



Use of Videos to Support Breast Self-Examination Knowledge and Skills: A Systematic Review

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Abstract

Breast cancer is the second most common cancer in women, and self-examination is the first-line intervention for the early detection of breast anomalies. Innovative educational tools and methods beyond the traditional face-to-face demonstration style are required to improve the effectiveness of the breast self-examination intervention. This study explored the type, source, and effectiveness of using BSE-related videos for improving BSE knowledge and skills. The PSALAR framework formed the foundation upon which the PICO framework was used to generate the search strategy. PubMed, MEDLINE, Scopus, CINAHL, EBSCO essentials, and Google Scholar were searched electronically. Using the PRISMA framework, eight studies that met the inclusion criteria were examined. The CASP checklist was used for quality assessment of the studies and relevant data were extracted with the JBI data extraction form. The two types of BSE videos deployed to support BSE were standalone instructional and Smartphone-based BSE videos and instructional videos were mostly used (87.5%). Individuals and healthcare organisations were identified as the sources of the BSE videos and individual sources were the origin of a majority of the BSE videos (62.5%). Exposing individuals or trainees to BSE videos significantly improved their BSE knowledge for three months after training ($p = <0.05$). Exposing individuals or trainees to BSE videos significantly improved their BSE skills for one year after training ($p = <0.05$). BSE videos are effective in improving BSE knowledge and skills when used to support BSE. Given that the major limitation of this study is that it included only eight studies due to a paucity of related studies and none of them was conducted in the United Kingdom, more elaborate studies on this subject are recommended.

Keywords: BSE Videos; Knowledge; Skills; Women

Introduction

Breast cancer remains one of the most prevalent forms of cancer affecting millions of women worldwide. According to the World Health Organization (WHO), breast cancer is the most frequent cancer among women, impacting over 2 million women every year, and also leads to the largest number of cancer-related deaths among women [1]. In this backdrop, early detection is crucial as it allows for more effective and less aggressive treatment options.

Breast Self-Examination (BSE) has long been considered a significant self-screening tool for early detection of breast anomalies.

The American Cancer Society highlights that while BSE is not a substitute for regular mammograms and clinical breast exams, it is a useful and essential tool, especially for women in regions where clinical screenings might be less accessible [2].

Despite its benefits, several studies have shown that the frequency and accuracy of BSE among women remain suboptimal due to various reasons, such as lack of knowledge, fear, and cultural beliefs [3]. Educational interventions have been seen as a potent weapon in addressing these issues.

The dawn of the digital age has led to the increasing use of videos as an educational medium. Videos, with their audio-visual appeal, are known to foster better retention and understanding of the subject matter as opposed to traditional text-based teaching methods [4]. Several health disciplines have explored the use of video aids to improve patient education and skill acquisition, showing promising results [5].

However, while there have been isolated studies on the effectiveness of videos in supporting BSE knowledge and skill acquisition, there lacks a comprehensive review of the available literature. This systematic review aims to fill that gap by assessing the current state of research on the use of videos to support BSE knowledge and skills.

Research Methodology Methodological perspective

The methodological standpoints that support the choice of methods applied in this study include hierarchy of evidence, Structured Literature Review (SLR) and Systematic review. The hierarchy of evidence is presented in figure 1.

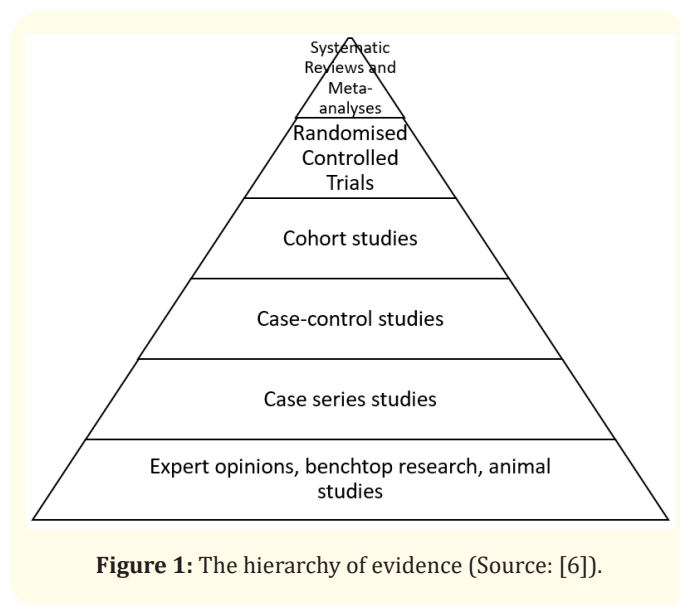


Figure 1: The hierarchy of evidence (Source: [6]).

The study identifies knowledge from previous studies through standardised guidelines involving systematic search, filtering, appraisal, interpreting, synthesizing and reporting. The standard approach consists of six main steps and is abbreviated as PSALSAR. The steps are as follows:

- Protocol - define the research scope,
- Search - define the searching string and types of databases,
- Appraisal - define literature inclusion/exclusion and quality assessment criteria,
- Synthesis - extract and categorize the data,
- Analysis - narrate the result and finally reach a conclusion, and
- Reporting results - stating the procedure followed and communicating the result to the public.

