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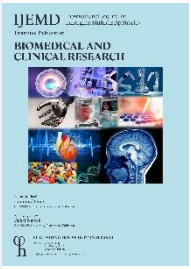

A Scoping Review of The Knowledge and Practice of Breast Self-Examination Among Women in Nigeria

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Abstract

Over 19 million cases of breast cancer were reported among women in 2020, surpassing lung cancer to become the leading cause of cancer worldwide. Women in developing countries have higher mortality rates than women in developed countries. Breast self-examination (BSE) is a simple procedure carried out by women themselves to determine any changes in their breasts and if needed seek further medical attention. This scoping review aimed to assess the available evidence on the knowledge and practice of BSE among women in Nigeria. This scoping review was conducted by searching African Journals On-Line (AJOL), ProQuest, PubMed and Science Direct databases for eligible studies. The relevant data was then extracted and a summary of the findings reported. 36 eligible articles were identified, 15 studies met the inclusion criteria and were considered for data extraction. All the studies included were cross-sectional descriptive surveys. The average reported knowledge of BSE is 67%, with 40% of study respondents practicing BSE, but only 26% of study respondents practiced BSE monthly. There's low practice of BSE among women in Nigeria. Further research and appropriate interventions are needed to improve early detection and treatment of breast cancer.

Keywords: *Breast self-examination; Knowledge; Nigeria; Practice; Women.*

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1. Introduction

Breast cancer is a public health problem worldwide and is one of the leading causes of death among all cancers affecting people across the globe. Global Cancer Observatory (GLOBOCAN) estimates breast cancer is now the most commonly diagnosed cancer worldwide with >19 million cases in 2020. Among them 2.3 million were new cases and accounted for 11.7% of new cancer diagnoses worldwide. Breast cancer is also the leading cause of morbidity and mortality resulting from malignancies among women in developing countries, which has largely been attributed to delayed diagnosis, lack of public awareness and screening modalities, among others[1], [2].

The incidence rate of breast cancer in the last three decades has increased by more than five percent per year in countries like Nigeria, Malawi and the Seychelles. In Nigeria the incidence of breast cancer was documented to be 54.3 per 100,000 in 2010, which was a hundred percent increase compared to the preceding decade[2]–[4].

In low- and middle-income countries (LMICs) such as Nigeria breast cancer is reported to account for one out of every four cases and one in six deaths resulting from cancers. Women in LMICs like Nigeria are also disproportionately affected, they are reported to have 17% higher mortality rates than women in developed countries. There has been a rapid increase in breast cancer cases in the preceding three decades among women in Ibadan, southwest Nigeria, by more than 5%, this trend of rising incidence and prevalence of breast cancer cases has also been reported in other regions of Nigeria[5].

The poor outcomes of breast cancer among women in Nigeria has been largely attributed to late presentation and poor access to healthcare facilities, amongst other factors. Majority of women diagnosed with breast cancer (77%) present late (stages III and IV). More than 30% of breast cancer deaths in sub-Saharan African (SSA) can be avoided by early diagnosis and appropriate treatment, which may be difficult to access in many rural areas. Early detection is obtainable through improved breast cancer awareness and encouraging clinical breast examination (CBE) which can be provided by skilled healthcare workers at healthcare facilities[6]–[8].

Access to healthcare in SSA countries including Nigeria can be challenging due to economic constraints and lack of screening equipment like mammography in most healthcare facilities. Hence, there is need to promote breast self-examination (BSE) which is a relatively simple, cheap and non-invasive method of examining the breast that can be performed by women themselves on a monthly basis to determine any changes in their breasts and seek early medical attention when any abnormal changes are detected in the breasts. Regular BSE enables women to be conversant with the normal anatomy of their breasts, some studies have reported that as much as 90% of breast lumps or masses are first detected by the women after conducting BSE. BSE is done once in a month, between the 7^{th} and 10^{th} day of the menstrual cycle, for women who are menopausal, they examine their breasts on a fixed date every month. The American Cancer Society recommended that women from 20 years of age should be educated on how to perform BSE monthly. The technique of BSE requires palpating the breasts for any lumps with the pads of the fingers not the flat side of the hand. The woman should perform BSE in 2 positions, first in erect position either sitting or standing and second while lying down[7], [9]–[12].

