

## ORIGINAL ARTICLE

# Exploring post mastectomy patients' experience on handmade knitted breast prosthesis, a project lead by the breast nurse specialist

Laila Al Balushi\*<sup>1</sup>, Mudhar Al Adawi<sup>1</sup>, Izdihar Al Siyabi<sup>2</sup>

<sup>1</sup>Department of Nursing, Royal Hospital, Ministry of Health (MOH), Oman

<sup>2</sup>Higher Institute of Health Specialization, Oman

**Received:** March 5, 2024

**Accepted:** June 16, 2024

**Online Published:** June 19, 2024

**DOI:** 10.5430/cns.v12n1p31

**URL:** <https://doi.org/10.5430/cns.v12n1p31>

## ABSTRACT

**Objective:** Not all post mastectomy patients are eligible for immediate or late breast reconstruction. Therefore, an appropriate external breast prosthesis (EBP) after mastectomy can inspire patient's copying mechanism, self-confident and improve body image. This study aims to highlight the perceived comfort, confidence, satisfaction of post mastectomy women with the use of knitted EBP.

**Methods:** A cross-sectional study design was implemented, and 51 participants completed an electronic questionnaire survey. The survey consisted of 26 close-ended questions related to body image satisfaction, confidence, satisfaction with the knitted EBP.

**Results:** Interestingly, almost more than half of the participants reported dissatisfaction with their physical appearance following mastectomy if they do not wear the EBP and they were highly confident after wearing the EBP (76%) and (86%) respectively. Moreover, almost all participants reported their satisfaction regarding the EBP in terms of weight and stated that it is light and can be worn with almost all types of clothes (94%) and (70%), respectively.

**Conclusions:** Our study shows that the majority of post mastectomy women had grateful experience with the knitted EBP and reported better self-confidence after wearing the breast prosthesis. However, there is no effect of EBP on young patient's decision to have breast reconstruction in future.

**Key Words:** Post-mastectomy, External breast prosthesis, Breast cancer

## 1. INTRODUCTION

Breast cancer (BC) is the leading women's cancer, affecting around 12% of women globally.<sup>[1]</sup> Moreover, the number of BC incidents is increasing in developing countries, including Oman, affecting 350 cases yearly, and 31% of them are diagnosed in their third and fourth stage.<sup>[2]</sup> The rise in cancer incidence is influenced by several factors such as the increasing elderly population and lifestyle habits. Some

of the key factors include obesity which accounts for 53% whereas physical inactivity, and smoking, contribute to 15%. Additionally, the adoption of a Westernized lifestyle, dietary alterations, and various environmental elements also play a substantial role.<sup>[3]</sup>

Surgical intervention, including breast-conserving and immediate or late reconstruction after mastectomy, is one of the BC treatment modalities, including chemotherapy and radio-

\*Correspondence: Laila Al Balushi; Email: [alial2050@outlook.com](mailto:alial2050@outlook.com); Address: Department of Nursing, Royal Hospital, Ministry of Health (MOH), Oman.

therapy.<sup>[4,5]</sup> Mastectomy is one of the surgical interventions in which total removal of the breast is done to prevent the spread of cancer in the body.<sup>[6]</sup> Women who have undergone mastectomy in the context of BC are faced with two significant challenges. Firstly, these individuals are confronted with the psychological and emotional burden associated with being diagnosed with breast cancer. Secondly, they must cope with the impact of losing their physical appearance.<sup>[7,8]</sup> After undergoing mastectomy surgery, these patients require a comprehensive care. The primary focus should be on wound care, pain management, and physical rehabilitation.<sup>[9,10]</sup> The experience of post-surgery varies among individuals but can include discomfort or pain around the surgery area, fatigue, and emotional distress. It's pivotal for healthcare providers to offer psychological support alongside with physical recovery.

Many complications can occur including: infection, seroma collection, hematoma, and lymphedema.<sup>[11]</sup> There might also be issues with wound healing and potential side effects from any additional treatments like radiation or chemotherapy.

Another consideration is the need for physical therapy to prevent stiffness and maintain range of motion in the shoulder and arm on the side of the mastectomy.<sup>[12]</sup> This can start a few days after surgery under the guidance of a physical therapist.

The patient may also need assistance with daily activities in the initial recovery period and emotional support to cope with body image changes and psychological distress associated with the diagnosis and treatment of cancer.<sup>[13]</sup>

Patients undergoing mastectomy without immediate cosmetic surgery fully understand the importance of breast reconstruction or external breast prostheses (EBP).<sup>[13]</sup> Research has shown that BC patients who have undergone mastectomy commonly experience ongoing physical and psychological challenges impacting various aspects of their lives, such as their sense of sexuality, maternity, attraction, and body image.<sup>[14,15]</sup>

