle-resource countries [3, 4]. In addition, many Sub-Saharan African countries including Nigeria are among the countries with the highest breast cancer mortality worldwide, reflecting weak health infrastructure and subsequently poor survival outcomes because of late presentation [5].

In Nigeria, breast cancer is the most common cancer among women, accounting for 25% of all cancer cases [6, 7]. Nigeria has also been reported to have the highest breast cancer mortality rate in Sub-Sahara Africa [6, 8].

Breast self-examination (BSE) is a basic, most significant, highly endorsed, crucial skill for the early discovery of breast cancer [8], particularly among young females who may not undergo or afford other regular clinical screenings, especially in developing countries. According to the WHO, the teaching of young girls [9] has been viewed as a modality that can promote health and prevent disease among women, and any foundation of good health laid at this stage of life can last longer. In addition, the study of Udeze et al. [10], Asuquo & Olajide [11] and Pangestuti et al. [12] averred that adolescence is seen as a crucial time for the establishment of lifetime habits. Healthy habits developed in adolescence are carried throughout adulthood. Consequently, adolescent girls are therefore a crucial target audience for breast cancer education and awareness-raising. Hence, teaching young women how to perform breast self-examination (BSE) is an optimistic approach for reducing breast cancer morbidity and mortality in societies [13, 14].

However, despite the established importance of breast self-examination (BSE) in early breast cancer detection, recent incidence rates indicate a persistent gap in knowledge and practice among young females. Existing studies [15–17] have emphasized the significance of teaching BSE to adolescent females, yet many still lack the necessary skills and knowledge.

Conversely, the effectiveness of various pedagogical tools for teaching BSE, such as video teaching, lectures, peer group discussions, and pamphlets, in enhancing BSE knowledge and practice remains unclear. This study aims to address this knowledge gap by comparing the effectiveness of traditional (lecture) and modern (podcast) methods in teaching BSE to adolescent females. By assessing the impact of these methods on BSE knowledge and practices, this research seeks to identify the most efficient approach for educating adolescents on breast self-examination, ultimately contributing to the reduction of breast cancer morbidity and mortality in this vulnerable population.

Hypothesis

H_0: There is no significant difference between pre-and post-intervention knowledge of breast self-examination using traditional and modern methods.

H_0: There is no significant difference between the pre-and post-intervention practice of breast self-examination using traditional and modern methods.

Materials and methods
Study design and settings

This was a quasi-experimental design with pre- and post-intervention tests without a control group conducted among female secondary school (SS) students from December 2022 to April 2023. The study settings were government-owned secondary schools in two separate zones (Ogbomoso and Oyo towns) in Oyo state, South-Western Nigeria. The secondary schools selected in the Ogbomoso zone were Ogbomoso High School, Ogbomoso, and the Anglican Grammar School, Ogbomoso. The Oyo zone included the Ladigbolu Grammar School, Oyo, and the Durbar Grammar School, Oyo. All of the schools are mixed and day school.

The interventions involved teaching female secondary school students about the knowledge and practice of breast self-examination using traditional methods and modern methods. Participants in Ogbomoso zone were taught breast self-examination using traditional methods, while those in Oyo zone were taught using modern methods.

Participants and procedures

The study was conducted among 276 female participants from a population of participants that included all females in senior secondary (SS) classes 1–3 of the four schools ($N=970$). The sample size was calculated using Yamane's formula $(n=N/(1+N(e)^2)$. The study sample from each school was determined using the proportional stratified random sampling procedure. Each stratum sample size in this method was exactly proportionate to the size of the strata's total population. A total of 276

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participants participated in both the pre- and post-tests. A total of 161 participants were in the traditional group, while 115 participants were in the modern group. The inclusion criteria included: being a female in SS class I, II or III and being aged 13-19years old. The exclusion criteria included: being a female in junior secondary classes I, II or III and male students were excluded.