Some studies have reported that good knowledge of BSE promotes early detection and early diagnosis of breast cancer. Similarly, those who perform BSE are more likely to start treatment at an earlier stage and are more likely to have breast conserving and less mutilating surgery, and they also have decreased

mortality[3], [13]–[16]. Some factors have been found to be determinants of BSE such as higher levels of education, gainful employment, higher levels of income, marital status, age, presence of social support, positive attitude towards prevention and family history of breast diseases [11]. The WHO recommends "organized population-based mammography screening every 2 years for women at average risk for breast cancer aged 50 to 69 years in well-resourced settings". The American Cancer Society recommends that "women aged 45 to 54 years should be screened annually, women aged 40 to 44 years should have the opportunity to begin annual screening, women aged 55 years and above should transition to biennial screening or have the opportunity to continue screening annually" [2]. In Nigeria, the National Cancer Control Plan (NCCP) advocates the implementation of clinical breast exam (CBE) at primary health care level while mammography will be provided at secondary and tertiary level. The plan also identified the need to educate the public on the importance of breast cancer screening, it also highlights the need to equip facilities for performing mammography [17].

After an initial scoping search there was no study that was found to have methodologically explored the literature and identified gaps in the knowledge and practice of breast self-examination among women in Nigeria. The knowledge of BSE entails having the information of the signs of breast cancer and the procedure of performing BSE. The practice of BSE "involves the act of palpating one's breast monthly, just after menstruation and the ability to detect abnormalities" [13].

Methodology

We used the "preferred reporting items for systematic reviews and meta-analyses extension for scoping reviews" (PRISMA-ScR) checklist during the conduct of this study [18]. This study was undertaken with the aim of examining the available evidence on the knowledge and practice of breast self-examination among women in Nigeria.

Research questions

This scoping review set out to answer the following questions:

i. What is the available evidence on the knowledge of breast self-examination among women in Nigeria?
ii. What is the available evidence on the practice of breast self-examination among women in Nigeria?

Eligibility Criteria

The following criteria were employed to assess the existing literature on BSE among women in Nigeria.

Inclusion criteria:

- Studies primarily concerned with women's knowledge and practice of BSE
- Studies reporting evidence among women
- Studies conducted in Nigeria
- Studies with full texts accessible

Exclusion criteria:

- Studies concerned with other early detection methods of breast cancer like clinical breast examination and mammography
- Studies reporting evidence among men
- Studies conducted outside Nigeria
- Studies where full-texts could not be retrieved

Search Strategy

A database search for relevant articles was conducted on four databases Pro-Quest, PubMed, Science Direct and African Journals On-Line (AJOL). The database search was conducted using the following keywords: "knowledge", "practice", breast self-examination", "women", "Nigeria". Search filters were applied where applicable to limit the search results to studies conducted in Nigeria, but no limits were applied to the dates of publication.

The lead researcher and assistants screened the titles of the search results and identified relevant articles. Duplicate articles were removed, the abstracts of relevant articles were then independently screen by the lead researcher and assistants to identify articles that met the inclusion criteria for this scoping review, the full articles were then retrieved. The reference list of the included articles were also screened to identify other eligible articles. The lead researcher and assistants then carried out the process of data extraction independently.

Charting The Data

A data extraction form was designed using Microsoft Excel after consulting similar scoping reviews on the knowledge and practice of breast self-examination as a guide[13]. It was then pre-tested by the lead-researcher and assistants. The authors, date of publication, geo-political region of Nigeria, study setting, study population, demographic characteristics of study participants – including age, level of education and occupation, and the significant findings from each study – regarding the knowledge and practice of breast self-examination were then independently extracted to answer the review questions. All discrepancies noted at the end of the data extraction process were resolved after careful consideration of the inclusion and exclusion criteria.

Collating, Summarizing And Reporting The Results

Collation and summarizing of the findings focused on the variables of interest – knowledge and practice of breast self-examination among women in Nigeria. Data extracted was thus arranged thematically and tabulated to summarize the findings of interest. These are contained in the results section of this review.

Results

The initial database search on the search engines delivered a total of 1,286 results. After the initial title screening and removal of duplicates 75 studies were assessed for eligibility. After screening the abstracts 36 were found to be eligible but 15 studies in total were found to have met the inclusion criteria for this review and were included in the data extraction process (Fig. 1). The studies that were excluded from this review were found to be concerned with breast cancer and other early detection measures (EDM) of breast

cancer like clinical breast examination (CBE) and mammography. Others were not concerned with the knowledge of breast self-examination among respondents[1], [3], [4], [11], [19], [20].