Recently, due to its significant positive impact on restoring a patient's body image and reduced physical and psychological challenges and improving the quality of life, immediate breast reconstruction after mastectomy has become the gold standard and an integral part of modern BC treatment.<sup>[16-18]</sup> In advanced countries, breast-conserving surgeries for BC have accounted for more than 50%, emphasizing the importance of breasts to women.<sup>[19,20]</sup> In addition, studies showed that BC women who have undergone breast reconstruction felt more confident and attractive with their physical image than women who have not undergone mastectomy without reconstruction.<sup>[21,22]</sup>

However, not all BC are eligible for immediate reconstruction; over half of all BC patients are treated with total mastectomy. In 2006, in the UK, around 60% of BC patients treated with breast surgery were required to use EBP.<sup>[23]</sup> Generally, hindrances to immediate conservative surgery may include the significant skin involved with the tumour, stage of BC, tumour pathology, the cost of breast implant, which some patients cannot afford, and lack of products in the local markets.<sup>[13,21]</sup>

Consequently, these factors enhance the emotional and psychological impact of body disfigurement after mastectomy; hence the patient loses their positive self-image, and femininity, and might suffer from long term tingling in the surgery site, pain over the chest wall, and impact on their daily activity level.<sup>[24]</sup> Moreover, they also suffer from depression, anxiety, lower quality of life, emotional distress, and lack of confidence.<sup>[25,26]</sup> Therefore, post-mastectomy rehabilitation is essential for women's health promotion, including the use of an EBP, which might help in improving body image and reduce emotional distress during their transformation to survivorship period.<sup>[27]</sup> Therefore, the availability of EBP immediately after mastectomy will be of great use to patients' experience and enhances their survival in survivorship duration.

An EBP is an artificial breast-shaped prosthesis which is crafted to ensure a realistic appearance of the breast. The EBP is made of either silicon or cloth, fitting in a bra cup with or without a bra pocket. It is designed to go straight against the chest wall where the breast has been removed.<sup>[13]</sup> The EBP is a fibre fill or foam that can be worn immediately after surgery or after the wound is healed 2-4 weeks post-mastectomy. It also comes in different sizes, types, skin tones and with or without nipples and areola. The weight of the EBP depends on the material used; for example, lightweight silicon combined with water, air, glycerine, or latex to provide a variety of consistency. There are different styles, such as self-adhesive and non-adhesive types.<sup>[28]</sup>

Many studies suggested that women wear EBP after mastectomy to reduce the sense of disturbed body image.<sup>[29,30]</sup> Therefore, it helps restore self-esteem in post-mastectomy patients by creating a natural breast appearance, which may help boost self-confidence and a sense of femininity in women. Also, it could help improve symmetry and weight balance, as mastectomy negatively impacts women's posture and balance. Finally, it enhances post-mastectomy women's physical and psychological well-being and overall quality of life.<sup>[29,31]</sup>

In Oman, the availability of all types of EBP in local markets is challenging. Moreover, factors including costly breast

silicones, patients' lack of information on available different types and use of EBP after mastectomy and no breast prosthesis fitting services for post-mastectomy patients increase the issue.<sup>[29]</sup> Considering these factors, a breast cancer nurse specialist (BCN) in a tertiary hospital created the project of handmade knitted EBP made from cotton and stuffed with poly-fibre material for post-mastectomy patients. The project is initiated to enhance the rehabilitation process after mastectomy, improve the patient's self-image and social life, and cover the lack of prostheses in local markets.

### **The Handmade External Breast Prosthesis Project**

The handmade knitted EBP is a volunteer act initiated by the BCN. The Knitted EBP is made of soft, non-wool, 65%-90% cotton, washable yarn, filled with poly-fibre material, and worn with and without special pocketed bras. They are knitted by volunteer women from the community who have good knitting experiences under the supervision of the breast nurse. The BCNs provides the volunteer with the required materials, sizes needed and number of prostheses required. Some of the materials are purchased internationally to have a quality prosthesis. All the knitted EBP is collected and kept in the Oncology Breast Clinic. Due to the unavailability of a breast prosthesis fitter, the BCN performs the fitting for all post-mastectomy patients who wish to have breast prostheses. All EBP is distributed free of charge for Omani and non-Omani patients.

A high-quality external breast prosthesis (EBP) should fit perfectly and be customized for the patient's comfort during wear.<sup>[32]</sup> Furthermore, the service of fitting the prosthesis is a crucial component of recovery after a mastectomy. However, these services still need to be better developed in Oman. Therefore, the BCN initiated the knitted EBP project for post-mastectomy patients in a tertiary cancer centre. This study aims to highlight the perceived comfort, confidence, and satisfaction of post mastectomy women with the use of knitted external breast prostheses.

## **2. METHODS**

### **2.1 Study setting**

The study was conducted in a tertiary hospital in Oman, one of the main cancer centres for breast cancer oncology services, including surgery, chemotherapy and radiotherapy treatments.