This study combined data from multiple previously published studies on the use of videos to support BSE towards a conclusion. The PSALSAR framework was suited for use in this systematic review. The PSALSAR ensured minimal error and produces accurate information for conclusions that might improve public health decision-making. The Protocol (P) phase in this study corresponded to the establishment of the systematic review’s scope, which was set using the PICO framework for generating a research topic. In the Search (S) phase, a search string with Boolean operator functions following pre-defined inclusion criteria was used. The appraisal (A) is the process of selecting research for inclusion based on quality criteria. The Critical Appraisal Skills Programme (CASP) qualitative/quantitative research checklist was used. Synthesis (S) was data extraction utilising the Joanna Briggs Institute (JBI) data extraction sheet followed by data categorization. The analysis (A) phase entailed determining trends and gaps by comparing results between published studies. During the reporting (R) phase, the methods used in the systematic review were summarised using the PRISMA framework for scientific consumption. PRISMA is an abbreviation for the Preferred Reporting Items of Systematic Reviews and Meta-Analyses.

Search strategy

In this systematic review, the PICO framework was used at the Protocol phase of the PSALAR framework to set the study scope

by developing a research question stated as thus: “Among women (P), what is the effect of BSE-related videos (I) compared to no BSE-related videos (C) on BSE knowledge and skills (O)”. PICO is an acronym for Population (P), Intervention (I), Comparison (C), and Outcome (O).

Following the formulation of a good research question, the search strategy was articulated and it coincides with the S (Search) in PSALAR. To ensure an evidence-based literature search, an appropriate research database was chosen first. PubMed, MEDLINE, Scopus, CINAHL, and EBSCO essentials are the frequently explored general databases for clinical research literature. In this study, PubMed was chosen as the database to start with. The key concepts in the PICO formulated research problem were identified as Women, Breast Self-Examination videos, Knowledge, and Skills. The generation of keywords was followed by the creation of a word list based on the identified keywords. In this systematic review, the word list was generated as follows:

- Women, females, girls, ladies, mothers (for Population);
- BSE videos, BSE movies, BSE Films (for Intervention);
- BSE knowledge, BSE understanding, BSE comprehension, BSE mastery, BSE expertise, BSE proficiency, BSE awareness, BSE skills (for Outcome).

The keywords were linked using the “OR” operator for words under Population (Women OR females OR girls OR ladies OR mothers), intervention (BSE videos OR BSE movies OR BSE Films) and Outcome (BSE knowledge OR BSE understanding OR BSE comprehension OR BSE mastery OR BSE expertise OR BSE proficiency OR BSE awareness OR BSE skills). Then the search term clusters were linked using the “AND” operator as follows: (Women OR females OR girls OR ladies OR mothers) AND (BSE videos OR BSE movies OR BSE Films) AND (BSE knowledge OR BSE understanding OR BSE comprehension OR BSE mastery OR BSE expertise OR BSE proficiency OR BSE awareness OR BSE skills). The use of Boolean operators is presented in table 1.

The search strategy was limited to English language article. Although this increases the risk of language bias, this was done because the researcher can only read and communicate in proficiently in the English language. The search strategy was limited to articles published within the past ten (10) years. The original PubMed search string was translated to enable search in MEDLINE, Scopus, CINAHL, EBSCO essentials, and Google Scholar.

Steps	Details
Protocol (Search question)	Among women, what is the effect of BSE-related videos compared to no BSE-related videos on BSE knowledge and skills. Population: Women Intervention: BSE videos Comparison: No BSE videos Outcome: BSE knowledge and skills
Selected database to start	PubMed/MEDLINE
Key concepts	Women, BSE videos, knowledge, skills
Word list	Population: Women, females, girls, ladies, mothers Intervention: BSE videos, BSE movies, BSE Films Outcome: BSE knowledge, BSE understanding, BSE comprehension, BSE mastery, BSE expertise, BSE proficiency, BSE awareness, BSE skills
Linking of search terms	Inserting Boolean operator “OR” Population: (Women OR females OR girls OR ladies OR mothers) Intervention: (BSE videos OR BSE movies OR BSE Films) Outcome: (BSE knowledge OR BSE understanding OR BSE comprehension OR BSE mastery OR BSE expertise OR BSE proficiency OR BSE awareness OR BSE skills) Inserting Boolean operator “AND” (Women OR females OR girls OR ladies OR mothers) AND (BSE videos OR BSE movies OR BSE Films) AND (BSE knowledge OR BSE understanding OR BSE comprehension OR BSE mastery OR BSE expertise OR BSE proficiency OR BSE awareness OR BSE skills)
Optimizing the search	Limiters: English language articles, Articles published within the past 10 years (2012-2022)
Translation to other databases	MEDLINE, Scopus, CINAHL, EBSCO essentials, and Google Scholar

Table 1: Development of the search strategy for PubMed/MEDLINE.

Inclusion and exclusion criteria

The criteria presented in this study were developed using the same PICO framework that was used to generate the search strategy. Concerning the Population for the study (P), studies involving females who are older than 17 years old were eligible for inclusion. Concerning intervention (I), studies involving BSE-related videos were eligible for inclusion. Concerning comparison (C), studies that non-BSE-related videos as control were eligible for inclusion. Concerning outcome (O), studies that assessed BSE knowledge and skill were eligible for inclusion. Generally, Peer-reviewed quantitative, qualitative, and mixed studies were eligible for inclusion. This was because peer-reviewed articles are subjected to scientific critiquing by experts and it would give validity and credibility to this systematic review. Only English language articles were eligible for inclusion. Furthermore, the date range 2012 to 2022 was considered because the researcher only needed current information, despite the fact that BSE have existed since the beginning of the twentieth century. The inclusion and exclusion criteria are presented in table 2.

