THE EFFECT OF BREAST CANCER SURGERY ON MARITAL QUALITY IN SAUDI ARABIA

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Abstract

Background: Breast cancer, accounting for 1 in every 8 cancer diagnoses, is a growing worry for women globally. In Saudi Arabia statistics have shown that BC accounts for over 30% of all recorded cancer cases. Marriage, being the only official relationship between a man and a woman in Saudi Arabia, is put to the test after the diagnosis of breast cancer, hence this systematic review is conducted, to gain knowledge and understanding on the effect of breast cancer surgery on marital quality in Saudi Arabia.

Method: This systematic review with narrative synthesis was conducted following Joanna Briggs Institute's (JBI) integrated mixed method protocol as well as the PRISMA reporting guidelines. The largest biomedical databases were searched in this review: Medline, CINHAL and Psychinfo.

Results: This review is the first of its kind in Saudi Arabia in exploring the influence of treating breast cancer with surgery on marital relationships. Five relevant articles were included (one qualitative and four quantitative). This review synthesised available evidence through narrative synthesis to put data into context and produced four core themes: (1) Women's social role in Saudi Arabia (2) Perceptions of breast cancer (3) Effects on relationship (4) Emotional reactions.

Conclusion: It has not been possible to conclude that breast cancer surgery affects marital quality in Saudi Arabia. However, it has been found that research in SA related to cultural influence on BC and BC effect on marital relationship is lacking greatly and is affecting how women in SA with BC are approached. Therefore, this review will create opportunities for future research in relation to BC effect on marital quality in SA more evidently.

Key words: Breast cancer, Saudi Arabia, Marriage, Breast cancer surgery, marital relationship

Introduction and Background

According to the World Health Organization (WHO), in Saudi Arabia, breast cancer (BC), statistics have shown that BC accounts for over 30% of all recorded cancer cases in the Kingdom of Saudi Arabia (3).

Breast cancer is the abnormal growth and division of cancerous cells in the breasts' ducts and/or lobules (2). Growth might be localized "tumour", or it could spread through blood vessels and lymph nodes to adjacent organs. This spreading process is called metastasis (3). The most common symptoms BC patients present with are changes of the size and/or shape of one or both breasts. Some patients also experience nipple irritation and/or leaking or discharge, as well as pain (4). Although aggressive, the treatment and the management of BC are highly successful with a 90% probability of survival, when detected in the early stages (5). However, due to patients' lack of knowledge and commitment to breast self-diagnosis and performing mammograms regularly, diagnosis is often made in later stages when cancerous cells have grown noticeably (4). First line of treatment of BC is surgery, either total mastectomy or partial removal of the breast known as "lumpectomy", as well as a combination of systematic therapy that is tailored based on the patient's progress and goals (6). Systematic therapy includes anti-cancer medications such as chemotherapy, hormonal therapy, and radiation therapy of affected areas (2,6). On the whole, going through breast cancer's extensive diagnostic and treatment procedures affects women's feminine identity and social role, an effect that lasts even after surviving BC (7).

To move the scene to Saudi Arabia, governments and private organizations are collaborating to increase awareness of BC and encourage women to perform self-diagnosis regularly and provide free mammogram screening for all women above 40 years old (1), yet surveys keep showing insufficient public response to free mammogram and educational classes (8,9,10). This lack of awareness affects women's decision making in relation to their health and wellbeing, making them dependent on resources or people that are not necessarily credible such as their family members, as well as their husbands (11).

When a woman suffers from BC, her whole family is affected by it, and her role as a mother, carer, wife or partner, and daughter changes (7). Therefore, many researchers have shifted their focus on how BC affects not only the patients but their relationships as well, which includes their marriage (11,12,13). Research on different populations has demonstrated that married women's experience with BC is better than single or divorced patients and is associated positively with survival and longevity (13). However, the marital relationship is affected significantly by the diagnosis of BC, causing stress and disruption of marital stability, leading to psychological problems, poor coping, lack of support, and sexual dissatisfaction among patients and their partners (14).

In Saudi Arabia, marriage is a sacred and extremely significant connection as it is the base for forming a family under the religious rules and norms of Islam (15). However, due to the cultural sensitivity related to intimate topics such as the marital relationship, intimacy, and sexual relations, the effect of BC on marital quality is rarely researched, even though it is an important factor in patients' welfare and recovery (12). Marital quality in this review is to be measured by patients' objective description of any changes in their marriage following their diagnosis of BC and treatment with breast surgery.

Aim

This mixed method literature review explores the effect of breast cancer surgery on marital quality in Saudi Arabia. BC surgery is the chosen phenomenon as healthcare professionals opt for breast dissection surgery as the number one treatment of choice in almost all cases (6), and the effect of these surgeries related to Saudi women and their relationship with their husbands is not widely reported in the literature.

The objectives of this systematic review are 1- To increase knowledge on the cultural influence on managing BC and its consequences in SA. 2- Improve BC patients' experience by understanding the effect of their diagnosis and treatment on their families and marital quality in particular. 3- To assess the husbands' role in making health related decisions by their wives in the context of the Saudi culture. Lastly, 4- make recommendations to research and practice to facilitate a smoother and a more holistic approach to BC management.

Method and Design

Review protocol

The main study design the reviewer sought to include in this review was qualitative studies as they allow in-depth exploration of the phenomenon in hand and gain an understanding of an issue from the perspective of participants (16). However, due to the paucity of qualitative studies in the available literature on marital changes related to BC in Saudi Arabia, quantitative studies done on the same topic were also considered in order to get a comprehensive, useful conclusion from combining findings of effectiveness (quantitative) and experience (qualitative) (17), making this review a mixed method systematic review (MMSR) with narrative synthesis.

This integrated MMSR (convergent data based) was conducted following Joanna Briggs Institute's (JBI) framework for evidence-based healthcare (18) and PRISMA reporting guidelines (19). JBI methodology for MMSR was chosen due to its clear and systematic eight steps developed to guide reviewers into conducting a formalized, unbiased systematic review.

