

Persistent post-surgical pain and its relationship to health-related quality of life in Pakistani women after breast cancer surgery

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Abstract

Background: Breast cancer is the most commonly diagnosed cancer in women; it is also the second-leading cause of death from cancer. Persistent pain after breast cancer surgery is a serious clinical problem that negatively impacts the health-related quality of life of breast cancer survivors. Although persistent post-surgical pain following breast cancer surgery has long been under-reported; however, it is less explored in Pakistan's geographical background.

Objective: The study aimed to examine the persistent post-surgical pain after breast cancer surgery and its relationship to health-related quality of life among Pakistani women.

Methods: A descriptive correlational research design was employed in this study. The Brief Pain Inventory Short Form (BPI-SF) was used to assess the persistent post-surgical pain. The Functional Assessment of Cancer Therapy-Breast (FACT-B) was used to measure the health-related quality of life. Data were collected between February and May 2019 from Pakistani women who have undergone breast cancer surgery for at least three months and attended follow-up visits at two tertiary care hospitals in Pakistan. A Spearman's correlation coefficient was used for data analysis.

Results: The study included 91 Pakistani women. The participants were all females, with an average age of 45.6 years ($SD = 6.53$). The majority received radical mastectomy ($n = 84$, 92.3%) with adjuvant therapy ($n = 91$, 100%). The prevalence of breast surgery-related persistent pain was 100%, with 63 (69.2%) rating the pain as moderate to severe and reported neuropathic pain. The data analysis revealed a statistically significant negative correlation between BPI-SF items and FACT-B dimensions ($r = -.43$, $p < 0.01$). The participants appeared to show the highest score of the FACT-B in the social/family well-being ($M = 16.58$, $SD = 3.44$). The lowest score of the FACT-B was physical well-being ($M = 6.98$, $SD = 6.38$).

Conclusion: Persistent post-surgical pain has a negative impact on the health-related quality of life of Pakistani women breast cancer survivors, particularly on their physical well-being. Therefore, follow-up care of breast cancer survivors after treatment completion requires proper persistent pain-relief treatments and interventions to control pain and maintain health-related quality of life in oncology and research in this sphere. This basic knowledge from this study will enlighten the nurses and health care professionals to pay more attention to pain management and regular evaluation of persistent post-surgical pain after breast cancer surgery in order to improve their health-related quality of life.

Keywords

cancer survivors; quality of life; pain management; breast neoplasms; postoperative pain; mastectomy; nursing; Pakistan

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Background

Breast carcinoma is the most frequently diagnosed cancer in women; it is also the second leading cause of cancer mortality (Gong et al., 2020; Saporito et al., 2019). In 2020, approximately 276,480 new invasive breast cancer cases and 48,530 in situ breast carcinoma cases were diagnosed, with the expected number of deaths being about 42,170 women

globally (American Cancer Society, 2020). In South Asia, Pakistan has the highest rate of breast cancer, especially in rural areas. Notably, breast cancer affects one out of every nine Pakistani women at some stage of their lives (Zaheer et al., 2019). There are approximately 34,000 incidences of breast cancer in Pakistan annually, and about 17,174 women will die from breast cancer (World Health Organization, 2020).

Breast cancer surgery is the most effective treatment option for breast cancer. However, as with any surgical

procedure, early or delayed complications can occur (Zimmaro et al., 2020). Persistent pain after breast cancer surgery is one of the most common long-term concerns among survivors of breast cancer (Bao et al., 2018; García-Aranda & Redondo, 2019; Ha & Thanasilp, 2021; Wang et al., 2020; Zimmaro et al., 2020). Although an increasing body of evidence exists that emphasizes the overall prevalence of persistent pain experienced by breast cancer survivors after breast cancer treatment but with inconsistencies between reports (Voute et al., 2020). Previous studies revealed approximately 50-93% (Costa et al., 2017; Gong et al., 2020; Zocca et al., 2018), 56% (Voute et al., 2020), and 15% - 60% (Fakhari et al., 2017; Saporito et al., 2019) of breast cancer survivors experienced persistent pain after the completion of breast cancer treatments.