Inclusion Criteria	Exclusion Criteria
Females > 17 years of age	Females < 18 years of age, males
BSE-related videos	Videos not related to BSE
BSE knowledge and skills	Attitude and perception
Peer-reviewed, Quantitative, English language article, published between 2012-2022	Grey literature, Systematic Reviews and Meta-analyses, non-English language article, published before 2012

Table 2: Inclusion/Exclusion Criteria.

Quality assessment

The Critical Evaluation Skills Programme (CASP) Checklist [7] was utilised in assessing the quality of the retrieved research. The 10-item CASP Checklist was chosen because it has been endorsed by the Cochrane group and is simple to use.

Data extraction

Data were extracted independently from relevant studies and populate a customized data extraction form with information pertaining to the study population, intervention, comparison, and interest. The extracted articles were double-checked and verified. The author’s name and year of publication, the data collection period, and the country in which the study was conducted were also extracted. The specific study details, such as the study design, study population, sample size, sampling techniques, and data collection procedures, were recorded. The findings of eligible studies were also identified.

Results

Electronic database search

A total of 5,316 potentially relevant articles were retrieved (PubMed = 9, MEDLINE = 6, Scopus = 3, CINAHL = 2, EBSCO essentials = 1,728, Google Scholar = 3,570). At the identification stage 5,259 articles were removed on the basis of title relevance, hence 57 articles were identified as relevant. The removed articles did not address the main concepts of the search string in their titles. Among the relevance 57 articles, duplication was observed and removed. A total of 32 duplicate articles were removed, and 25 articles were left. Furthermore, the remaining articles’ abstracts were screened for methodology. A total of 14 systematic reviews were removed and 11 articles were left for eligibility check. During eligibility check, the inclusion and exclusion criteria were considered with respect to the article content. A total of 3 articles were excluded on the basis of age of participants (less than 18 years old) and design (systematic review design). The remaining 8 eligible full-text articles were included in the study. The selection and selection process utilized in this systematic review is illustrated in figure 2.

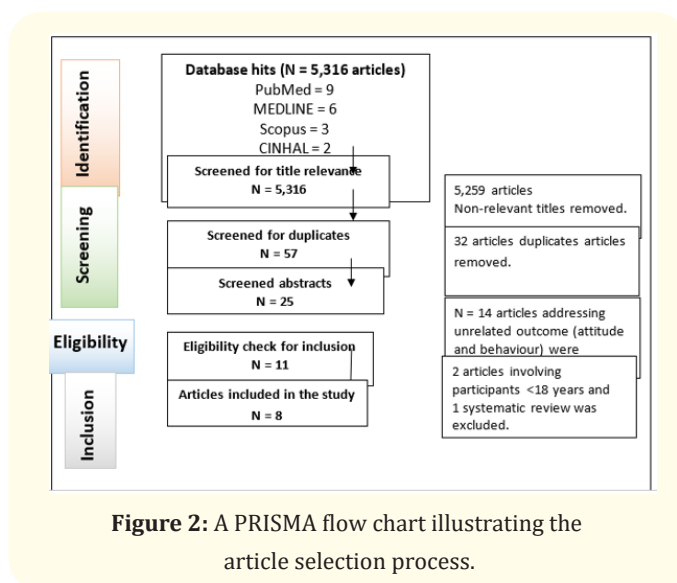


Figure 2: A PRISMA flow chart illustrating the article selection process.

Excluded studies

Out of 11 full-text articles that were checked for eligibility, 3 were excluded. The reasons for the exclusion of the three articles were the following: (a) 2 of the articles involved study participants who were aged 15-22 years. Based on the exclusion criterion that excludes studies involving persons younger than 18 years, the 2 studies did not meet the requirements for inclusion in this systematic review. (b) 1 of the articles utilized a systematic review design. This systematic review requires mainly primary studies, hence excluded the systematic review on that basis.

Characteristics of the included studies

A total of 8 articles met the inclusion criteria and were found eligible for inclusion in the evidence synthesis of this study. The citation details of the included articles are presented in table 3.

Serial	Reference
1	Parvathi, U., & Mathew, R. (2019). A study to assess the effectiveness of video assisted teaching programme on knowledge regarding Breast Self-Examination among adult women in selected hospital in Bangalore. <i>Indian Journal of Public Health Research & Development</i> , 10(12), 256–260.
2	Kang, S., Shin, H., Lee, J., & Kim, S. (2020). Effects of smartphone application education combined with hands-on practice in breast self-examination on junior nursing students in South Korea. <i>Japan Journal of Nursing Science</i> , 17(3), e12318.
3	Olii, N., & Abdul, N. (2021). The influence of booklets and videos on the ability to practice Breast Self-Examination in students of high school 4 Gorontalo. <i>Indian Journal of Forensic Medicine & Toxicology</i> , 15(2), 3096–3101.
4	Apoorva, D., Kishore, G., & Khodadadi, F. (2021) Health beliefs related to breast cancer and Breast Self-Examination among Indian women: Effect of educational program. <i>Indian Journal of Forensic Medicine & Toxicology</i> , 15(4), 738–744.
5	Koçak, A.M., & İldan, Ç. S. (2022). Breast self-examination training video with the sign language for deaf women: An interventional study. <i>European Journal of Cancer Care (Engl)</i> , 31(1), e13543.
6	Tomar, G. (2019). Effectiveness of video assisted teaching module regarding knowledge of breast self-examination among girls. <i>International Journal of Nursing Education</i> , 11(3), 36-38.
7	Kissal, A. & Kartal, B. (2019). Effects of health belief model-based education on health beliefs and breast self-examination in nursing students. <i>Asia-Pacific Journal of Oncology Nursing</i> , 6(4), 403-410.
8	Khiyali, Z., Aliyan, F., Kashfi, S.H., Mansourian, M., & Khani, J.A. (2017) Educational intervention on breast self-examination behavior in women referred to health centers: Application of health belief model. <i>Asian Pacific Journal of Cancer Prevention</i> , 18(10), 2833-2838.