### **2.2 Study design and population**

This is a cross-sectional study design using the electronic survey to explore the experience of women who had breast mastectomy and used the knitted breast prosthesis. Knitted breast prosthesis as a volunteer project carried out at the

centre. The distribution of knitted breasts was done after four weeks of mastectomy for each woman, and it was done under the guidance of the BCN. The total knitted breast prosthesis distribution was around 70 pairs, and out of them, 51 women agreed to share their experience using the external breast prosthesis. Out of the total participants, 51 women completed the survey electronically. The inclusion criteria included Omani and non-Omani women who underwent unilateral or bilateral post-mastectomy patients. The BCN does fitting to maintain the correct fitting and sizes as well as the number of patients and the number of prostheses distributed. Participants can read in Arabic or English and can follow the instructions given in written or digital form. The exclusion criteria encompassed any external breast prosthesis provided by sources outside the oncology centre. This was because of the availability of various types, such as gel and silicone. Also, there is a lack of information regarding how the fitting process is done and who performed it.

Participants were informed about this study through BCN when they attended their wound assessment follow-up clinic one week after surgery. The information was shared about the knitted breast prosthesis project and the upcoming research, and those who agreed to participate were approached. In addition, some participants were recruited from another oncology centre through holistic care team collaboration. The knitted prosthesis project and fitting service were held in one oncology centre. Therefore, a collaboration between the holistic care departments was initiated for better patient service.

The BCN set up an official dedicated Instagram account for remote patient follow-ups in the centre, a widely used platform in Oman. This account was used also to disseminate posts and reels about prostheses availability, different types, schedule dates, and fitting services by the BCN, as well as share images and videos about the process. The account was given to all the new patients during their first clinic visit post-neoadjuvant chemotherapy or in their upfront surgery clinic with BCN. For patients who did not want to use social media, information about the EBP was given through written documents. The documents included the type of prosthesis, sizes, date of fitting service, how to care for the prostheses at home, and the clinic number to contact.

Patients' privacy was upheld by having them register using pseudonyms. Access was controlled by disabling the reply option on all posts, and directing any comments or questions to private messages instead. Since the account holder deactivated the sharing button, there were no public discussions under the posts. All inquiries were addressed privately to BCN.

All the EBP were stored in the adult oncology clinic, with the BCN maintaining detailed records of the number of prostheses, sizes, distribution dates, and patient contact numbers. Patients were informed about an upcoming survey during the fitting sessions to gather feedback on their experience. After 3-4 weeks, the BCN began sending out an electronic survey link to post-mastectomy patients. Data was collected by completing the online survey or the paper-based questionnaire. Patients were allowed to provide consent before answering the survey questions, with the freedom to withdraw or continue their participation at any time.

### 2.3 Study tool

After a literature search, main researcher developed the questions related to acceptance of general appearance (not acceptable, neutral, acceptable), satisfaction with body image after wearing the EBP (not satisfied, acceptable, greatly satisfied), self-confidence after wearing the EBP (not at all confident, not sure, confident), quality of the knitted EBP in term of weight (heavy, light, not sure), ability to use EBP during activity (displaced, fairly fixed, not sure), causing pain (yes, no, not sure), and causing skin problems (yes, no, not sure) and help you psychologically (yes, no, not sure). Then these questions were given to four experts to validate the content in relation to the research objectives. These experts were; a member from patient experience committee at the hospital, one patient who had mastectomy done, one researcher who is an expert in tool validation, and one senior oncology consultant. All these experts provided comments for modification and their comments were integrated into the tool. Then survey was translated to Arabic version as targeted participants were Arabic speakers and was given to a qualified person with higher education in Arabic language for translation validation.

Furthermore, the survey was piloted with three post-mastectomy women for validation in terms of language used and the ability of the patients to understand the questions. These three patients verified the language and few Arabic grammatical issues which were corrected. The final tool consisted of 26 items. Scale reliability test was run using SPSS version 23 and value for Cronbach's Alpha was  $\alpha = 0.64$  for the 26 items.

### 2.4 Statistical analysis

Statistical analysis was performed using IBM SPSS version 23. Univariate analysis was done to describe the characteristics of participants and the frequency of each answer. Bivariate analysis was done to run the cross-tabulation test and count the number of patients who were satisfied with body image and the quality of the knitted prosthesis.

### 2.5 Ethical consideration

This study was approved by the Royal Hospital Scientific Research Board under approval number SRC#72/2022. Participants in this study were informed about the objective of the research, and the voluntary participation was explained by the primary author and via an online link or paper-based prior to the questions. In addition, no details were required for the tool for identifying the specific participant. To ensure the confidentiality of collected data, all data were collected and transmitted online to the primary author.

## 3. RESULTS

Table 1 shows the demographic characteristics for the 51 women. Our participant population consisted predominantly of young, married and secondary to higher education. Majority of women range from 31 to 50 years of age. Almost two third of participants were married.