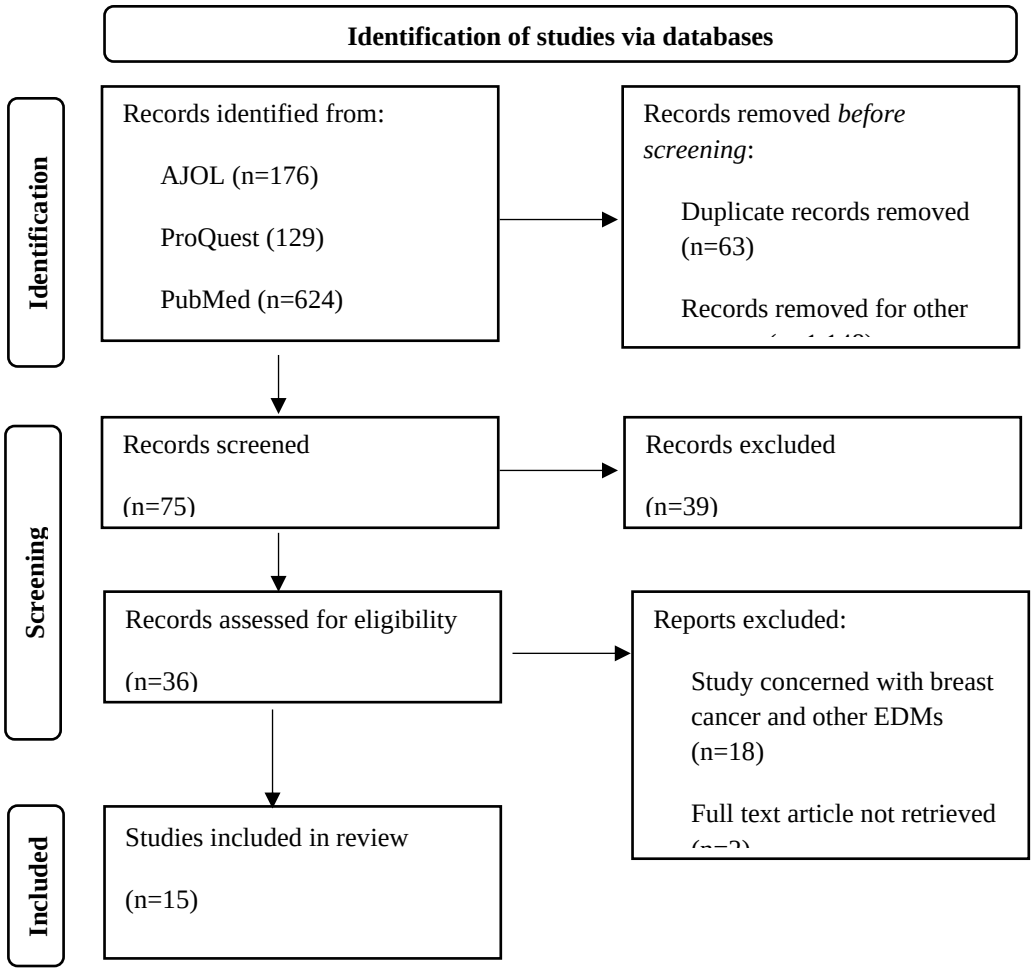

Figure 1: PRISMA 2020 Flow Diagram of the study selection process.

Characteristics Of Included Studies

All 15 studies included in this scoping review were cross-sectional descriptive surveys. One of the studies was conducted among female secondary school teachers[10]. Two of the studies were carried out in a market among female traders[7], [21]. Two were hospital-based and conducted among female health workers[22], [23]. Three of the included studies were community based[15], [24], [25]. Seven were conducted on university campuses, one of which was among female cleaners[8] while the other six were among female undergraduate students[16], [26]–[30]