Table 3: Citation details of included studies.

Overview of the included studies

The 8 included articles were quantitative studies. Three were conducted in India [8-10], and one was conducted in each of South Korea [11] and Indonesia [12]. Two were conducted in Turkey [13, 14] and one was conducted in Iran [15]. Four out of the eight studies examined the effect of educational interventions involving BSE-related videos on BSE knowledge [8-10,15]. Another three studies examined the effect of educational interventions involving BSE-related videos on BSE Skills [12-14]. One study examined the effect

of BSE-related videos on both BSE Knowledge and BSE skill [11]. Five of the studies utilized the single group pretest posttest quasi-experimental design [8-10,12,13], one study utilized the post-test quasi-experimental design with control [13], and two studies applied the pretest, post-test quasi-experimental design with control [11,15].

Across the studies, the sample size of participants was between 30 and 500. Five of the studies applied non-probability sampling techniques such as purposive and convenience in the selection of participants [8-10,12,14]. The other three studies utilized probability sampling technique (simple random) for the selection of participants [11,13,15]. Similarities were observed across the studies as all eight studies involved study participants older than 17 years.

Kissal and Kartal [14] agree that BSE knowledge should be measured using a self-report questionnaire and BSE skill should be measured using a checklist. In line with the forementioned, the studies collected data from participants utilizing self-report questionnaires for BSE knowledge [8,10,11] and assessor-report checklists for BSE skill [12,13]. Additionally, Mishra, *et al.* [16] noted that comparison between two or more sets of data for the purpose of drawing conclusions can only use inferential statistics such as t-test, Chi square, Analysis of variance (ANOVA) among others. All eight studies utilized inferential statistics such as the paired t-test and Chi square/Fisher exact test for ratio and categorical measures respectively. A summary of the characteristics of the included articles is presented in table 4.

Quality assessment of the included studies

Quality assessment of the included studies was done using the CASP checklist (CASP acronym for the Critical Appraisal Skill Programme). Depending on how well each of the included studies addressed the items in the CASP checklist, a numerical grade was awarded. All eight articles included in this study scored above 16 and depicted acceptable quality. The CASP quality assessment is presented in table 5.

Characteristics of the included studies' participants

A total of 946 participants were examined in the included articles. The minimum age of the study participants is 18 years. In two of the studies, the majority of the study participants were married and had at least a high school diploma [10,13]. Moreover, participants' educational and marital statuses were not reported in three of the included studies [8,11,12]. The majority of the study participants had family history of breast cancer in one study [11], while the majority of the study participants had no family history of breast cancer two other studies [13,15]. A summary of the participants' demographic characteristics is presented in table 6.

Author, title, country	Aim	Design	Sample	Data collection, instrument, and data analysis method
Parvathi and Mathew [8] A study to assess the effectiveness of video assisted teaching programme on knowledge regarding Breast Self-Examination among adult women in selected hospital in Bangalore, India	To examine the effect of education intervention on BSE Knowledge	Single group Pre-test post-test design	Sample size: 30. Age: > 17 years. Sampling method: Purposive Treatment: The participants watched an instructional BSE video Follow up: Not specified	Data collection: Self-report Instrument: BSE knowledge questionnaire Data analysis method: Paired t-test
Kang, <i>et al.</i> [11] Effects of smartphone application education combined with hands-on practice in breast self-examination on junior nursing students. South Korea	To compare the effects of different educational methods on BSE knowledge and skills.	Pre-test post-test quasi-experiment	Sample size: 86. Age: 20-22 years. Sampling method: Random Treatment: Group A (n = 26) received Smartphone-based video education and Group B (n = 32) received smartphone-based video education combined with hands-on practice, and the control group (Group C, n = 28) received a one-time classroom lecture. Follow up: 2 weeks	Data collection: Self-report and assessor-report Instrument: Knowledge of BSE questionnaire and Skills of BSE Checklist Data analysis method: Chi square and Fisher exact test
Olii and Abdul [12] The Influence of Booklets and Videos on the Ability to Practice Breast Self-Examination in Students of High School 4 Gorontalo. Indonesia	To determine the effect of booklets and videos on the ability to practice breast self-examination on students at High school	Single group Pre-test post-test quasi-experimental	Sample size: 60. Age: >17 years. Sampling method: Purposive Treatment: Group A (n = 30) read BSE booklet 30mins daily for 5 days. Group B (n = 30) watched BSE video education Follow up: Not specified	Data collection: Assessor-report Instrument: Skills of BSE Checklist Data analysis method: Paired t-test
Apoorva, <i>et al.</i> [10] Health beliefs related to breast cancer and breast self-examination among Indian women: effect of educational program. India	To examine the effect of education intervention on BSE Knowledge	Single group Pre-test post-test	Sample size: 500. Age: > 17 to 65 years. Sampling method: Convenience Treatment: The participants watched an instructional BSE video Follow up: 3 months	Data collection: Self-report Instrument: BSE knowledge questionnaire Data analysis method: Chi square