**Table 1.** Demographic characteristics of study participants ( $n = 51$ )

	Variable	N (%)
Age	Between 19-30	5 (9.8%)
	31-40	18 (35.3%)
	41-50	19 (37.3%)
	Above 50	9 (17.6%)
Marital status	Single	6 (11.8%)
	Married	40 (78.4%)
	Divorced	3 (5.9%)
	Widow	2 (3.9%)
Educational level	Illiterate	3 (5.9%)
	Secondary	25 (49%)
	Higher education	22 (43.1%)
	Others	1 (2%)

Table 2 shows the participant's responses with frequency with each statement. Interestingly, almost more than half of the participants reported that they do not accept their physical appearance after mastectomy if they do not wear the EBP and they were highly confident after wearing the external breast prosthesis (76%) and (86%) respectively. Moreover, almost all participants reported their satisfaction regarding the EBP in terms of weight. They stated that it is light and can be worn with almost all types of clothes (94%) and (70%), respectively. However, only some participants were not sure about the weight or the usability during activities, which can be explained by the fact that few participants wear the EBP with a non-pocketed bra. None of the women reported that the EBP caused skin damage or complications. Those who didn't use the prosthesis for a longer duration were unsure whether it caused skin issues or not. Cross tabulation of satisfaction with appearance and the characteristics of the EBP ( $n = 51$ ), shown in Figure 1.

**Table 2.** Frequency table

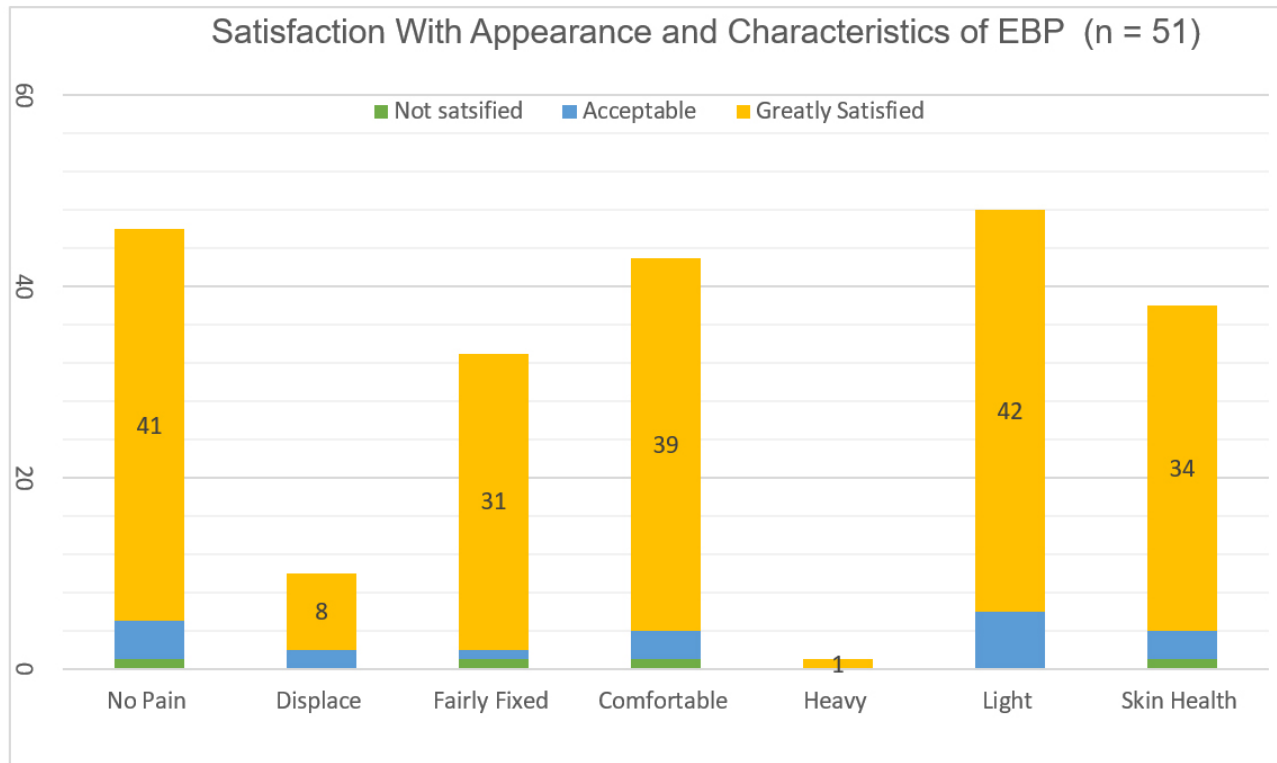
Variable	Percentage
Do you accept your external appearance after mastectomy without using the external breast prosthesis?	
Not acceptable	76.5%
Neutral	7.8%
Acceptable	15.7%
How satisfied are you with your appearance after wearing the external breast prosthesis?	
Not satisfied	2%
Acceptable	9.8%
Greatly satisfied	88.2%
Are you confident in yourself after wearing the external knitted breast prosthesis?	
Not at all confident	0%
Not sure	13.7%
Confident	86.2%
When do you use the breast prosthesis?	
While going outside the house	54%
All the time except sleeping time	45%
Do you think that the knitted breast prosthesis helps you psychologically after mastectomy?	
Yes, it is	98%
No, it is not	1.9%
Not sure	0%
What do you think about the weight of the external knitted breast prosthesis?	
Heavy	2%
Light	94.1%
Not sure	3.9%
Do you think the external knitted Breast Prosthesis can be worn with all types of clothes?	
Yes	70.6%
No	7.8%
Not sure	21.6%
What do you think about the external knitted breast prosthesis during activities?	
It is displacing from the place	19.6%
It is fairly fixed	64.7%
Not sure	15.7%
Did the external knitted breast prosthesis cause any skin health problems?	
Yes	0%
No	74.5%
Not sure	25.5%
Do you think the knitted breast prosthesis has affected your decision to have a breast reconstruction in the future?	
No, effect at all	43%
Yes, medium effect	45%
Yes, strong effect	11%