Furthermore, following a preliminary database search, the PEO framework was chosen in this review to determine the association between breast cancer surgery and changes in marital quality. This framework is typically used to establish to what degree does the exposure of interest affect an outcome (20). In this review, the P= population is married couples in Saudi, the E= exposure of interest is breast cancer surgery, and the O= outcome is marital quality and stability. Details on the review question format are seen in Table 1.

Table 1: Search question in PEO format:

Q: How does breast cancer surgery affect marital quality of couples in SA?		
Population	Exposure	Outcome
Married couples in SA	Breast cancer surgery	Marital quality

Cochrane library was searched for similar reviews conducted on Saudi married couples, but none were found. A detailed description on how this review was conducted will be specified in the following part, in order to understand the methodology and make this review reproducible by other reviewers.

Search strategy

The largest biomedical databases were searched for relevant studies to answer the review question: Medline (1946 to May 20, 2022), CINHAL (1976 to April 30, 2022) and Psychinfo (1806 to April 30, 2022). No timeframe or limits were set during the search to get as many related articles to the topic as possible. The PEO framework was applied during the database search; however, the outcome (marital quality) was not found as an index term and was substituted by the databases with quality of life; this reduced the specificity of the search and very few related articles were found. As a result, the search strategy was changed to search databases with P and E alone in order to broaden the research and get more related results. This search resulted in more related articles, some of which were qualitative studies, which helped gain a complete understanding of the issue in hand together with the quantitative evidence (21). In addition, reference lists of related articles were scanned as well to find more studies that could answer the review question. Further details on the results are provided in the next chapter.

Medical subject headings (MeSH) terms along with explode option were selected when searching index terms to increase specificity and sensitivity. Truncation (*) was used on some of the keywords to search different endings of the same term at once, the Boolean operator was used to also increase sensitivity; key words are detailed in the facet analysis in Table 2.

Table 2: Facet analysis

Facet analysis	P		E		O *EXCLUDED FROM SEARCH*
Index terms (Mesh)	Saudi Arabia		Breast neoplasms		Quality of life
Key words	Saudi Saudi marri$ Married couples Spouses Husband Wife	A N D	Breast cancer Mastectomy Breast cancer surgery Lumpectomy Reconstructive surgery	A N D	Marital quality Intimacy Marital stability Relationship quality

Studies selected for this review were included based on eligibility by meeting inclusion criteria set by the researcher. Inclusion criteria were English language articles, although all the included studies were conducted in Arabic as it is the native language of the population; they were all translated and published in English. Studies written in languages other than English were excluded due to the cost and time needed for translation. Sample had to be Saudi or people living in Saudi Arabia receiving treatment in Saudi hospitals, diagnosed with breast cancer and treated by surgery as it's the main definer of the population; no age limit was set. Married status, or used to be married during their diagnosis and treatment, was a characteristic for the population. Because marital quality is a focal indicator for this review, any studies done on single women were excluded. Studies that used quality of life indicators or other questionnaires that had marital quality in its measuring elements were also included as they answer the review question indirectly

Data extraction and analysis

Different tools depending on the studies' design were used for critical appraisal. Qualitative studies were appraised using Critical Appraisal Skills Programme (CASP) which had 10 questions (22). For quantitative, cross-sectional studies, Centre for Evidence Based Management (CEBM) tool was used, which consisted of 12 questions that are approved by Oxford centre of evidence medicine (23). Both tools are answered with yes, no or can't tell to help the researcher think systematically; further elaboration of the tool's questions and results are in the findings chapter.

Data was extracted from all eligible articles that met inclusion criteria using Johanna Briggs Institute form for a convergent integrated MMSR (17). The full text of included articles was obtained and carefully revised to ensure all valuable information was methodically gathered and sequentially grouped and coded into meaningful themes via thematic analysis to answer the review question.

A comprehensive narrative synthesis was conducted on the results of included studies to put data into context and find similarities across all studies (24). This process followed three stages established by Popay et al., (2006):

Element.1: A preliminary or initial synthesis was produced by data translation through thematic analysis as seen in the next chapter.

Element.2: Done by discovering commonality of findings, population, and settings of included studies through textual description and tabulation as seen in data extraction while acknowledging the heterogeneity and variability of the included studies' design.

Element.3: Robustness assessment is a process to be applied throughout the analysis and synthesis of a systematic review by using valid tools for critical appraisal, to assess the strength and weight of evidence and support the synthesis process for drawing conclusions or generating hypotheses (24), which was done in this review through quality assessment of included studies that led then to the production of the final core themes.

Findings

This chapter will incorporate search results from all databases and number of included studies that would answer the review question. Then, the quality assessment of the selected studies is discussed. Moreover, detailed results following data extraction of the individual studies included is presented, with a table to summarize these findings. Finally, the chapter presents a comprehensive analysis and synthesis for findings to bring all the data together in a systematic manner.

Search Results

Following the databases search with P= population and E= exposure alone, a total of 1,467 articles came up from the databases searched (Medline= 947, CINHAL= 153, Psychinfo= 367). They were logged and filtered for duplication through a reference manager software Rayyan.ai (25). 573 were duplicates and were removed automatically, and a total of 794 were included for title and abstract screening. Although qualitative studies were the targeted study design to be included in this review, very few qualitative articles were found, and most of those discovered articles could not answer the review question directly as they were conducted on non-Saudi populations. As a result, 785 articles were excluded for irrelevancy and not meeting the inclusion criteria. Only 9 studies remained for the next step of obtaining and reading the full text. Consequently, four studies were eliminated for the following reasons:

1. Wrong outcome measure: Almusa et al. (2019) investigated understanding the depth of knowledge of male partners "husbands" in relation to breast cancer diagnosis and prevention tools, such as self-examination and mammogram and how that affected the number of women getting such education and awareness.

2. Irrelevancy: a grounded theory by Saati et al. (2013), looked into how cultural beliefs affected women's behaviour towards diagnosis and treatment of BC and how the communication between healthcare professionals guided their decision making, without exploring how BC would weigh on their marital relationship.