Table 1: Characteristics of included studies

Author, Year	Demographic characteristics			Sample size	Study setting	State and region
	Age	Level of education	Occupation			
Balogun and Owoaje, 2005	16 - 80 years	mostly primary (31%) and secondary (37%) level of education	traders	281 respondents	market	Oyo state, south-west Nigeria
Kayode et al, 2005	22 - 59 years	66% had a first university degree and a further 14% had a second university degree	teachers	341 respondents	secondary school	Kwara state, north-central Nigeria
Agu and Ede, 2006	17 - 40 years		students	654 respondents	university campus	Enugu state, south-east Nigeria
Oluwole, 2008	23 - 50 years	mostly tertialy level of education	health care workers	100 participants	hospital	Ondo state, south-west Nigeria
Bellgam and Buowari, 2012	21 - 85 years	Secondary (56%) and tertiary (21%)	Mostly civil servants (31%) and traders (31%)	691 participants	community	Rivers state, south-south Nigeria
Agbo et al, 2012	18 - 38 years		Students	115 students	college campus	Plateau state, north-central Nigeria
Obaji et al, 2013	19 - 65 years	Secondary (54%) and tertiary (21%)	Traders	238 women	market	Ebonyi state, south-east Nigeria

Sambo et al, 2013	16 - 35 years		students	345 students	university campus	Kaduna state, north-west Nigeria
Omoyeni et al, 2014	30 - 60 years	Mostly primary and secondary level of education (82%)	university cleaners	140 participants	university campus	Osun state, south-west Nigeria
Adegbenro et al, 2014	20 - 60 years	Mostly primary and secondary level of education (70%)	Mostly traders and farmers (65%)	400 participants	community	Osun state, south-west Nigeria
Yakubu et al, 2014	20 - 60 years	all had tertiary level of education	nurses	102 nurses	hospital	Kano state, north-west Nigeria
Ighodaro and Akhigbe, 2016	21 - 35 years		students	211 students	university	Edo state, south-south Nigeria
Sani et al, 2016	18 - 60 years	University (40%), secondary (29%)	Teachers (35%), housewives (27%), traders (20%)	392 participants	community	Sokoto state, north-west Nigeria
Akpanekpo, 2017	18 - 25 years		students	350 female undergraduate students	university campus	Akwa Ibom state, south-south Nigeria
Salawu and Akindiya, 2018	16 - 27 years		students	251 students	university campus	Osun state, south-west Nigeria

Study Findings

All of the 15 included studies reported on the knowledge and practice of breast self-examination among women across different regions of Nigeria. The findings are presented in table 3. The practice of breast self-examination ranged from 94% of good practice among third year nursing students to 0.4% among market women[7], [28].

Table 2: Study Findings

Author, Year	Level of Education	Occupation	Study Findings
Balogun and Owoaje, 2005	mostly primary (31%) and secondary (37%) level of education	Traders	• 32% of respondents are aware of BSE while 18% of the traders have practiced BSE • There was an association between the level of education and awareness of BSE. Traders with tertiary education were more knowledgeable about BSE.
Kayode et al, 2005	66% had a first university degree and a further 14% had a second university degree	Teachers	• 96% of respondents had heard about BSE and 42% of them knew the correct procedure. • 55% had practiced BSE before, and 49% were currently practicing BSE.
Agu and Ede, 2006		Students	• 88% of respondents knew about BSE, • only 27% performed monthly BSE
Oluwole, 2008	mostly tertiary level of education	health care workers	• 94% of respondents were aware of BSE • 80% of respondents practiced BSE • 50% practiced BSE monthly
Bellgam and Buowari, 2012	secondary (56%) and tertiary (21%)	mostly civil servants (31%) and traders (31%)	• 40% of respondents have heard of BSE • 29% have performed BSE before • 10% practice BSE monthly
Agbo et al, 2012		Students	• only 21% of respondents knew what BSE is and 16% had practiced BSE before. • knowledge of BSE did not translate to practice of BSE
Obaji et al, 2013	secondary (54%) and tertiary (21%)	Traders	• 39% of respondents had heard of BSE • 22% had practiced BSE in the past • only one respondent (0.4%) practiced BSE monthly
Sambo et al, 2013		Students	• 74% of respondents had heard of BSE • 55% of respondents practiced BSE • 25% practiced BSE monthly