Women who were greatly satisfied with their appearance responded that EBP does not cause pain at the surgery site. Interestingly, none of the women reported pain at the surgery site when using the prosthesis. Those women who were

greatly satisfied reported fairly fixed EBP during activities and interestingly very few reported displacements of EBP during activities almost half of women ( $n = 23$ ) were greatly satisfied and reported that EBP was comfortable. More than

half ( $n = 27$ ) who were greatly satisfied were also reporting light EBP. Moreover, none of the women reported skin com-

plication from the use of EBP and those who were greatly satisfied did not report any skin problems.



**Figure 1.** Cross tabulation of satisfaction with appearance and the characteristics

#### 4. DISCUSSION

This study aimed to explore the women’s experience with knitted breast prostheses post mastectomy. Interestingly, the majority of women (88.2%) had a grateful satisfaction experience with the knitted EBP, mainly since they reported non-acceptance of their appearance and body changes after mastectomy. Most women also reported better self-confidence after wearing the knitted breast prosthesis. The uniqueness of this study is that it is the first, which is the confidence reported among women in a preservative community.

It is proven that breast reconstruction surgery after mastectomy in women can have a significant impact on their physical and psychological well-being as women may experience greater sense of self-confidence, physical attractiveness, a better quality of life and less emotionally distressed.<sup>[33]</sup> This result is similar to our study result, which showed that the majority of young participants expressed that there is medium to no effect of EBP on their decision to have future breast reconstruction. The remaining participants may have higher coping skills and mechanisms or cannot afford the cost of reconstruction surgery, which could be due to cultural, and belief differences. Younger women are more concerned

with restoring the normal appearance and sense of femininity, confirming that almost half of the participants in this study expressed that they always wore the EBP. Similar findings have been reported in Brunet’s study.<sup>[33]</sup>

The current study also found that women do not accept their body image after mastectomy and strongly feel disqualification and feminine incompetence. Interestingly, those women reported high satisfaction when they used the EBP and felt their self-esteem improved as they thought their body image was restored. The result is consistent with previous studies that showed high satisfaction among most external breast prosthesis wearers.<sup>[29]</sup>

It is well documented that loss of positive self-image is among the most common emotional effects women confront after a mastectomy.<sup>[8]</sup> However, the emotional impact of mastectomy was not examined in this study.

The participants in this study experienced the use of the knitted EBP in terms of weight, ability to use the breast prosthesis with different types of clothes and use during activities, skin health problems and pain. Participants were comfortable using the knitted EBP and stated that it caused no pain at the surgery site. They could wear it during activities and with

different types of clothes. As it is well reported that EBP weight could be a significant factor in influencing patients' satisfaction, those who feel that the weight of the external breast is not appropriate were not happy using it. However, this study had findings opposite to those of those who studied silicon types of external breast prostheses and experienced problems with the weight, movement, shape, texture, comfort, and style of prostheses.<sup>[34]</sup> Silicone-type EBP was not discussed in this study.

Therefore, this could be an enhancing factor that promotes women's satisfaction, self-esteem, and body image. This is in parallel with,<sup>[13,35]</sup> which reported that knitted EBP is more appropriate than silicon in terms of promoting satisfaction. Study<sup>[36]</sup> reported that participants complained that breast silicon prosthesis was too heavy and caused discomfort and shoulder pain. However, this study did not explore a comparison between the knitted' weight and silicon-made prosthesis.

Moreover, in this study, no participants expressed discomfort and pain at the surgery site due to EBP; this could be due to the prosthesis's light weight and wearing it according to the BCN instructions. This is in accord with several researches.<sup>[21,23]</sup> None of the women reported that EBP causes skin health issues or complications. Those who used a pocketed bra to hold the EBP were not sure if it caused skin health issues.

A study conducted in Brazil<sup>[23]</sup> concluded that different levels of activity were considered distressing for Brazilian women who wear breast prostheses as it led up unexpected movement of the prosthesis. However, in this study, less than half of the participants reported that their prostheses were displaced during activities. This could be attributed to the crucial role of the BCN in providing proper fitting guidance, support, and resources.