3. Wrong comparator: Ahmed et al. (2017) a cross-sectional study that assumed that women patients with BC in Saudi Arabia have poor quality of life of and explored their theory by surveying patients. Researchers then linked the results to their clinical qualities of their cancer and their level of physical activity.

4. Wrong population: Sebgul et al. (2021) in an online survey done during COVID-19 times, where their population was husbands only, researchers surveyed husbands to explore their knowledge on BC diagnosis procedures such as breast self-examination and mammogram, however, their wives, as part of the targeted population in this study, were not surveyed or included.

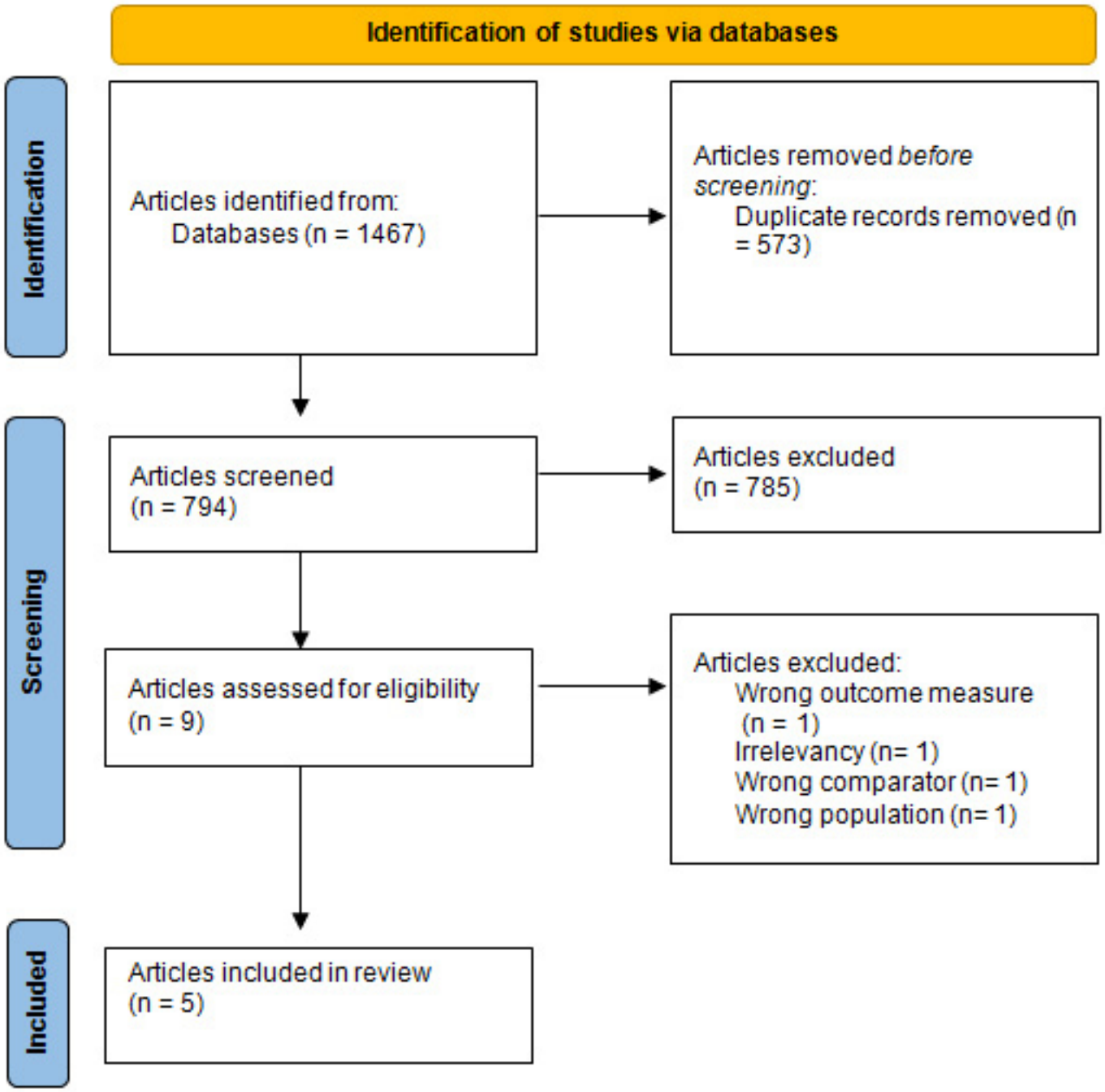
Subsequently, five eligible articles that met the inclusion criteria were included in this review and went through data extraction and quality assessment. A PRISMA flow diagram of the exclusion process is seen in Figure 1.

Quality assessment

Quality assessment conventionally known as critical appraisal is a systematic evaluation that is done to determine the quality of the papers and make an informed decision on whether the clinical evidence in the included articles are reliable, valuable, and useful to answer the review question (26). As this is a mixed methods review it integrated two reliable tools for critical appraisal, Critical Appraisal Skills Programme (CASP) for qualitative studies and Centre for Evidence Based Management (CEMB) for cross-sectional studies.

The only qualitative study included (12) is an interpretive phenomenology that explored women's experience of surviving BC. All the participants had finished treatment which included breast surgery; hence, the study was included to investigate the effect of their condition on their marriage. Of the included cross-sectional studies only one study (27) assessed marital quality directly in relation to breast cancer using The Spousal Perception Scale (SPS) and 89% of their participants were treated with breast surgery therefore, the study was included in the review. The remaining cross-sectional studies (28,29,30) examined the quality of life of BC patients; only indicators that assessed marital satisfaction, directly or indirectly were studied in this review.

Figure 1: Exclusion process in a PRISMA diagram



ORIGINAL CONTRIBUTION / CLINICAL INVESTIGATION

The qualitative paradigm involves exploration and understanding of non-numerical data such as opinions, lived experiences, and underlying reasons from the population's perspective as well as giving meaning to things that are not easily understood (31). The CASP tool for qualitative research was used for quality assessment of the qualitative paper by (12), and is summarized in Table 3, followed by an interpretation of the assessment.