<p>Koçak and İldan [13]</p> <p>Breast self-examination training video with the sign language for deaf women: An interventional study.</p> <p>Turkey</p>	<p>To examine the effect of a video prepared with the sign language giving breast self-examination (BSE) skills to deaf women</p>	<p>Post-test quasi-experiment</p>	<p>Sample size: 60.</p> <p>Age: >17 years.</p> <p>Sampling method: Random</p> <p>Treatment:</p> <p>Group A (n = 30) watched a BSE training video with sign language. Group B (n = 30) watched a BSE training video without sign language.</p> <p>Follow up: Not specified</p>	<p>Data collection: Assessor-report</p> <p>Instrument: BSE Skill Assessment Form</p> <p>Data analysis method: Chi square and Fisher exact test</p>
<p>Tomar [9]</p> <p>Effectiveness of video assisted teaching module regarding knowledge of breast self-examination among girls.</p> <p>India</p>	<p>To examine the effect of a BSE-related video on BSE knowledge</p>	<p>Single group Pre-test post-test</p>	<p>Sample size: 70 First year nursing students</p> <p>Age: >17 years.</p> <p>Sampling method: Convenience</p> <p>Treatment: Participants watched a BSE training video</p> <p>Follow up: 7 days</p>	<p>Data collection: self-report</p> <p>Instrument: BSE Knowledge questionnaire</p> <p>Data analysis method: Paired t test</p>
<p>Kissal and Kartal [14]</p> <p>Effects of health belief model-based education on health beliefs and breast self-examination in nursing students.</p> <p>Turkey</p>	<p>To examine the effect of a BSE video on BSE skills of nursing students</p>	<p>Single group pre-test Post-test</p>	<p>Sample size: 48.</p> <p>Age: >17 years.</p> <p>Sampling method: Convenience</p> <p>Treatment: Participants watched a BSE training video (the English version of Bristol-Myers Squibb oncology video)</p> <p>Follow up: 1 year</p>	<p>Data collection: Assessor-report</p> <p>Instrument: BSE Proficiency Rating Instrument (BPRI)</p> <p>Data analysis method: Paired t test, ANOVA</p>
<p>Khiyali., et al. [15]</p> <p>Educational intervention on breast self-examination behavior in women referred to health centers: Application of health belief model.</p> <p>Iran</p>	<p>To examine the effect of a BSE-related video on BSE knowledge among women</p>	<p>Pre-test post-test quasi-experiment with control</p>	<p>Sample size: 92.</p> <p>Age: >17 years.</p> <p>Sampling method: Random</p> <p>Treatment:</p> <p>Group A (n = 46) watched a BSE training video. Control Group (n = 46) had no intervention.</p> <p>Follow up: Not specified</p>	<p>Data collection: Self-report</p> <p>Instrument: BSE Knowledge Questionnaire</p> <p>Data analysis method: Paired t test</p>

Table 4: Characteristics of the included studies.

Serial	CASP item	Parvathi and Mathew [8]	Kanget al. [11]	Olii and Abdul [12]	Apoorva., et al. [10]	Koçak and İldan [13]	Tomar [9]	Kissal and Kartal [14]	Khiyali., et al. [15]
1	Was there a clear statement of the aims of the research?	2	2	2	2	2	2	2	2

2	Is the methodology appropriate?	2	2	2	1	1	1	2	2
3	Was the research design appropriate to address the aims of the research?	1	2	1	2	1	2	1	2
4	Was the recruitment strategy appropriate to the aims of the research?	1	2	1	1	1	1	1	1
5	Was the data collection in a way that addressed the research issue?	2	2	2	2	2	2	2	2
6	Has the relationship between researcher and participants been adequately considered?	2	1	2	2	2	2	2	2
7	Have ethical issues been taken into consideration?	2	2	2	2	2	2	2	2
8	Was the data analysis sufficiently rigorous?	1	2	1	2	2	2	2	2
9	Is there a clear statement of findings?	2	2	2	2	2	2	2	2
10	How valuable is the research?	2	2	2	2	2	2	2	2
	Sum Score (maximum = 20)	17	19	17	18	17	18	18	19

Table 5: Summary of quality assessment with the CASP checklist.

Demographic category	Parvathi and Mathew [8]	Kang., et al. [11]	Olii and Abdul [12]	Apoorva., et al. [10]	Koçak and İldan [13]	Tomar [9]	Kissal and Kartal [14]	Khiyali et al. [15]
Sample size, n	30	86	60	500	60	70	48	92
Age	>17	20-22	>17	18-65	>17	>17	>17	>17
Education, n (%)								
No formal education	*	*	*	12 (2.4)	29 (48.3)	*	*	3(3.2)
High school diploma or more	*	*	*	488 (97.6)	31 (51.7)	*	*	89(96.7)
Marital status, n (%)								
Single	*	*	*	463 (92.6)	15 (25)	*	1(2.1)	8(8.70)
Married	*	*	*	37 (7.4)	45 (75)	*	47(97.9)	84(91.3)
Family history of breast cancer, n (%)								
Absent	*	28 (32.6)	*	*	56 (93.3)	*	*	85(92.4)
Present	*	58 (67.4)	*	*	4 (6.7)	*	*	7(7.6)

Table 6: Summary of the participants' demographic characteristics.