Omoyeni et al, 2014	mostly primary and secondary level of education (82%)	university cleaners	• 51% of the population had average knowledge of BSE and 25% had excellent knowledge of BSE • 69% have performed BSE before • 18% practice BSE monthly
Adegbenro et al, 2014	mostly primary and secondary level of education (70%)	mostly traders and farmers (65%)	• 47% of respondents were aware of BSE • 30% of respondents have practiced BSE before
Yakubu et al, 2014	Tertiary level of education	Nurses	• all (100%) participants were aware of BSE, however none provided an accurate description of how it was performed. • 91% had practice BSE before • 45% were practicing monthly BSE • Nurses in surgical wards had a higher rate of practicing BSE • knowledge or awareness does not correlate with the practice or effective performance of BSE
Ighodaro and Akhigbe, 2016		Students	• 77% of respondents knew about BSE • 69% practiced BSE • The presence of a healthcare professional in the family and level of study is associated with knowledge of BSE
Sani et al, 2016	University (40%), secondary (29%)	Teachers (35%), housewives (27%), traders (20%)	• 75% of respondents had average to good knowledge of BSE • 34% of respondents practiced monthly BSE • there's a relationship between educational level of respondents with knowledge and practice of BSE
Akpanekpo, 2017		Students	• 78% of the respondents had heard about BSE • 23% perform BSE regularly
Salawu and Akindiya, 2018		Students	• 89% of respondents know about BSE • Only 57% could correctly define BSE • 88% have practiced BSE before • 35% practice BSE regularly

Knowledge of Breast Self-Examination

The knowledge of BSE ranged from 100% among female nurses in a tertiary hospital to 21% among female college students in Plateau state[23], [31], the average across all included studies is 67%.

Five of the included studies reported knowledge among less than 70% of respondents. One was carried out among female students of a college of education in Plateau state[31], two among female traders in Oyo and Ebonyi states[7], [21] and the remaining two were community based studies conducted in Rivers and Osun states[24], [25].

In the study conducted among female college students in Plateau state, only 21% of the students knew what BSE meant[31]. Balogun and Owoaje's study among market women in Oyo state, south west Nigeria reported that 37% of the traders were aware of BSE. They also concluded that women who had higher levels of education up to tertiary level knew more about BSE than those who were not educated up to tertiary level[21]. Obaji et al reported 39% of their study participants had heard about BSE but only one participant (0.4%) knew how often BSE should be done [7]. Bellgam's study among women in some local government areas across Rivers state reported knowledge of 40% among study participants. Adegbenro et al conducted their review among rural women Osun state, they reported knowledge of BSE among 47% of study participants[24], [25].

The other included studies reported knowledge of BSE among >70% of respondents. One was conducted among women across four local government areas of Sokoto state, they reported that 75% of study participants had average to good knowledge of BSE [15]. Kayode and Akande in their study among female secondary school teachers in Ilorin, Kwara state reported that 96% of the respondents knew about BSE and electronic media was the leading source of information[10]. Omoyeni et al in their study conducted among female cleaners in Obafemi Awolowo University (OAU) Ile-Ife, Osun state reported knowledge of BSE of 76%[8].

Two of the studies were conducted among female health practitioners. The first was conducted among female healthcare workers of Federal Medical Center (FMC) Owo, Ondo state, which reported 94% of awareness of breast self-examination. The second by Yakubu et al was conducted among female nurses employed at AKTH. They reported that all the nurses (100%) were aware of BSE[22], [23].

Five other studies were conducted among female undergraduate students across Nigeria. Sambo et al conducted their study conducted among undergraduate female students of Ahmadu Bello University (ABU) Zaria, Kaduna state Nigeria. They reported 74% of the respondents being aware of BSE. Ighodaro and Akhigbe conducted their study among female nursing students in University of Benin Teaching Hospital (UBTH), Edo state. They reported 75% of participants having knowledge of BSE, 45% of them reported receiving formal training on BSE. The authors also reported that the knowledge of BSE was associated with respondent's age, level of study and presence of a health care worker in the family[27], [28]. Akpanekpo's study among female undergraduate students of University of Uyo, Akwa-Ibom state and reported that 78% of respondents were knowledgeable about BSE. Agu et al reported that among undergraduate female students of University of Nigeria Nsukka, Enugu Nigeria, 88% of the respondents knew about BSE. Salawu and Akindiya conducted their study among undergraduate female students of Adeleke University Ede, Osun state and they reported that 89% of study participants were aware of BSE[16], [29], [30].

Yakubu et al reported that 14% of study respondents were aware that BSE should be performed around the fifth day of the menstrual cycle, Omoyeni et al reported that 19% of study respondents observed BSE a

week after menstrual period, Salawu reported 43% of respondents practiced BSE a week after menstruating while Akpanekpo reported 22% of study participants practiced BSE within 5 days after menstruation[8], [23], [29], [30].