Table 3: Critical appraisal of qualitative study using CASP tool (CASP, 2018):

Items		Answer
1-	Was there a clear statement of the aims of the research?	Y
2-	Is a qualitative methodology appropriate?	Y
3-	Was the research design appropriate to address the aims of the research?	Y
4-	Was the recruitment strategy appropriate to the aims of the research?	C
5-	Was the data collected in a way that addressed the research issue?	Y
6-	Has the relationship between researcher and participants been adequately considered?	C
7-	Have ethical issues been taken into consideration?	Y
8-	Was the data analysis sufficiently rigorous?	Y
9-	Is there a clear statement of findings?	Y
10-	How valuable is the research?	

After completing the quality assessment of the phenomenological study, it was found to be methodical and detailed in its design, synthesis method and results reporting. Questions from 1-5 reveal how useful and clear the aim and results of the study are. Moreover, in such design the risk of potential bias is assessed by presence or absence of certain criteria in the evaluation and appraisal process. These criteria include reflexivity and credibility (32), which were seen as the researcher provided clear links, explanations and justifications of the choices made in each step of the study within the qualitative framework. Question 10 on the value of the research, clarifies and uncovers the struggles and obstacles BC patients face in Saudi Arabia, which is a rare publicly discussed topic in such traditional society, and this adds to the credibility of the research findings as well (26). Another evaluation criterion is transferability, which is lacking as a detailed description of the setting and context in which the interviews were conducted, was not provided.

The remaining studies included in this review were cross-sectional, which is a part of the quantitative design that is non-experimental. In all the included studies in this review descriptive surveys were used that identify and observe the characteristics of a population and the extent of a phenomenon, "breast cancer", by collecting the same type of data at a point of time (33). These descriptive surveys cannot provide robust evidence when generating a hypothesis; however, as they are based on the accuracy of their statistical tests and analysis done on the numerical, objective data gathered, it helps elevate the level of evidence produced (16). The included studies with this design were appraised using the Centre for Evidence Based Management (CEBM) tool summarized in Table 4.

Table 4: Critical appraisal of cross-sectional studies using CEBM tool (CEBM, 2014)

Items / Reference	(Almutairi et al., 2016)	(Nageeti et al., 2019)	(Zahrani et al., 2019)	(Al-Zaben et al., 2015)
1- Did the study address a clearly focused question / issue?	Y	Y	Y	Y
2- Is the research method (study design) appropriate for answering the research question?	Y	Y	Y	Y
3- Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described?	N	Y	Y	Y
4- Could the way the sample was obtained introduce (selection) bias?	N	N	N	N
5- Was the sample of subjects representative with regard to the population to which the findings will be referred?	C	C	C	C
6- Was the sample size based on pre-study considerations of statistical power?	N	N	N	N
7- Was a satisfactory response rate achieved?	C	C		C
8- Are the measurements (questionnaires) likely to be valid and reliable?	Y	Y	Y	Y
9- Was the statistical significance assessed?	Y	Y	Y	Y
10- Are confidence intervals given for the main results?	Y	Y	Y	Y
11- Could there be confounding factors that haven't been accounted for?	Y	Y	Y	Y
12- Can the results be applied to your organization?	N	Y	C	Y

A primary advantage of cross-sectional surveys is the ability to observe a large group of people at once with low costs. However, it is prone to certain biases, including recall bias and response rate bias (33). As all the included studies were done retrospectively, there was a risk of recall bias, and there were no interventions or comments made on how it was counteracted. Moreover, as seen in Table 4, all studies have clearly stated their question, design, and sampling method. In question 5 on representativeness and generalisability, although every study was conducted in a different city in Saudi Arabia, the populations have a lot in common in terms of their religion, cultural practices, and beliefs. However, it is difficult to assume that the findings can be generalized to the whole population as the included studies have not justified the sample size. During the sampling process of the included studies, there were no power calculations mentioned anywhere that would measure the statistical significance of the results and produce the appropriate sample size, which introduces possible selection bias (34). This type of bias may affect the validity of the study as their sample is not representative to the target population (33). Additionally, researchers in included studies have given and received completed questionnaires from participants while being with them in the clinical setting and that increased the response rate and restricted the response rate bias (16).

Data extraction

One qualitative study and four quantitative "cross sectional" studies were included in this review. All studies were conducted in the Kingdom of Saudi Arabia in multiple cities which highlights the similarities and variations of the population regarding cancer in general and BC specifically. The studies were published between 2015-2021. Population was breast cancer patients, regardless of whether they were still receiving treatment or had recovered. Some of the studies were conducted in outpatient clinics while others were conducted with hospitalized patients. Following are the detailed findings of every included study:

In ALmegewly et al.(12) phenomenology paper, they conducted semi-structured, face-to-face interviews with 18 patients; the city in which the patients reside was not mentioned. Written consent was obtained prior to conducting the interviews. Each participant was given around 30 minutes to 2 hours depending on how much they were willing to share. Interviews were conducted in Arabic then translated to English. The population were Saudi female BC survivors, who finished treatment at least 6 months before data collection. No further details on demographic data were collected; sample was selected using purposive sampling. Three themes emerged, 1- meaning of cancer 2- hidden survival and 3- the cultural meaning of survival. Researchers emphasized on the cultural effect on BC survivors in the Saudi population. However, important issues were not discussed with participants such as marital quality changes, body image disturbances, and whether they were supported, or abandoned by their husbands during their journey.