Pre-visiting to the schools was performed to familiarize the participants with the purpose and benefit of the study. Confidentiality was assured. Permission was sought from the school head as an agreed-upon convenient time for readiness of the participants. Those younger than 18 years were given a parental consent form.

Three phases were then used to conduct the study: the pre-intervention phase, the intervention phase, and the post-intervention phase.

Pre-intervention phase
Pre-intervention tests were performed using both instruments (questionnaire and observational checklist) for the two groups.

Intervention phase
Teaching tools such as leaflets/pamphlets showing images of the steps of conducting BSE and audio-visual aids were used during this phase. However, the traditional group was taught using the lecture method, while the modern group was taught with audio-visual information (watching a podcast) based on the content of the questionnaire and checklist. The teaching was prepared and delivered in English, which is the general language. Training for each group took one and a half hours (90 min). Each participant was given a unique identification tag that could be traced back during the post-test. Both the pre-test and the intervention were conducted on the same day.

Post-intervention phase
After six weeks of intervention, the participants were recontacted for the post-test using the same questions from the pre-test questionnaire. The effectiveness of the two methods of teaching was subsequently compared.

Study instrument
Two instruments used to collect data in this study were self-developed validated questionnaire and observation checklists. The questionnaire included information on participants' demographic variables and questions on their knowledge of and practices related to breast self-examination, while an observational checklist was used to test participants' knowledge of and practices related to BSE (See Appendix 1).

The contents of the observational checklist comprised the processes of carrying out BSE, which included physical assessment, palpation, and five steps. Each of the items was graded to a total of 20 points (See Appendix 1).

These instruments were subjected for correction, appropriate opinion, clarity and all-inclusiveness of the constructs by external reviewer and other experts in the field. The instruments were made to pass through the face and content validity. All the corrections made were implemented before the administration of the instrument.

A pilot study was conducted to test the reliability of the instrument among participants who were not included in the study. The reliability coefficient was 0.76.

Statistical analysis
Descriptive (frequency, percentage, mean and standard deviation) and inferential (independent t-test) statistics were used to analyse the data using SPSS version 23 to examine the differences in the mean scores of the two groups before and after the intervention.

Ethical considerations
The Institutional Research Ethics guidelines and the ethical principle pertaining to human participation were followed in the conduct of the study. (i.e., Helsinki Declaration). The researcher obtained formal ethical approval from the Oyo State Ministry of Education with reference number EDU215/T8VOL1/90. Permission to carry out the study was also obtained from the principal of each school. Students were gathered together during break time, and the purpose of the study was explained to them. Participants were informed that this was a three-phase study and about the duration of the study and the approximate time that would be taken from them. The students who were ready for education completed the informed consent form. Parental consent was obtained from those younger than 18 years via administration of parental informed consent form.

Results
General characteristics of the participants
Table 1 shows the demographic characteristics of the female adolescents in the traditional and modern secondary school groups in the study, with mean ages of 15.49 ± 1.65 and 15.43 ± 1.40 years, respectively. Additionally, the results revealed that 141 (87.6%) and 103 (89.6%) of the participants were aged 14–17 years, respectively. The majority of the participants—87 (54%) and 56 (54%)—were in SS I, and the others were in SS II and III, respectively. Above average (70.2%) and 59 (51.3%) of the students reached menarche between the ages of 10–13 years; 47 (29.2%) and 56 (48.7%) started between 14 and 17 years of age, while only 1 (0.6%) reached menarche at 18 years. The majority (133; 82.6%) and (96; 83.5%) of the participants' fathers had education up to the secondary

Table 1 Demographic characteristics of participants under traditional and modern methods of teaching (*N*=276)