None of the study respondents in Yakubu et al's could provide an accurate description of how BSE is done, Kayoed and Akande reported that 42% of study respondents knew the correct procedure for BSE, Agbo et al reported only 17% of study respondents knew how BSE was performed. Omoyeni et al reported that half of respondents (47%) used the pads of their fingers in conducting BSE, 20% used the "vertical strip pattern", 16% employed the "wedge pattern" and 28% used the "circular pattern" [8], [10], [23], [26].

Yakubu et al reported that most of their study respondents (69%) were aware of the correct purpose of doing BSE, while Kayode and Akande reported that half of the respondents in their study (56%) did not agree that BSE is useful in detecting breast swellings[10], [23]. Three studies were found to have reported an "association between BSE and level of education" Balogun and Owoaje ($p=0.045$), Obaji et al ($p=0.001$) and Sani et al ($p<0.001$)[7], [15], [21]. Bellgam et al reported that no respondent without formal education in their study had heard of or practiced BSE[24].

Practice of Breast Self-Examination

Practice of BSE among reviewed studies ranged from 0.4% among market women to 94% among female nursing students [7], [28], the average practice of BSE was 40% across the studies included in this scoping review.

Agbo et al reported the practice of BSE among 16% of respondents in their study among female college students, Balogun and Owoaje reported practice of 18% among female traders[21], [31]. Obaji et al reported practice among 22% of market women in Abakaliki, Akpanekpo reported 23% of female undergraduate students in University of Uyo performed BSE regularly, while Agu and Ede reported 27% of female undergraduate students in Enugu practiced BSE[7], [16], [30]. Adegbenro et al reported 29% rural women in south-west Nigeria practiced BSE, Bellgam et al reported 29% of respondents practiced BSE[24], [25].

Kayode et al reported 55% of female secondary school teachers in Ilorin practiced BSE, likewise Sambo et al reported 55% of female undergraduate students of ABU Zaria practiced BSE. Sani et al reported that 65% of respondents in Sokoto practiced BSE[10], [15], [27]. Omoyeni et al reported 69% of female cleaners in OAU Ile-Ife practiced BSE. Oluwole reported 80% of female healthcare workers of FMC Owo practiced BSE. Salawu reported 88% of female undergraduate students had practiced BSE before[8], [22], [29]. Yakubu et al reported 91% of female nurses in Kano practiced BSE, while Ighodaro and Akhigbe reported 69% of female nursing students in UBTH practiced BSE[23], [28].

The least reported practice of monthly BSE was 0.4% of respondents in Obaji et al's study among market women[7]. Bellgam and Omoyeni reported 10% and 17% of study participants respectively performed BSE monthly[8], [24]. Akpanekpo, Sambo et al and Agu et al reported monthly BSE among study participants of 23%, 25% and 27% respectively[16], [27], [30]. Salawu and Akindiya reported monthly BSE of 35%, while Yakubu et al reported 44% of study respondents practiced monthly BSE. The highest reported was 50% of study respondents practicing monthly BSE by Oluwole[22], [23], [29]. The average reported monthly practice of BSE in the included studies that reported on monthly practice of BSE is thus 26%.

Ighodaro and Akhigbe reported a “significant association between age, level of study, knowledge of breast cancer and screening methods with the practice of BSE”. Sani et al also reported a “significant relationship between the educational level of respondents and the frequency of practice of BSE” [15], [28]. However, Yakubu et al reported that knowledge of BSE did not correlate with practice or effective performance of BSE. Agbo et al also concluded that knowledge of BSE did not translate to practice of BSE[23], [31].

Discussion

This review was undertaken with the aim of exploring the available evidence on the knowledge and practice of BSE among women in Nigeria. This scoping review identified 15 studies that were conducted across five of the six geographical regions of Nigeria. The south-western region of Nigeria had the highest number of studies conducted, while the north-eastern region of Nigeria was not found to have any studies conducted on the subject matter. The studies reviewed were mostly conducted among female university students and female health care workers, with a few others conducted among female market traders. The average knowledge across the included studies was found to be 67%, while the average practice of BSE among the reviewed studies was found to be 40%. However, the average practice of monthly BSE among those studies that represented evidence on monthly BSE was 26%.