Almutairi et al.(28) cross-sectional paper surveyed 145 female patients diagnosed with BC. They were Saudi nationals, but were seen in multiple outpatient clinics in Riyadh, Saudi Arabia. The population age was over 18 years old, with no history of mental illness; over 50% of them were married and 27% were treated with breast surgery. The study aimed to determine the effect of sociodemographic and clinical characteristics of BC on patients' quality of life using European English for Research and Treatment of Cancer (EORTC) questionnaire, along with a specific questionnaire for BC patients (BR23). Both tools' validity and reliability are known for assessing quality of life (QoL) of cancer patients. The general findings concluded that women with BC in Saudi have lower QoL scores (31.15) compared to other Western (66.5), Asian (65.8), and even other Arabic gulf countries (63.9). Marital status had a significantly positive effect on patients' financial problems, while reduced scores were found in sexual enjoyment. Moreover, patients had positive score in emotional functioning and getting proper emotional support but struggled with physical functioning and how treatment modalities affected them negatively in terms of physical symptoms.

Another cross-sectional study by Nageeti et al.(29) used the same European Organization for Research and Treatment of Cancer (EORTC) questionnaire, to expound the QoL of BC women treated in Saudi Arabia. Researchers surveyed 88 BC survivors in a hospital in Makkah, using convenient sampling. Their population was female patients treated for BC, aged 18 years old or older, who have received any form of cancer treatment modalities. Around 70% of the sample were married women, and 60% were treated with surgery, 79% did not have any reconstructive or plastic surgery after treatment. The general QoL score in that region was (64.0), which varies greatly from the study done in a different city (Riyadh).

Zaahrani et al. (30) cross-sectional study surveyed 96 patients, using non-probability, purposive sampling to recruit Saudi female BC patients from a military hospital in Tabuk. The study aimed to determine the quality of life of women with BC using the quality-of-life instrument for BC patients (QOL-BC) that evaluates the well-being on four aspects of life: physical, psychological, social, and spiritual. Social well-being had elements like family distress, personal relationships, and sexuality, which relates directly to this review's question. 35% of the sample were married and they showed significant higher scores ($p > 0.05$) than widowed and divorced patients in both physical and social function.

Last included quantitative, cross-sectional study Alzaben et al.(27) was done in a university clinic in the Western region of Saudi Arabia, Jeddah. Using convenience sampling, they surveyed 49 married women with BC, regardless of their nationalities. Participants were given 3 questionnaires, the first one on their demographic data, second on their anxiety scale and the third on quality of marital relations; all tools are valid and reliable in both English and Arabic versions. Researchers aimed to find a relationship between anxiety levels and marital quality. Results have found that 90% of the sample were treated with surgery, and over half of them were Saudi citizens. On marital relations scale, women showed low to moderate scores in terms of spousal support. They averaged 47.6 (SD=8.7) with a theoretical score ranging from 12-66, and finally on the anxiety scale, only 25% had serious anxiety symptoms which was mainly related to their age and education level. No significant relationship was found between marital quality and anxiety levels, but their sample size might be a limitation to these findings.

A summary of the key features and results is seen in Table 5 respectively.

Table 5: Data extraction summary

Reference	(ALmegewly et al., 2019)	(Almutairi et al., 2016)	(Nageeti et al., 2019)	(Zahrani et al., 2019)	(Al-Zaben et al., 2015)
Study design	Interpretive phenomenology.	Cross-sectional	Cross-sectional	Cross-sectional	Cross-sectional
Sample size	18 Breast cancer survivors.	145	88 Breast cancer survivors.	96	49
Patient characteristic	Saudi, aged 30-50 y/o.	Saudi, BC patients, >18 y/o.	Females, resided in SA, >18 y/o.	Saudi, females, diagnosed with BC, >18 y/o.	Married women with BC, 18-65 y/o.
Aim	To explore the experience of being a breast cancer survivor in Saudi Arabia.	To assess the quality of life of Saudi female breast cancer patients and determine the effects of the sociodemographic and clinical characteristics on their quality of life.	To assess the quality of life of females with breast cancer in Saudi Arabia and its association with their demographic, social, and clinical data.	To determine the quality of life of women with breast cancer in Tabuk, SA.	To examine the relationship between the quality of marital relationship and anxiety among women with breast cancer in Saudi Arabia.
Setting	Oncology outpatient clinic.	Outpatient units form different clinics, Riyadh, Saudi Arabia	King Abdullah Medical City, Makkah, Saudi Arabia	Surgery Department of King Salman Armed Forces Hospital.	Breast cancer centre at a university hospital.
Outcomes and findings	Three themes emerged. For women in Saudi, breast cancer has a cultural stigma linked to death. It changes the sense of self and of society, leading some women to hide their diagnosis from the public and their families. The meaning of survival in a Muslim context has a cultural and religious base, linked to God's will.	Global health score of participants had a mean score of 31.15 (95% CI 27.79-34.51) (P < 0.005). Poor functioning was found in sexual enjoyment (mean 22.52 [95% CI 17.97-27.08]) while future perspective scored the highest (mean 76.32 [95% CI 70.5-82.12]).	Role functioning scored the highest (mean 71.2, SD = 31), whereas social functioning and emotional functioning scored the lowest, (mean 57 SD = 35.8) and (mean 59.5 SD = 32). The mean global QOL of patients with no children was significantly lower than those who had children (60.2 vs. 64.8, P = 0.043).	The highest score in the psychological well- being subscale was observed for loss of control (8.57±1.11). For the social concern subscale, the highest score was observed for home activities (7.46±1.88), followed by sexuality (7.31±1.86).	The spousal perception scale averaged 16.7 (SD=3.9) on a theoretical range of 6-24, indicating low to moderate support, and the Quality of Marriage Index averaged 31.0 (SD=5.7) on a range of 28-37, indicating moderate scores. The average number of anxiety symptoms was 5.6 (SD=3.8), ranging from 0-15.
Source of funding	Governmental.	Not mentioned.	Not specified.	Governmental.	Not mentioned.

Following the methodology of convergent integrated mixed method systematic review, this review opted to apply narrative synthesis and thematic analysis on the data extracted from eligible studies to arrange data into homogenous groups and generate a connection between studies' "themes" (35).