Persistent Post-Surgical Pain (PPSP) may result from damage to the nerve fibers during the surgery (Juhl et al., 2016). The characteristics of PPSP are considerable neuropathic pain with and without sensory changes, which can persist for many years, and pain intensity that can vary over time (American Cancer Society, 2020). The pain is most often in the axilla, upper medial arm, breast, and/or chest wall, and it lasts beyond three months after surgery (Tait et al., 2018). In addition, neuropathic pain associated with peripheral neuropathy symptoms is also commonly found among breast cancer survivors who received breast cancer surgery with adjuvant therapy (Noh et al., 2018; Wang et al., 2020).

The evidence for a particular number of existing PPSP cases assists in recognizing the size of the impact on survivors. At the same time, a detailed description of pain characteristics helps better understand the experience and effects of pain on individual survivors (Bao et al., 2018; Schreier et al., 2019). Unfortunately, the prevalence and characteristics of pain after breast cancer surgery assessed by health care professionals may be underestimated as it is frequently hidden by survivors reluctant to report pain to physicians (Schreier et al., 2019). In addition, there is currently no evidence regarding the characteristics of PPSP in Pakistani breast cancer survivors.

PPSP is considered one of the most troublesome adverse effects, worsening the quality of life, and is a strong indicator and predictor of Health-Related Quality of Life (HRQoL) in breast cancer survivors (Bao et al., 2018; Chen et al., 2018; Costa et al., 2017; Enien et al., 2018; Zocca et al., 2018). Previous research has revealed that persistent post-surgical pain with adjuvant therapy has a greater prolonged negative impact on HRQoL in breast cancer survivors (Noh et al., 2018; Ozair et al., 2019). In addition, a previous study conducted in Pakistan revealed that pain was found to be one of the most important predictors of quality of life among breast cancer patients (Siddiqui et al., 2019).

Existing evidence from the United States, European countries, and other Asian nations point out that persistent pain after breast cancer surgery is a major and growing problem that negatively impacts the HRQoL of breast cancer survivors. It is difficult to justify and plan interventions to decrease persistent pain's negative consequences to enhance survivors' well-being with an unknown individual context burden. Ascertaining the specific population characteristics of persistent pain and HRQoL will help unwrap the trends and burden of this problem. More importantly, the study aimed to

determine the PPSP and its relationship with HRQoL in breast cancer women in a particular Pakistani context to understand better the experience and impact of persistent pain in this population.

Methods

Study Design

A descriptive correlational research design was employed in this study.

Samples/Participants

Data were collected among Pakistani women who had undergone breast cancer surgery for a minimum of three months and gave consent. The sample size was calculated using power analysis of priori sample size calculation. The effect size was calculated from a previous study to determine the relationship between pain and HRQoL with a medium effect size of 0.4 (Abu Farha et al., 2017). Using the alpha level of 0.05 and the power of 0.80 with the effect size between r of 0.3 to r of 0.4, the proper sample size was between 47 and 85 (Polit & Beck, 2012).

Instruments

There were four sections to the data collection process. The researchers developed the first two sections based on the relevant evidence to obtain the demographic profile sheet, which included questions about the personal information of the participants: age, marital status, place of residence, educational level, occupation, religion, family monthly income, height, and weight. The clinical and treatment-related data sheet included questions about the type and stage of breast cancer, duration of disease, types of treatment undertaken, axillary lymph node dissection performed, pain intensity before and after surgery, and duration after treatment completion. Brief Pain Inventory (BPI) – Short Form Pakistani version was used to assess the characteristics of PPSP after getting permission.

BPI - short form consists of (9 items): screening question about the participant's pain presence on the day (1 item), a body diagram to indicate the pain region and the worst pain area (1 item), the severity of pain (4 items), level of pain relief (1 item), effects of pain treatment on pain relief (1 item), and interference of pain (1 item, with seven sub-items) (Im et al., 2020; Poquet & Lin, 2016). BPI is a well-known self-report pain assessment tool that has demonstrated adequate validity and reliability across cultures and languages for clinical neuropathic and nociceptive pain assessment in previous cancer pain research, including breast cancer (Im et al., 2020; Kuosmanen et al., 2019; Matsuoka et al., 2020; Miettinen et al., 2019).