Several limitations are acknowledged by the researcher in this study. Firstly, the findings reported in this study are based on a small sample ( $n = 51$ ). Second, minimal information was collected from the participants, leading to limited interpretation of some findings, such as the availability of EBP before surgery, disease stage, and prognosis after the surgery. Third, the participants were almost homogenous: nearly all spoke and wrote Arabic, and only two were non-Arabic speakers. Participants were ethnically nondiverse, and had surgery done in the governmental sector. Fourth, participants were recruited only if the BCN did the fitting service, which would have resulted in missing of many participants.

Despite these limitations, the findings from this study shed light on the strong satisfaction level among women who wore

EBP in Oman. It is worth noting that this is the first study of its kind, conducted on breast cancer patients' experience towards the EBP in governmental cancer centres and adding a novel perspective to the existing body of research.

#### 4.1 Implications for nursing

The BCNs played a central role in the women's acceptance of their new breast prosthesis. Evidence-based nursing intervention deliver nursing care that utilizes the latest research to enhance patient safety, health, and well-being. This practice aims to provide top-quality care, decrease healthcare expenses, and minimize discrepancies in patient outcomes.<sup>[37]</sup> The main goals of the nursing care plan for mastectomy patients should focus on promoting physical recovery and emotional health, managing pain and discomfort, and addressing lymphedema.<sup>[38]</sup> Additionally, these plans should educate patients on self-care and wound management, and support them in adjusting to changes in their body image and self-esteem such as the availability of EBP in local and international stores. This study has a few vital recommendations for the nursing administration of cancer centres. First, the role of BCN should be enhanced in providing support and comprehensive information about breast prostheses, assisting patients in making informed decisions when selecting the most suitable breast prostheses for their unique needs. Second, to ensure the availability of EBP and fitting services for post-mastectomy patients in all the cancer centres as a holistic care. Third, a rehabilitation team should be initiated to follow these patients in their life journey. Fourth, raise community awareness about post-mastectomy physical and psychological patients' challenges for collaboration in ongoing projects like knitting breast prostheses.

In conclusion, our study concluded that women experience significant physical and emotional difficulties after breast mastectomy, and the usage of external breast prostheses, such as the handmade knitted style, effectively overcomes it. All women were delighted and self-confident after the use of knitted breast prostheses. Moreover, the knitted breast was found to be easy to use during activity, light in weight, and not cause discomfort, skin complications or pain at the surgery site. It's important to note that our study has certain limitations. It was conducted in a single centre and relied on a convenient sample from one cancer centre, which may limit the generalizability of our findings. However, these findings still provide valuable insights into the use of knitted breast prostheses after mastectomy.

#### ACKNOWLEDGEMENTS

We thank all participating women with breast cancer for their contributions to the study.

## AUTHORS CONTRIBUTIONS

Dr. J. Blake Smith and Emily Weatherford were responsible for the design and revising of the manuscript. Dr. Ken Tillman was responsible for editing and revising. All authors read and approved the final manuscript.

## FUNDING

No funding.

## CONFLICTS OF INTEREST DISCLOSURE

The authors declare that there are no potential conflicts of interest.

## INFORMED CONSENT

Not applicable.

## ETHICS APPROVAL

The Publication Ethics Committee of the Sciedu Press. The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

## PROVENANCE AND PEER REVIEW

Not commissioned; externally double-blind peer reviewed.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

## DATA SHARING STATEMENT

No additional data are available.

## OPEN ACCESS

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).