Thematic analysis and narrative synthesis

A theme is a connection of patterns found in the data set that capture something interesting and important in relation to answering the research question through analysis and interpretation of data rather than summarization (35). This process has been chosen in this review due to its flexibility in the type of data it analyses, as thematic analysis bridges the divide between qualitative and quantitative paradigms (36). Subsequently, this review followed an inductive approach for thematic analysis that allowed themes to emerge from data, molded by the reviewers' knowledge and experience (data led analysis) rather than being pre-set based on theory (36). This approach was chosen due to the scarcity of related articles that answer the review question directly, which gives flexibility to the researcher in developing codes and generating themes. Another analytic choice made for thematic analysis is the coding option; as an inductive approach was taken, semantic coding or descriptive seemed befitting; "it captures the explicit meaning of the data and is built around participants' sayings" (37). A clear 6-step framework for writing the thematic analysis developed by Braun & Clarke was followed in this review. The steps are seen in Table 6.

Table 6: (Braun & Clarke, 2006) framework for thematic analysis

Step 1: *Become familiar with the data,* ***Step 2****: Generate initial codes,* ***Step 3****: Search for themes,*	***Step 4:*** *Review themes,* ***Step 5****: Define themes,* ***Step 6****: Produce a report.*

The first two steps of the framework were carried out interchangeably. The reviewer went through the data mass from the selected articles, making associations and connections through reading and re-reading, making observations of repeated ideas and statements across studies, and then grouping these ideas into broad segments "codes" to prepare them and create a rigorous foundation for theme production.

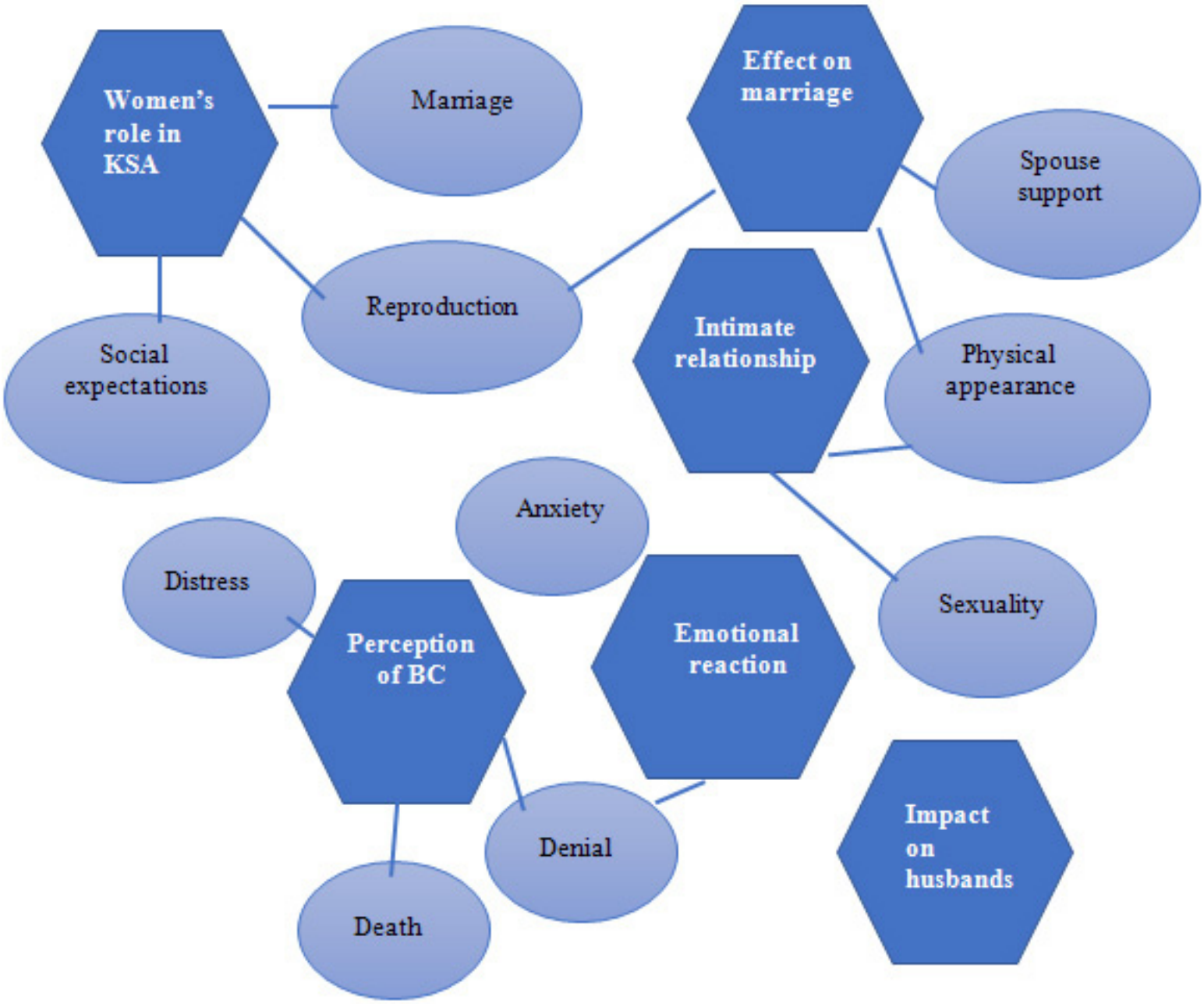
Step 3 was guided by the reviewer's background, answering the review question, and in the analysis of codes. Six raw themes were constructed primarily; a detailed process of this step is seen in the thematic map in Figure 2.

Following that, in steps 4 & 5 of reviewing and finalizing themes, two themes, the effect on marriage and intimate relationship, were combined into one major theme, named effect on the relationship. Moreover, the last theme: impact on husbands, was eliminated as it seemed to lack support from available evidence, even though the theme is of great importance, as marital quality is supposed to be assessed from both parties; husbands and wives . Successively, four final themes were generated: (1) Women's social role in Saudi Arabia, (2) Perception of breast cancer, (3) Effect on the relationship, and (4) Emotional reaction. The articles from which themes were generated from are summarized in Table 7. The final themes were then discussed with the editor in an attempt to eliminate researcher bias in theme selection.