Questionnaire for Functional Assessment of Cancer Therapy-Breast (FACT-B) Pakistani version was used to assess the HRQoL. FACT-B is a frequently used self-report questionnaire with good validity and reliability properties. The 36-item FACT-B consists of four general subscales: physical well-being (PWB), social well-being (SWB), functional well-being (FWB), emotional well-being (EWB), and additional concerns. The response of each item is measured on a five-point Likert scale and scored 0 (not at all), 1 (a little bit), 2

(somewhat), 3 (quite a bit), 4 (very much) (Algamdi & Hanneman, 2019; Im et al., 2020). The total score was considered acceptable if the response rate of the overall item was more than 80% and of additional concern if more than 50% (e.g., at least 22 of 27 items). A higher score indicates a better quality of life (Miettinen et al., 2019).

The content validity of the instruments was established by three experts, and the scale content validity index (S-CVI) score was 0.9. In addition, the reliability of the instruments was measured with 20 breast cancer survivors who met the inclusion criteria in terms of internal consistency using Cronbach's alpha coefficient. Item analysis was also conducted to determine the homogeneity of the items within a scale. Cronbach's alpha coefficients for BPI-SF and FACT-B were 0.87 and 0.79, respectively.

Data Collection

After obtaining permission, the researchers attended the outpatient department (OPD) of the Bolan Medical Complex Hospital (BMCH) and the Centre for Nuclear Medicine and Radiotherapy (CENAR), Pakistan, five days a week during the data collection period (February 2019 to May 2019). The staff nurses at the clinics initially identified breast cancer survivors who attended the clinics, met the eligible criteria, and agreed to or were willing to the approach by the researchers. Full informed consent was sought and obtained from each participant to ensure an autonomous decision was made. The participants completed the questionnaire in approximately 20 – 30 minutes in the study setting. Number coding was used for each participant to maintain their anonymity and confidentiality.

Data Analysis

The Statistical Package for Social Studies (SPSS 20.0; IBM Corp., New York, NY, USA) was used to analyze the data. Sociodemographic, clinical, and treatment characteristics of the study participants were analyzed by using descriptive statistics. Spearman's correlation coefficients were employed to assess the strength and direction of the linear relationships between PPSP and HRQoL since both variables were not normally distributed. The p -value < 0.01 was considered statistically significant.

Ethical Consideration

The ethical clearance of the research was approved by the Institutional Review Board, Behavioral and Social Science, Prince of Songkla University, Thailand (approval number: PSU IRB 2018 – NST 060). In addition, the study permission was obtained from Bolan Medical Complex Hospital (Estt: /BMCH/ DA-1/ 2678/2 2019) and the Center for Nuclear Medicine and Radiotherapy Hospital (Ref number: Dir -3 (17) 96 2019). Informed consent was also signed by each participant prior to the data collection process.

Results

Sociodemographic Characteristics

A total of 91 eligible participants with a mean age of 45.6 years ranging from 27 to 62, were recruited and completed the self-administered questionnaires. The demographic characteristics

of the participants are shown in Table 1. The majority of the study participants were Muslim (94.5%), married (92.3%), living with a spouse (73.6%) with more than three children (58.1%), and care responsibilities (68.1%). The majority was illiterate (41.8%), housewife (96.7%), with a monthly family income range between 7,000 - 20,000 Pakistani Rupee Rate (PKR) (1 PKR equivalent to 0.006 USD).