## COPYRIGHTS

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

## REFERENCES

- [1] Wilkinson L, Gathani T. Understanding breast cancer as a global health concern. *British Journal of Radiology*. 2022; 95(1130). PMID: 34905391. <https://doi.org/10.1259/bjr.20211033>
- [2] Mehdi I, Monem EA, Al Bahrani BJ, et al. Age at diagnosis of female breast cancer in Oman: Issues and implications. *South Asian J Cancer*. 2014; 3(2): 101-106. PMID: 24818104. <https://doi.org/10.4103/2278-330X.130442>
- [3] Choi JW, Hua TNM. Impact of Lifestyle Behaviors on Cancer Risk and Prevention. *J Lifestyle Med*. 2021; 11(1): 1-7. PMID: 33763336. <https://doi.org/10.15280/jlm.2021.11.1.1>
- [4] Al-Balushi L, Al-Kharosui S. Patients' perspective on early discharge with drain in situ after breast cancer surgery. *Clin Nurs Stud*. 2022; 10(1): 14. <https://doi.org/10.5430/cns.v10n1p14>
- [5] Saunders CM. Breast surgery: a narrative review. *Medical Journal of Australia*. 2022; 217(5): 262-267. PMID: 35988063. <https://doi.org/10.5694/mja2.51678>
- [6] Arthur DW, Winter KA, Kuerer HM, et al. Effectiveness of Breast-Conserving Surgery and 3-Dimensional Conformal Partial Breast Reirradiation for Recurrence of Breast Cancer in the Ipsilateral Breast: The NRG Oncology/RTOG 1014 Phase 2 Clinical Trial. *JAMA Oncol*. 2020; 6(1): 75-82. PMID: 31750868. <https://doi.org/10.1001/jamaoncol.2019.4320>
- [7] Hasan S, Chew KS, Balang RV, et al. Beyond the scars: a qualitative study on the experiences of mastectomy among young women with breast cancer in a country with crisis. *BMC Womens Health*. 2023; 23(1). PMID: 37953265. <https://doi.org/10.1186/s12905-023-02734-0>
- [8] Lundberg PC, Phoosuwan N. Life situations of Swedish women after mastectomy due to breast cancer: A qualitative study. *European Journal of Oncology Nursing*. 2022; 57. PMID: 35272173. <https://doi.org/10.1016/j.ejon.2022.102116>
- [9] Chiappa C, Fachinetti A, Boeri C, et al. Wound healing and postsurgical complications in breast cancer surgery: A comparison between PEAK PlasmaBlade and conventional electrosurgery - A preliminary report of a case series. *Ann Surg Treat Res*. 2018; 95(3): 129-134. PMID: 30182018. <https://doi.org/10.4174/ast.2018.95.3.129>
- [10] Chang PJ, Asher A, Smith SR. A targeted approach to post-mastectomy pain and persistent pain following breast cancer treatment. *Cancers (Basel)*. 2021; 13(20). PMID: 34680339. <https://doi.org/10.3390/cancers13205191>
- [11] Unger J, Rutkowski R, Kohlmann T, et al. Potential risk factors influencing the formation of postoperative seroma after breast surgery - A prospective study. *Anticancer Res*. 2021; 41(2): 859-867. PMID: 33517291. <https://doi.org/10.21873/anticancer.14838>
- [12] Leonardis JM, Lulic-Kuryllo T, Lipps DB. The impact of local therapies for breast cancer on shoulder muscle health and function. *Crit Rev Oncol Hematol*. 2022; 177. PMID: 35868499. <https://doi.org/10.1016/j.critrevonc.2022.103759>
- [13] Jetha ZA, Gul RB, Lalani S. Women experiences of using external breast prosthesis after mastectomy. *Asia Pac J Oncol Nurs*. 2017; 4(3): 250-258. PMID: 28695172. [https://doi.org/10.4103/apjon.apjon\\_25\\_17](https://doi.org/10.4103/apjon.apjon_25_17)
- [14] Morales-Sánchez L, Luque-Ribelles V, Gil-Olarte P, et al. Enhancing self-esteem and body image of breast cancer women through interventions: A systematic review. *Int J Environ Res Public Health*. 2021; 18(4): 1-20. PMID: 33572137. <https://doi.org/10.3390/ijerph18041640>
- [15] Rautalin M, Jahkola T, Roine RP. Surgery and health-related quality of life - A prospective follow up study on breast cancer patients in Finland. *European Journal of Surgical Oncology*. 2021; 47(7): 1581-1587. PMID: 33593622. <https://doi.org/10.1016/j.ejso.2021.02.006>