Table 7: Articles in which the themes came from

Articles / Themes	Women's social role in Saudi Arabia	Perception of breast cancer	Effect on relationship	Emotional reaction
(ALmegewly et al., 2019)	X	X	X	X
(Almutairi et al., 2016)	X		X	X
(Nageeti et al., 2019)	X	X		X
(Zahrani et al., 2019)	X	X	X	X
(Al-Zaben et al., 2015)		X	X	X

Figure 2: Primary thematic map



Theme 1: Women's social role in Saudi Arabia.

The first theme focuses on how women's social role is shaped by the culture of Saudi Arabia (SA) and how it affects their marriage. Women in SA are expected to marry and have children at one point in their lives, which in turn is affected or delayed by their diagnosis of BC. It is noted that younger, unmarried patients experienced BC worse than married patients in all aspects of quality of life (12,28). Moreover, as wives, the majority of the house chores and child care falls on the shoulders of women, as men are considered "breadwinners" of the house, and being a BC patient affects that role tremendously. Married women across all the included studies have expressed that their home activity role, which includes their role as wives, was the worst variable to be affected by their BC (mean score= 67.6, 71.2, 74.6) (12,28,30). Furthermore, the culture in Saudi is very inclusive of family members, whether immediate or extended family, and as women carry big responsibilities as mothers and wives, they often hide their diagnosis of BC from their family in order to "protect them" from the worry and fear of BC consequences and to maintain their strong, collective presence for their loved ones instead of being vulnerable and accept the help and support (12).

Theme 2: Perception of breast cancer.

This theme highlights patients' perception of BC in the cultural and religious context of SA which in turn reflects on their decision making on choosing surgery for treatment and the consequences of this decision on their marriage. Across all included studies, women have expressed that BC was a cause of distress in their lives. It interfered with their future plans and dreams, some women even said that upon diagnosis they thought it was the end of their lives (12). Younger patients were shocked when diagnosed with BC and thought of infertility and early menopause (30). While older, uneducated women felt "cursed" for having BC and feared that the illness would transmit to their daughters and sisters (12). In light of religious beliefs, many women accepted their diagnosis as a test from God and were at peace with whatever their fate would be, giving that in Islam people believe that when they endure such suffering, they would be rewarded by God (27). Nevertheless, even though the treatment in Saudi Arabia is free and covered completely by the government, several women expressed fear of the financial burdens following their diagnosis and unemployed women were concerned about the cost of their illness on their husbands and their family as a whole (27,29).

Theme 3: Effect on the relationship.

As marriage is the only legal relationship in SA, this theme was produced to assess the effect of BC diagnosis and treatment on couples' intimacy and the dynamic of their marriage. However, in such a conservative community, the topic of intimacy and private relationship is rarely discussed openly and often talked about in a sensitive and careful manner (27). It is evident as some of the included studies had important scores in sexual enjoyment and sexual relationship, yet no further discussion or comments were made on it (28,30). Furthermore, issues that affect the intimate relationship, like menstrual disturbances and vaginal dryness, were also neglected as women considered this a sensitive and embarrassing topic to discuss with the researchers (29). Additionally, the marital relationship was disturbed by physical changes in body image, like hair loss, weight gain, and mastectomy (27,28,30). As the Islamic religion allows a man to marry more than one woman, BC patients were fearful of losing their husbands and did not have a strong belief that their relationship would withstand this journey. In fact, one woman stated that her husband left her after undergoing BC surgery (12).

Although spousal support and marital quality during BC scored low to moderate when examined, women's expectations of their husband were low, they looked for support when in crisis from their family members and close friends instead of asking their partners (27).

Theme 4: Emotional reaction.

This theme is about patients' emotional reaction to BC as well as the social factors in their lives that affected their emotions either positively or negatively. BC diagnosis was associated with many negative adjectives; patients used words like depression, anxiety, fear, loss of control and death to describe their emotions and experiences (12,28,30). Widowed patients experienced extreme loneliness having to go through the BC journey without a companion or husband on their side. However, support from family members and strong bonds with their close relatives and friends made the suffering more tolerable (12). Additionally, as patients experienced various physical changes, many of them were looked at with pity and were getting lots of negative comments from their surrounding people which made them avoid social gatherings and increased a feeling of isolation (12,27). Young patients have always feared infertility and premature menopause from all the chemotherapy and hormonal therapy they were receiving, that even when recovered patients were interviewed, they were not at ease with their situation and still worried that the cancer might reoccur at any time. Moreover, through all the included studies, patients with lower education and lower socioeconomic status experienced anxiety and stress more severely than educated and employed patients, yet the employed patients worried constantly about losing their jobs from all the sick leave they were on for treatment courses (27,28,29,30).

Discussion

This chapter will critically interpret the findings from this review in the context of other evidence, as well as compare the results with similar reviews done on different populations. Additionally, it will report the importance and implications of this review's findings for both practice and future research. At the end, the challenges and limitations of this review will be discussed.

Results interpretation in context of wider literature

Based on the database research, this is the first review to address the effect of BC on marital quality in Saudi Arabia. This reflects how cultural norms and the community's shyness away from "sensitive" aspects of life related to BC, such as intimacy, breast touching and examination, and opening to strangers about private matters, limits researchers from exploring such a conservative community (11). Moreover, this review question focused on the effect of BC surgery as it is the first line of treatment after diagnosis. Yet, studies that were dedicated to how exposure to BC surgery affected the marital relationship were rather general on the quality of life of affected patients.

It is also worth noting that the majority of included studies (n=4) used questionnaires, which are, although standardized and allow high quality statistical analysis of data, they limit participants' elaboration and explanation on their experiences to only answering the questions predefined by researchers (38).