Demographic Variables	Traditional (*n*=161)		Modern (*n*=115)	
	Frequency	Percent %	Frequency	Percent %
Age (years)				
10–13	11	6.8	5	4.3
14–17	141	87.6	103	89.6
18–19	9	5.6	7	6.1
Class				
SSS 1	87	54.0	56	48.7
SSS 2	52	32.3	32	27.8
SSS 3	22	13.7	27	23.5
Age at Menarche (years)				
10–13	113	70.2	59	51.3
14–17	47	29.2	56	48.7
18–19	1	0.6	Nil	Nil
Ethnicity				
Yoruba	156	96.9	113	98.3
Igbo	4	2.5	2	1.7
Hausa	1	0.6	Nil	Nil
Father's level of education				
No formal education	5	3.1	6	5.2
Primary education	23	14.3	13	11.3
Secondary education	76	47.2	69	60.0
Tertiary education	57	35.4	27	23.5
Mother's level of education				
No formal education	12	7.5	8	7.0
Primary education	19	11.8	17	14.8
Secondary education	72	44.7	62	53.9
Tertiary education	58	36.0	28	24.3

Table 2 Mean score differences in BSE knowledge pre- and post-intervention

Categories of scores	Traditional		Modern	
	Pre-test	Post-test	Pre-test	Post-test
N	**161**	**161**	**115**	**115**
Mean	8.1925	13.7453	8.3130	16.9217
Standard Deviation	3.1771	4.0885	2.3892	2.9114
Minimum	1.00	3.00	3.00	7.00
Maximum	17.00	23.00	15.00	22.00
Mean Diff.	5.5528		8.6087	

Table 3 Presents the pre- and post-intervention mean score of practice of breast self-examination

Categories of scores	Traditional		Modern	
	Pre-test	Post-test	Pre-test	Post-test
N	**161**	**161**	**115**	**115**
Mean	7.1671	13.0652	6.4409	15.6757
Standard Deviation	2.4796	2.7444	2.7472	3.1203
Minimum	0.50	3.00	0.40	2.50
Maximum	13.00	19.00	12.50	18.50
Mean Diff.	5.8981		9.2348	

level, while 130 (80.7%) and 90 (78.2%) mothers had education up to the secondary level, respectively. Almost all the participants were of the Yoruba ethnic group.

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Table 2 shows the results of knowledge of breast self-examination among female adolescents showed that the modern approach was more effective than the traditional method. The mean gain of the modern method is 8.6087, while that of the traditional method is 5.5528.

Table 3 shows the difference in the mean score between modern and traditional methods with regard to the practice of breast self-examination. The mean gain in the traditional era was 5.8981, and that in the modern era was 9.2348.

Table 4 shows that among the participants, there was no significant difference between the mean score of pre-intervention knowledge of breast self-examination using traditional and modern methods (Crit-t=1.96, Cal.t = -0.343, DF=274, p(0.732)>0.05 level of significance).

Nonetheless, there was a statistically significant difference in postintervention knowledge of breast self-examination among female adolescents (Cal.t = -2.643,

Table 4 Showing the difference in the mean scores of pre- and post-intervention knowledge of breast self-examination using traditional and modern methods among female adolescents

	Treatment groups	N	Mean	Std. Dev.	Crit-t	Cal-t.	DF	*p*-value
Pre-test	Traditional method	161	8.1925	3.1771				
	Modern method	115	8.3130	2.3892	1.96	− 0.343	274	0.732
Post-test	Traditional method	161	13.7453	4.0885				
	Modern method	115	16.9217	2.9114	1.96	-2.643	274	0.009

*Independent t-test

Table 5 Showing the difference in the mean scores of pre- and post-intervention BSE practices using traditional and modern methods

	Treatment groups	N	Mean	Std. Dev.	Crit-t	Cal-t.	DF	*p*-value
Pre-test	Traditional method	161	7.1671	2.4796				
	Modern method	115	6.4409	2.7472	1.96	2.293	274	0.023
Post-test	Traditional method	161	13.0652	2.7444				
	Modern method	115	15.6757	3.1203	1.96	2.225	274	0.027

*Independent t-test

DF=274, p(0.009)<0.05 level of significance). Hence, knowledge of breast self-examination among female adolescents using modern methods was more effective than traditional methods.