The knowledge of BSE was reported to be higher among female health workers and female nursing students, one study reported knowledge of 100% among female nurses. This may be because they are exposed to lectures and seminars concerning breast cancer and BSE during their classroom activities, or they may encounter such discussions during clinical activities like ward rounds. Yakubu et al also reported that nurses on the surgical wards were more likely to know about BSE, this may be because they manage patients with breast cancer and other breast diseases when they are admitted into surgical wards. The knowledge of BSE among female health care workers in Nigeria was found to be higher than the 63% reported among female health workers surveyed across multiple health centres in Tehran[23], [32].

Five of the studies reviewed were conducted among female university students, all of them reported high knowledge of BSE which ranged from 74% to 89%. This is comparable to a study conducted among final year medical students in Sudan, which reported knowledge of BSE among 86% of study respondents[33]. The high rates of knowledge of BSE among female undergraduate students may be because they encounter them in lectures, seminars, public health campaigns or from their friends on campus.

Kayode and Akande conducted their study among female secondary school teachers in north-central Nigeria. They reported a high knowledge of BSE, 96% of study participants were aware of BSE. This is in contrast to a study among female teachers in Saudi Arabia where 43% of study respondents knew of BSE as a screening tool for breast cancer. There may be some other socio-cultural factors at play that may have an influence on breast screening practices among women in these two countries accounting for such a large difference among similar population group (female school teachers)[10], [34]. The average knowledge of BSE across the studies included in this review is 67%, this is much higher than a national survey among Saudi Arabian women, which reported the knowledge of BSE to be good among 37% of respondents[35].

The studies that reported higher rates of BSE practice were done among female healthcare workers and female nursing students. This is probably because they knew more about the benefits of BSE in the early detection and management of breast masses, also having a higher level of education provides women with the opportunity to become aware of their health and to access health information that may be relevant to

them[3], [15], [24]. There was no clear change in trend of knowledge or practice of BSE over the years as BSE was found to be more associated with level of education.

The average rate of practice of BSE across the studies included in this review is 40%, which is almost twice the reported rate (21%) in a national survey among Saudi Arabian women[35]. Kayode and Akande reported that 55% of female secondary school teachers practiced BSE which is higher than the 32% reported in a study among female teachers in Saudi Arabia[10], [34].

Sambo et al reported 55% of respondents among female university students practiced BSE, similar to the findings of a study among female university students in Malaysia that reported more than half (55%) of study participants practiced BSE. However, the practice of BSE was reported to be 27% in one study among female university students in Korea. Another study among female university students in Cameroon reported also lower rates of practice of BSE, 41% of study respondents had practiced BSE before[27], [36]–[38]. The lower rates may be because the students surveyed were not enrolled in health-related courses and so had little knowledge of the importance of BSE.

Some articles included in this scoping review reported reasons for low rates of BSE to include inadequate knowledge of and information on the procedure to conduct BSE, not having time to conduct BSE or forgetfulness, some said BSE was an embarrassing or uncomfortable procedure while others did not feel comfortable touching their breasts, others had a dislike to touch their own breasts, while some thought it was not necessary to do BSE and some said they were afraid of finding a lump[15], [39].

The reported prevalence of monthly BSE was low among respondents surveyed in studies included in this review with an average of 26% across the studies that reported on monthly BSE practice. This is higher than the 3% reported by Nde et al among undergraduate female students in Cameroon, 2.6% among study respondents in Egypt and 6% among female healthcare workers in Tehran[32], [38]. Our study also reported higher practice of monthly BSE than 1.3% in another study in Egypt, 3% - 22.7% in the United Arab Emirates (UAE), 17.4% in Yemen and 36.7% - 55.4% in Malaysia[40]. A few other studies reported higher rates of regular practice of BSE, one study in Malaysia reported 47% of respondents performed BSE monthly, another study in Thailand reported 33% of respondents practiced regular BSE[41], [42].

The predictors of the practice of BSE varied between studies, with the most commonly associated factors being educational status and knowledge of breast cancer[3], [15], [24], [25]. This is probably because women with a higher level of education are more likely to pay more attention to their health and well-being and to educate themselves about health conditions that they may be at risk of developing. However, a few other studies concluded that there was “no significant relationship between educational level and knowledge of BSE” [43], [44], this is probably because they were conducted among populations where most of the women are educated and there maybe some other socio-cultural factors or beliefs that influenced their attitude towards BSE. Some other factors found to have been associated with the practice of BSE include “age, religion, marital status, presence of a health professional in the family and knowledge of breast cancer screening methods” [25], [28].