In this review's findings, the first and third developed themes resonate with another study that was conducted on a culturally compatible population to Saudi; Bahraini women as they are both from the Arabic Gulf region and share the same religion, language, and cultural beliefs. The study aimed to understand the experience of Bahraini women with breast cancer (39). Their results showed how pressured women are by their social role as wives and mothers and how they felt responsible for their families and communities. It was also noted that despite suffering from BC, women feared that their husbands might remarry, given their current condition. They felt obliged to keep their husbands fulfilled by performing their marital duties and preventing any disturbances to the marital dynamic.

In this review, although it is essential to adjust expectations from both husbands' and wives' sides, communication in general was not mentioned nor asked about in all included studies. As a result, patients would suffer and fear in silence without opening up to their husbands and sharing their suffering. In contrast, a literature review on marital adjustment in the context of breast cancer was conducted based on 14 studies from different western countries, mainly the USA and European countries; the reviewers defined marital adjustment as the process in which a married couple achieves a common goal while maintaining individuality (14). Researchers have found that communication was a fundamental influence affecting marital adjustment, and couples who communicated their needs from their partners had a significantly positive effect on their marital adjustment. The western review by (14) has also concluded that the partner's emotional support and involvement during the BC journey affected the marriage positively. This differs from this review's results, which found that Saudi patients sought support from their social circle rather than their husbands.

It was also found in all included studies in this review that younger BC patients experienced worse psychological and emotional distress than older ones as they felt that their lives had been cut short by their diagnosis and that older couples who have been married for a long time and have already had children, felt that their relationship could endure and sustain the distress of BC. The same findings in relation to younger and older patients were also seen in studies on different populations like Bahraini and Chinese (39,40). However, in an older study done in 1999 that looked at the effect of BC on marriage breakdown in Canada, have found that despite the common knowledge that BC causes marital collapse, couples with pre-existing marital difficulties and low marital satisfaction were the ones to struggle after being diagnosed with BC and had higher risks of separating (41).

Furthermore, given the close and involved familial relationship in Saudi, there was a comparable finding from a study done on a Chinese community that asserted the role of family and how extremely important it is that even treatment decisions made by the patient such as getting a mastectomy and undergoing chemotherapy were affected by their family (40).

Whereas in Malaysia, another Asian country that has the same religion as Saudi, they have recognized the familial involvement and understood the husbands' role in decision making. Hence, researchers recommended programs to educate both patients and their husbands to help them in making treatment decisions when diagnosed with BC (42). This intervention would benefit all cultures with great familial involvement, such as SA. Moreover, there was a study that surveyed Saudi male partners to link their knowledge on BC to their wives' utilization of BC screening programs, and it was found that husbands' increased knowledge was significantly associated with their wives' attitude towards breast self-examination and taking mammograms (43).

Although marital relationship and quality are the responsibility of both parties, husbands, and wives, in all included studies in this review researchers have only questioned and interviewed the women alone, leaving the husbands' role vague and unexploited.

Review contribution

Following the database research on marital quality changes regarding BC in SA it was noted that studies are limited and not specific to the phenomenon of interest. This review opens new horizons for further research on the effect of BC on marital relationship in SA and helps understand the phenomenon and assists in formulating policies and guidelines related to management plans of BC.

Overall, future research would benefit from utilizing more complex and meticulous analysis, as well as follow-ups to increase the quality, rigor and trust worthiness of the evidence produced. Like for example, researchers could include husbands when conducting surveys or interviews to get a complete picture of the marital dynamics. Furthermore, conducting more qualitative studies with open-ended questions would create better chances for patients and their families to express and form clearer images of their struggles with BC treatments and its effect on the family as a unit. Researchers could also benefit from assigning female interviewers to help BC women talk more freely about their condition as the culture in SA limits the communication between males and females in regard to intimate subjects.

In practice, apart from exploring the effect of BC on marriage, such reviews on this topic would be a great addition to clinicians, social workers, nurses, and psychologists, in helping them understand the uniqueness of the Saudi culture and ethnicity. It would open doors to ideas like support groups for patients to feel safe and that they are not struggling alone with their fears and difficult issues. Moreover, when a patient's history is being taken, simple inclusion of questions related to marital stability as baseline data will aid in recognizing high risk couples and support them as needed before and during treatment.

Limitations

This systematic review followed JBI steps and guidelines to conduct high-quality review and eliminate bias as much as possible, yet it is not without limitations.

For instance, the synthesis was done by a single researcher in an attempt to answer the review question, although it is recommended that the process be performed by at least two reviewers (24). Nevertheless, specific tools and techniques were used to appraise and synthesize data to ensure transparency, and decisions throughout were discussed with the supervisor to minimize risk of bias and enhance robustness of the evidence.

Conclusion and Recommendation

Succeeding an exhaustive review of the literature following the JBI protocol for integrated mixed method systematic review, it has not been feasible to definitely conclude that BC surgery affects marital quality in Saudi Arabia due to the rarity of published studies. However, it has been found that research related to BC and cultural influence and BC and marital relationship is lacking greatly and is affecting the way women in SA with BC are approached and treated.

Breast cancer remains a global issue that causes dysfunctionality in different aspects of affected women's lives which includes their marriage. Understanding how marital quality changes the outcome of patients being treated for BC, whether in decision making or psychological support, will help healthcare professionals at every level to assess and intervene as needed in order to improve patients' experience, provide the guidance they require, and alleviate their suffering as much as possible.

Recommendation

It is time that sensitive and personal topics like marital relationship in conservative communities be discussed and acknowledged openly as it is the first step to help decision makers understand the struggles of these patients and work on fixing their problems. Thereafter, management of breast cancer should go beyond surgery and physical treatments, as it has been seen through all cultures and religions, that body image changes due to BC surgery and treatments have affected women's self-esteem greatly and created a fear of losing their husbands, which begs the need for psychological referral and evaluation to formulate individualized plans and support all women undergoing BC surgery or chemotherapy. Therefore, future studies should focus on open ended questions that allow researchers to highlight BC women's needs in the context of Saudi Arabian culture.

Ethical consideration

This review does not require ethical approval; however, basic ethical principles were maintained when conducting this systematic review. All included studies have obtained ethical approval prior to conducting their research from designated committees.

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