In terms of the practice of breast self-examination, there was a statistically significant difference among the participants who used both educational tools (Cal.t=2.225, DF=274, p(0.027)<0.05 level of significance). However, the use of modern methods was more effective than the use of traditional methods in the post-test (Table 5).

Discussion

The study revealed that education using both traditional and modern techniques had a positive impact on participants' knowledge and practical abilities related to breast self-examination. The findings of this study revealed that teaching using both traditional and modern approaches improves BSE, and this finding is corroborated by research conducted by Tewelde et al. [18], Juanita et al. [19] and Ahmed et al. [20] on educational programmes on BSE knowledge and practice.

In this study, the pre- and post-intervention mean gains of knowledge and practice of BSE using traditional methods increased from 8.1925 to 13.7453 and from 7.1671 to 13.0652, respectively. This revealed an improvement in their knowledge and practice of BSE after using an interventional tool. In agreement with this, Ayran et al. [21] reported that although participants' BSE knowledge and practices were lacking before BSE peer education, BSE knowledge and practices significantly improved following BSE peer education. This finding is similar to the findings of the present study. Furthermore, Ozturk et al. [22] showed notable variations between BSE practices and knowledge before and after an educational intervention. Additionally, a study by Seif & Aziz [23] revealed

that following education, participants' knowledge and BSE behaviours increased to 95.1% and 86%, respectively, from 15% to 5.2%, respectively, before education.

This study also revealed that the pre- and post-intervention mean gains of knowledge and practice of BSE using the modern (podcast) method improved from 8.3130 to 16.9217 and from 6.4409 to 15.6757, respectively. This finding is in agreement with a study conducted in Ethiopia where the level of knowledge of the participants increased from 37.7 to 57.4%, and the level of practice also increased from 16.4 to 70.3% following a planned teaching intervention.

However, a notable finding in this study is the superior effectiveness of the modern method (podcast) in teaching breast self-examination (BSE) knowledge and practice among adolescents compared to the traditional method. The mean differences in the pre-post intervention knowledge of BSE using traditional and modern methods were 5.5528 and 8.6087, respectively, while the pre-post-intervention knowledge of BSE using traditional methods was 5.8981 and 9.2348, respectively. This suggests that the modern method was significantly more effective than the traditional method. This outcome may be attributed to today's adolescents being more visual and inclined towards interactive learning, as opposed to traditional auditory learning. Furthermore, technological advancements have enabled the use of modern tools such as podcasts and the internet to reach a wider audience, making health education more accessible and engaging. Consistent with this finding, a study by Tuna [24] revealed that internet education significantly improved the knowledge and practices of BSE among participants. Other studies [25, 26] have also highlighted the effectiveness of modern educational methods in promoting a positive mind set towards breast cancer prevention.

Limitations

Due to time constraint, follow up session of educational intervention on knowledge and practice of BSE could not be done. Participants were not given remind to practice BSE during the interval period. School holiday period brought about the longer interval time resulting in forgetfulness of the process by the participants.

Conclusion

It is concluded in this study that both traditional (lecture) and modern (podcast) methods are useful tools for effectively teaching breast self-examination, but modern methods are more significantly effective at teaching BSE among female adolescents who are inclined with technology. A future study among other categories of women is recommended to assess the effectiveness of these educational tools.

Abbreviations
BSE   Breast Self-Examination
SS   Senior Secondary

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12885-024-12949-5.

Supplementary Material 1

Data availability
The datasets used and analysed during the current study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate
Approval was obtained from the ethics committee of Oyo State Ministry of Education. The procedures used in this study adhere to the tenets of the Declaration of Helsinki. Informed consent was obtained from all participants aged ≥ 18 years and the parents of those < 18 years included in the study. Parents of those < 18 years old signed informed consent.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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