% = percent, n = frequency, * = not stated in the study.

Data extraction

For the systematic review, seemingly relevant data were extracted from the eight included articles. The extraction was done with the aid of the Joanna Briggs Institute (JBI) data extraction tool. One data extraction sheet was utilized for holding data emanating from one study only. Three of the included studies utilized instructional BSE videos without a mention of the developer, develop-

ment process, and guidelines applied. One of the studies utilized an author-developed smartphone-based BSE video, but the guidelines applied were not mentioned. Koçak and İldan [13] utilized an author developed instructional BSE video that utilized the BSE guidelines proposed by WHO [17] and Republic of Turkey, Health Ministry General Directorate of Public Health, [18]. The key findings extracted from the studies are presented in table 7.

S/N	Author	Type of BSE video	Source of BSE video	Effect of BSE video on BSE knowledge	Effect of BSE video on BSE skill	Authors interpretation
1	Parvathi and Mathew [8]	Instructional BSE video	Developed by the authors. The established Guidelines followed were not mentioned.	Overall BSE knowledge increased (13.3% vs. 83%, mean = 8.63 vs. 15.2, t = 12.68, p = <0.001).		BSE video significantly increases BSE knowledge
2	Kang, <i>et al.</i> [11]	Smartphone based BSE video	Developed by the authors. The established Guidelines followed were not mentioned.	Knowledge of BSE (Group A 0.65 ± 0.10 vs. 0.80 ± 0.10, p = <0.01; Group B 0.66 ± 0.17 vs. 0.77 ± 0.11, p = <0.01; Group C 0.68 ± 0.12 vs. 0.70 ± 0.13, p = >0.05)	Skills in BSE (Group A 1.92 ± 0.61 vs. 2.55 ± 0.23, p = <0.05; Group B 1.92 ± 0.44 vs. 2.87 ± 0.14, p = <0.05; Group C 1.70 ± 0.55 vs. 2.23 ± 0.27, p = >0.05).	BSE video significantly increases BSE knowledge and BSE skill
3	Olii and Abdul [12]	Instructional BSE video	Source of BSE video was not mentioned		Group A (BSE skill 0.11 ± 0.08 vs. 1.49 ± 0.39, p = 0.001). Group B (BSE skill 0.07 ± 0.05 vs. 1.61 ± 0.33, p = 0.001).	BSE video significantly increases BSE skill
4	Apoorva, <i>et al.</i> [10]	Instructional BSE video	Source of BSE video was not mentioned	Overall BSE knowledge increased (38.5% vs. 83%, p = <0.001).		BSE video significantly increases BSE knowledge
5	Koçak and İldan [13]	Instructional BSE video	Prepared by the authors in line with WHO [17] and Republic of Turkey Health Ministry General Directorate of Public Health guidelines [18]	The BSE skills in Group A were significantly higher from those who watched the training video without sign language (40% vs. 0%, p = <0.001).		BSE videos combined with sign language increased BSE skills
6	Tomar [9]	Instructional BSE video	Source of BSE video was not mentioned	Pre-test vs. post-test: 7.1% vs. 95.8% had above average BSE knowledge (p < 0.001)		BSE video significantly increases BSE knowledge
7	Kissal and Kartal [14]	Instructional BSE video	BSE training video (the English version of Bristol-Myers Squibb oncology video)		BSE skill improved from 53.13 ± 16.13 at pre-test, 73.96 ± 13.17 at 6 months, and 78.75 ± 12.12 at 1 year, p = 0.001)	BSE video significantly increases BSE skill
8	Khiyali, <i>et al.</i> [15]	Instructional BSE video	Source of BSE video was not mentioned	At post-test: 3.02 ± 17.13 for experimental group vs. 3.87 ± 8.89 for control, (p = 0.001)		BSE video significantly increases BSE knowledge

Table 7: Key findings from the included studies.

Analysis and synthesis of evidence

To ensure a systematic evidence synthesis process in this systematic review, a five-stage framework proposed by Connelly and Peltzer [19] was applied. The five-stage framework involved the following: (1) read the articles, (2) re-read the articles rigorously,

(3) identify the important results (4) categorize the findings using illustrations (5) interpret the findings to draw a conclusion. The eight included article were read and re-read to familiarize and be immersed in the results and narrative content. The results relevant to this systematic review were identified and categorized as illustrated in table 8.

	[8]	[11] ^a	[12]	[10]	[13]	[9]	[14]	[15] ^a
Intervention features								
Follow up period in days	Nr	14	Nr	120	Nr	7	365	Nr
Type of BSE video	Instr	Smart	Instr	Instr	Instr	Instr	Instr	Instr
Source	Auth	Auth	Nr	Nr	Auth	Auth	Stand	Auth
Intervention outcome on BSE Knowledge	↑ ^b	↑ ^b	Nr	↑ ^b	↑ ^b	↑ ^b	Nr	↑ ^b
Intervention outcome on BSE Skill	Nr	↑ ^b	↑ ^b	Nr	Nr	Nr	↑ ^b	Nr

Table 8: Evidence synthesis table.