- [16] Antram E, Shaari E, Balasubramanian R, et al. Investigating the time to adjuvant treatment following immediate breast reconstruction in breast cancer patients. *Annals of Breast Surgery*. 2023; 7: 15-15. <https://doi.org/10.21037/abs-21-37>
- [17] Chen W, Lv X, Xu X, et al. Meta-analysis for psychological impact of breast reconstruction in patients with breast cancer. *Breast Cancer*. 2018; 25(4): 464-469. PMID: 29442215. <https://doi.org/10.1007/s12282-018-0846-8>
- [18] Qiu J, Hou S, Li P, et al. Medical professionals' knowledge of the use of external breast prostheses among breast cancer patients in China - a cross-sectional study. 2021; 10(2): 595-606. PMID: 33708543. <https://doi.org/10.21037/gc-20-657>
- [19] Susini T, Renda I, Giani M, et al. Changing trends in mastectomy and breast reconstruction. Analysis of a single-institution experience between 2004-2016. *Anticancer Res*. 2019; 39(10): 5709-5714. PMID: 31570471. <https://doi.org/10.21873/anticancer.13770>
- [20] Filip AC, Marcu OA, Pop MS, et al. The multidisciplinary approach to breast cancer - the role of support specialties before and after mastectomy. *Archives of the Balkan Medical Union*. 2020; 55(3): 437-445. <https://doi.org/10.31688/ABMU.2020.55.3.09>
- [21] Nair NS, Penumadu P, Yadav P, et al. Awareness and Acceptability of Breast Reconstruction Among Women with Breast Cancer: A Prospective Survey. *JCO Glob Oncol*. 2021; 7: 253-260. PMID: 33571006. <https://doi.org/10.1200/JCO.20.00458>
- [22] Stanis M, Kolak E, Branecka-Woźniak D, et al. Evaluation of women's quality of life after breast reconstruction surgery. *Pomeranian J Life Sci*. 2020; 66(2): 55-60. <https://doi.org/10.21164/pomjlifesci.698>
- [23] Borghesan DHP, Gravena AAF, Lopes TCR, et al. Variables that affect the satisfaction of Brazilian women with external breast prostheses after mastectomy. *Asian Pacific Journal of Cancer Prevention*. 2014; 15(22): 9631-9634. PMID: 25520080. <https://doi.org/10.7314/APJCP.2014.15.22.9631>
- [24] Chang PJ, Asher A, Smith SR. A targeted approach to post-mastectomy pain and persistent pain following breast cancer treatment. *Cancers (Basel)*. 2021; 13(20). PMID: 34680339. <https://doi.org/10.3390/cancers13205191>
- [25] Zhang C, Hu G, Biskup E, et al. Depression Induced by Total Mastectomy, Breast Conserving Surgery and Breast Reconstruction: A Systematic Review and Meta-analysis. *World J Surg*. 2018; 42(7): 2076-2085. PMID: 29426972. <https://doi.org/10.1007/s00268-018-4477-1>
- [26] Matthews H, Turner A, Williamson I, et al. 'It's a silver lining': A template analysis of satisfaction and quality of life following post-mastectomy breast reconstruction. *Br J Health Psychol*. 2018; 23(2): 455-475. PMID: 29498475. <https://doi.org/10.1111/bjhp.12299>
- [27] Hiltrop K, Heidkamp P, Breidenbach C, et al. Conflicting demands, coping, and adjustment: A grounded theory to understand rehabilitation processes in long-term breast cancer survivors. *Psychooncology*. 2021; 30(11): 1957-1964. PMID: 34272908. <https://doi.org/10.1002/pon.5769>
- [28] Qiu J, Hou S, Li P, et al. Medical professionals' knowledge of the use of external breast prostheses among breast cancer patients in China-a cross-sectional study. *Gland Surg*. 2021; 10(1): 595-606. PMID: 33708543. <https://doi.org/10.21037/gc-20-657>
- [29] Anishya A, Appavu S. External Breast Prosthesis for Post Mastectomy Women. 2021; 11(03): 52711. <https://doi.org/10.5958/2349-2996.2021.00018.5>
- [30] Jetha ZA, Gul RB, Lalani S. Women experiences of using external breast prosthesis after mastectomy. *Asia Pac J Oncol Nurs*. 2017; 4(3): 250-258. PMID: 28695172. [https://doi.org/10.4103/apjcn.apjcn\\_25\\_17](https://doi.org/10.4103/apjcn.apjcn_25_17)
- [31] Anishya A, Appavu S. External Breast Prosthesis for Post Mastectomy Women. *Asian Journal of Nursing Education and Research*. 2021; 11(3): 427-0. <https://doi.org/10.5958/2349-2996.2021.00018.5>
- [32] Liang YN, Xu B. Factors influencing utilization and satisfaction with external breast prosthesis in patients with mastectomy: A systematic review. *Int J Nurs Sci*. 2015; 2(2): 218-224. <https://doi.org/10.1016/j.ijnss.2015.04.005>
- [33] Brunet J, Price J, Harris C. Body image in women diagnosed with breast cancer: A grounded theory study. *Body Image*. 2022; 41: 417-431. PMID: 35526352. <https://doi.org/10.1016/j.bodyim.2022.04.012>
- [34] Olfat S, Miandoab PS, Banaee N, et al. Evaluating the effect of the silicone prosthesis on the photon dose distribution in radiation therapy of breast cancer. *Frontiers in Biomedical Technologies*. 2021; 8(3): 175-182. <https://doi.org/10.18502/fbt.v8i3.7112>
- [35] McGhee DE, Mikilewicz KL, Steele JR. Effect of external breast prosthesis mass on bra strap loading and discomfort in women with a unilateral mastectomy. *Clinical Biomechanics*. 2020; 73: 86-91. PMID: 31958702. <https://doi.org/10.1016/j.clinbiomech.2019.12.027>
- [36] Qiu J, Tang L, Huang L, et al. Physical and psychological effects of different temperature-controlled breast prostheses on patients with breast cancer during rehabilitation: a randomized controlled study (CONSORT). *Medicine (United States)*. 2020; 99(13): E19616. PMID: 32221086. <https://doi.org/10.1097/MD.00000000000019616>
- [37] Chien LY. Evidence-based practice and nursing research. *Journal of Nursing Research*. 2019; 27(4). PMID: 31313747. <https://doi.org/10.1097/jnr.0000000000000346>
- [38] de la Borbolla Martínez GD, Martínez MEH, Raygoza NP. Nursing intervention in women who developed lymphedema after undergoing a modified radical mastectomy: A pre-experimental study. *Ecancermedicalscience*. 2018; 12. PMID: 29743947. <https://doi.org/10.3332/ecancer.2018.827>