It is worthy to note that not all respondents who were aware of BSE knew its purpose (for early detection of breast lumps) and fewer still knew of the proper timing, frequency and procedure to conducting BSE all of which are important for BSE to be effective. Similarly not all of the studies included in this scoping review reported on the knowledge in terms of the proper timing, procedure and frequency of BSE. No studies were found to have been conducted on the knowledge and practice of BSE among women in the

six states that make up the north-eastern region of Nigeria. Few studies were conducted among women in rural settlements. Most articles included in this scoping review were conducted in urban centres, among health care workers and female university students, this might have contributed to the higher levels of knowledge and practice of BSE among Nigerian women compared to other developing countries.

Implications for research and practice

BSE is one of the screening methods for early detection of breast lumps, although CBE and mammography are preferred they usually involve a trip to the healthcare facility which may be far away for rural dwellers. This study's findings showed that very few participants knew the purpose of BSE as a form of screening method for the early detection of breast abnormalities and most respondents did not know the proper procedure for conducting BSE. Therefore public awareness should be created with the aim of educating women on the proper knowledge and practice of BSE which will positively contribute to detecting of breast cancer early and promptly instituting proper treatment, thereby reducing its associated morbidity and mortality.

This study also found no studies had been conducted to evaluate the knowledge and practice of BSE in the entire north-eastern region of Nigeria which consists of six states. Also, most of the studies included in the review were conducted within urban settings, leaving out the rural settings. Hence, this should stimulate more research in these areas to give a better understanding of the knowledge and practice of BSE in Nigeria.

Strengths and limitations

This scoping review is probably the first to evaluate the available research on the knowledge and practice of BSE among women in Nigeria. This scoping review was able to identify some gaps in the existing literature and highlight some areas for possible future research. The methodology allowed the identification of eligible articles in a methodical manner.

However, this review is not without its limitations. Literature search was only performed on four databases, it is possible for other eligible studies to be found on other databases. There may also be other factors contributing to the knowledge and practice of BSE that were not identified in this study. Furthermore, the studies reviewed were mostly conducted within urban settings, the results may be different if more rural women and women with no formal education were surveyed.

2. Conclusion

This review was conducted to assess the available evidence on the knowledge and practice of BSE among women in Nigeria, eligible articles were included in this study after a database search, which was followed by data extraction and the results presented in this study. The knowledge of BSE among respondents in the studies included in this review was 67% on average, although the value was much higher among certain groups like female nurses and nursing students. Overall the practice of BSE was low among women in Nigeria with an average of 40% among respondents in the studies reviewed. There were some factors reported to have a positive effect on the knowledge and practice of BSE, notable among them is the level of education.

Considering the constraints in health facilities across Nigeria, health care workers should educate women on the benefits of BSE. The adoption of BSE among women in Nigeria will help to improve the early

detection of breast lumps that will promote early diagnosis and prompt treatment of breast cancer, thereby reducing breast cancer morbidity and mortality among women in Nigeria.

In view of this scoping review findings, the following recommendations are made for future research, practice and policy:

1. Healthcare workers should develop educational programs that will be aimed at increasing the knowledge of breast cancer and the benefits of BSE among women across Nigeria.
2. Health programmes can be organized with the aim of teaching women how to check their breasts regularly and to seek early treatment for any abnormal changes, social media platforms can be used to publicise such programmes.
3. Doctors and nurses should be encouraged to educate their patients on the proper procedure of BSE and they should report for further medical evaluation if any abnormal lumps or swellings are found.
4. Other screening modalities of breast cancer such as mammography should be provided by the federal and state ministries of health at secondary and tertiary health care centres inline with the NCCP for proper evaluation of women who may have identified any breast lumps during BSE.
5. The NCCP should be reviewed by the federal ministry of health (FMoH) to include BSE as a screening modality for breast cancer, as it has been shown to promote early detection of breast cancer.
6. Future studies should be conducted by researchers to address some of the gaps identified in this study, more studies should be conducted in the north-eastern region of Nigeria and in the rural areas.
7. Interventional studies can be conducted by researchers to identify the factors influencing BSE and adopt approaches to improving BSE among women in Nigeria.
8. A systematic review may be conducted by researchers with a view to assessing the impact of BSE knowledge and practice on breast cancer prevention.

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Availability of data and materials

The data used in this study are available through the detailed reference list.

Ethics approval and consent to participate

Not applicable.

Competing Interests

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