Nr = Not reported; Instr = Instructional video; Smart = Smartphone-based video;

Auth = Author-developed; Stand = standardized; ↑ = increase in outcome;

^a = higher level quality of evidence rated using CASP checklist; ^b = Statistically significant finding.

On types of BSE videos used to support BSE, seven out of the eight included studies (87.5%) utilized standalone instructional videos while one utilized Smartphone based videos (12.5%).

On source of the BSE videos available for supporting BSE, five out of the eight studies (62.5%) utilized author developed BSE videos and one out of eight (12.5%) utilized a standardized BSE video developed by the Bristol-Myers Squibb Foundation and available in the public domain.

On outcome of BSE video of BSE knowledge, six out of the eight included studies examined the impact of BSE video on BSE knowledge. All six (100%) studies reported statistically significant increase in BSE knowledge at 0-3 months of follow up ($p < 0.05$).

On outcome of BSE video of BSE skill, three out of the eight included studies examined the impact of BSE videos on BSE skill. All three studies (100%) reported statistically significant increases in BSE skill up to 1 year follow up period ($p < 0.05$).

Discussion

This study observed that two types of BSE videos are used to support BSE. They include standalone instructional videos and Smartphone based BSE videos. Moreover, the standalone instructional videos were more available than the smartphone-based videos (87.5% vs. 12.5%). Instructional videos are visual aids that demonstrate a process and explain a concept for knowledge and skill transfer [20].

Instructional videos create a more engaging sensory experience than using print materials alone [21]. They could be used in a classroom or training setting [22]. The six main kinds of Instructional videos are explainer videos, micro videos, training videos, video tutorials, screen-casts, and video presentations [23]. They present in different formats on hardware (compact discs and flash drives) or internet-based that is accessible to Smartphone users [24,25].

The finding of this study did not corroborate Esen., *et al.* [24] that noted that there are standalone BSE video resources and Web-based Smartphone accessible BSE-related videos. Moreover, Esen., *et al.* [24] added that there are more standalone instructional BSE videos produced by individuals rather than leading authorities available in hardware disc formats and fewer web-based Smartphone-accessible formats. The reason for the fewer web-based BSE videos from the leading authorities could be because the videos from authorities are either made for professional use or require strict permission before use [26]. It is quite unlike YouTube BSE-related videos that are designed and uploaded by non-professionals for entertainment or content creation and require no permission for use [27]. This finding underscores a need for more web-based Smartphone-accessible BSE-related videos.

The creation of instructional videos is not limited to instructional design professionals as even non-certified persons can produce instructional web-based videos [28]. This systematic review revealed that the two main sources of BSE-related videos were

individuals and healthcare organizations such as Bristol-Myers Squibb Foundation. There are more BSE-related videos prepared by individuals (62.5%) compared to those produced by healthcare organizations (12.5%) available for public use. The reason for the small number of resources from reputable healthcare organizations compared to individual sources could be the needed rigorous steps applied by reputable healthcare organizations to ensure the validity and reliability of any presented information. The thorough process could be very time-consuming [2]. This finding supports Yurdaisik [29] that found that 26% of BSE-related videos were prepared by Health organizations of unknown credibility, 20% by patients, 14% by physicians, 10% by news channels, 2% by herbalists, 2% by blogs, and 2% by non-profit healthcare organizations. Considering the vital nature of health information, this finding underscores a need for trustworthy healthcare authorities to create and upload BSE-related videos to promote the dissipation of accurate health information. Furthermore, the findings of this systematic review support Esen, *et al.* [24] that reported that the majority of BSE videos are prepared by individual sources (70.6%). This finding highlights a need for more BSE videos with accurate information to be made by universities, healthcare organizations, and health policy authorities and uploaded into public spaces.

This systematic review found that exposing individuals or trainees to BSE videos will significantly enhance their BSE knowledge sustainably for 3 months post-training. The reason for the observed impact on BSE knowledge could be that instructional videos engage the multiple senses of the learner. The learner/trainee can see and hear the concept being described and can process it in the same way as they process their day-to-day interactions [30]. This finding corroborates Yilmaz, *et al.* [31] who reported in a Turkish study that the BSE knowledge scores of women increased significantly from the pre-test to the post-test after 4 weeks of follow-up after BSE training involving videos and didactic lectures. In addition, this finding supports Ozerdogan, *et al.* [32] that an increase in BSE knowledge scores between pre-test and post-test after three weeks of BSE training. Furthermore, this finding is in line with Abasi, *et al.* [33] that reported that BSE knowledge scores increased between pre-test and post-test after 6 months of follow-up after BSE training. The similarity in findings could be related to the idea that pre-experimental or quasi-experimental designs were used in the compared studies. Pre-experiments and quasi-experiments are subject to numerous threats to internal and external validity hence an unfair chance of committing type 1 error [34]. A pure experimental design may be needed to reach a more valid conclusion.

This study found that exposing individuals or trainees to BSE videos will improve their BSE skills sustainably for up to 1year post-training. The reason for the improvement in BSE skills for

as long as 1-year post-training could be related to the fact that BSE videos demonstrate psychomotor cues alongside cognitive prompts which results in Visuomotor adaptation in the learner/trainee [35]. This finding partly supports Akarsu and Andsoy [36] that reported that exposure of women to BSE video demonstration with a hands-on approach improves BSE skills for about 3 months post-training. This finding also supports Abera, *et al.* [37] that reported a significant improvement in BSE skills from 16.4% to 70.5% ($p < 0.001$) of first-year midwifery students after 3 months of training with BSE leaflets, videos, and lectures combined. Although it was difficult to conclude in Abera, *et al.* [37] that BSE videos alone were responsible for the improvement in BSE skills, it however may have contributed. Even though the compared studies did not use a homogenous singular BSE video, their results were similar.

Strengths and limitations of the Study

Strengths

One of the main strengths of this systematic review attempts to fill a knowledge gap existing as a result of paucity of related studies. At the time of this report, very few reviews relate to the use of videos to support BSE. The study further explores the types and sources of BSE videos available which very few studies have been able to do. More so, this study employed the rigorous PRISMA guideline to ensure transparency and reproducibility. It also included only recent studies published between 2012 and 2022. It provided a synthesis of the most recent evidence. Despite the mentioned strengths, this systematic review also has some limitations.

Limitations

The major limitation of this systematic review is that due to the existing dearth of literature originating from the United Kingdom, it could not include and examine studies from the United Kingdom. Therefore, only eight studies were included due to very few available studies in the reputable databases searched. Furthermore, no study on the subject conducted in the United Kingdom was found in the databases searched. This limits the generalizability of this systematic review's findings beyond the study population. Furthermore, this systematic review only included primary studies published in English, resulting in language bias. This restriction was imposed to save time and resources required for translating studies published in other languages. Because this was a student project, the systematic review was conducted by a single reviewer, so no peer debriefing or debated consensus was reached regarding the included studies. According to Francois, *et al.* [38], evidence synthesis conducted without debated consensus is prone to judgmental errors and thus biased.

Implication for policy and practice

This systematic review is very important to reducing breast cancer. The findings of the types, sources, and impact of videos on BSE knowledge and skills will equip healthcare providers on required information for targeted application of BSE videos. Additionally, the findings support that the use of BSE videos could result in favourable outcome concerning increasing awareness/knowledge and skills among women who lack such information and resources. Currently, hospitals such as the New Cross Hospital Wolverhampton, Cannock Chase Hospital Cannock Staffordshire, and West Park Hospital Wolverhampton have a policy on teaching women about BSE with the aid of a BSE video. Hopefully, other hospitals that care for women's health would key into the initiative.

The findings of this systematic review showed that standalone instructional videos are more available than web-based BSE videos. Additionally, are available, but most of them are produced by individual sources rather than reputable Health authorities/organizations. The exposure of persons/trainees to BSE videos results in increased BSE knowledge and skills significantly.

With increasing Smartphone use and the growing internet relevance to human day-to-day activities, web-based BSE videos are bound to have more demand than standalone instructional videos. In line with this assertion, policymakers should formulate policies aimed at encouraging more production of web-based Smartphone-accessible BSE videos. Improved availability of web-based BSE video is likely to reach a wider audience, therefore will better protect the health of the public.

Considering how crucial the content of BSE videos may be to the health of the female breasts, the source of BSE videos would desirably be reputable healthcare organizations. Since non-individual sources are expected to engage in rigorous peer review processes before publishing their BSE videos, policymakers should enact policies to discourage individual sources from uploading non-peer-reviewed BSE videos.

Since trainee exposure to BSE videos has shown to increase BSE knowledge and skills, healthcare policy makers should consider incorporating BSE videos into BSE training guidelines. For effective health education related to BSE, healthcare providers should consider taking advantage of the potential of BSE videos in engaging and appealing to persons of diverse educational attainment and physically challenged (deaf).

To increase the awareness of women regarding BSE, it would be vital to recruit the women for training. During the training sessions, firstly brief them on the importance of BSE as a first line in-

tervention against breast cancer and then play the BSE videos. Furthermore, an online video URL address could be sent to the general public for a self-learned self-paced training. This way, the larger women population could be reached and trained. A course survey could be added to the post-test evaluation to enable feedback and further modification of the course to suite growing needs. Additionally, exposure of women to BSE videos should be considered for incorporation into hospital routine.

Conclusion and Recommendation

This study revealed that the two types of BSE videos deployed to support BSE were standalone instructional and Smartphone-based BSE videos. Instructional videos were used more of the time (87.5%) to support BSE. Individuals and healthcare organisations were identified as the sources of the BSE videos. Individual sources created the majority of the BSE videos. The rationale for the lesser quantity of resources from reputable healthcare organisations compared to individual sources might be the rigorous efforts that reputable healthcare organisations must take to assure the authenticity and trustworthiness of any supplied material. The findings revealed that exposing individuals or trainees to BSE videos significantly improved their BSE knowledge for 3 months after training. This study further revealed that exposing individuals or trainees to BSE videos significantly improved their BSE skills throughout one year after training. Given the importance of the content of BSE videos to the health of female breasts, the source of BSE videos should ideally be credible healthcare organizations. Furthermore, with the increased usage of Smartphones and the rising significance of the internet in daily human activities, web-based BSE videos have greater demand and applications than standalone instructional videos. More studies like this are recommended in the future when more studies conducted in Europe, the Americas, and Africa are available. There is paucity of mixed method studies on this subject matter, hence it is recommended that more mixed method studies be carried out to enable triangulation of findings for greater credibility and validity.

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