Table 1 Sociodemographic characteristics

Characteristics	N = 91	%
Age (in years)		
27-34	2	2.2
35-42	27	29.7
43-50	46	50.5
51-58	11	12.1
59-66	5	5.5
<i>M ± SD</i> (45.6 ± 6.53)		
Range (27-62)		
Religion		
Hindu	1	1.1
Muslim	86	94.5
Christian	4	4.4
Level of education		
Illiterate	38	41.8
Primary school	29	31.9
Matric*	16	17.6
Intermediate**	3	3.2
Graduate***	4	4.4
Post-graduate	1	1.1
Marital status		
Single	5	5.5
Married	84	92.3
Widow	1	1.1
Divorced /separated	1	1.1
Living situation		
With a spouse, partner	67	73.6
With family	24	26.4
Child care responsibilities		
No	29	31.9
Yes	62	68.1
Specify number		
Two children	8	12.9
Three children	18	29.0
>3 children	36	58.1
Dwelling status		
Rural	39	42.9
Urban	52	57.1
Working status		
Employed	2	2.2
Retired	1	1.1
Housewife	88	96.7
Monthly family income (PKR)****		
7000 – 20 000	52	57.1
21 000 – 34 000	28	30.8
35 000 – 48 000	6	6.6
49 000 – 62 000	4	4.4
63 000 – 76 000	0	0.0
77 000 – 90 000	1	1.1

Abbreviation: *M ± SD* (Mean ± Standard Deviation *Matric (Secondary school certificate), **Intermediate (Higher secondary school certificate), ***Graduate (Bachelor degree), ****USD 1 =Pakistani Rupee (PKR) 151.78.

Clinical and Treatment Characteristics

The Body Mass Index (BMI) average of the participants was 27.0 ($SD \pm 0.56$), with 62.6% overweight. The majority had no comorbidity ($n = 57$, 62.6%). Between the ages of 8 and 18, 48.3% of the participants were diagnosed with breast cancer. The average time since initial diagnosis with breast cancer was 21.20 months ($SD \pm 8.79$). Type of breast cancer and TNM stage at diagnosis were mostly invasive ductal carcinoma ($n = 68$, 74.7%) and stage III ($n = 60$, 65.9%). None of the samples had a metastatic recurrence, and treatment received by participants included radical mastectomy technique (92.3%) and axillary lymph node dissection (63.7%). In addition, the majority (82.4%) received both chemotherapy and radiotherapy as adjuvant treatments. The average time from breast cancer surgery to data collection was 8.59 months ($SD \pm 7.48$) (Table 2).

Table 2 Clinical and treatment-related characteristics

Characteristics	N = 91	%
BMI		
< 18.5	1	1.1
18.5 - 24.9	29	31.9
25 - 29.9	57	62.6
>30	4	4.4
$M \pm SD 27.0 \pm 0.56$; Range < 18.5 – >30		
Comorbidities		
Without comorbidities	57	62.6
With comorbidities	34	37.4
Specific comorbidities and treatments		
DM	8	23.5
With Insulin injection	8	100.0
Hypertension	26	76.5
With antihypertensive drugs (Nebivolol, Tenormin)	20	76.9
No treatment	6	23.1
Time since breast cancer diagnosis (months)		
8 – 18	44	48.3
19 – 29	37	40.7
30 – 40	8	8.8
41 – 51	1	1.1
52 - 63	0	0.0
64 – 73	1	1.1
$M \pm SD 21.20 \pm 8.79$; Range = 8 – 72		
TNM stage at breast cancer diagnosis		
Stage I	1	1.1
Stage II	22	24.2
Stage III	60	65.9
Stage IV	8	8.8
Type of breast cancer		
Ductal Carcinoma in Situ (DCIS)	8	8.8
Invasive ductal carcinoma	68	74.7
Invasive lobular carcinoma	15	16.5
Number of recurrences or metastases recorded		
No	91	100.0
Surgery with adjuvant therapy		
Chemotherapy and radiotherapy	75	82.4
Chemotherapy	10	11.0
Radiotherapy	3	3.3
Hormonal therapy	1	1.1
Chemotherapy and hormonal therapy	1	1.1
Radiotherapy and hormonal therapy	1	1.1

Table 2 (Cont.)

Time since received breast cancer surgery (months)		
3 – 13	79	86.8
14 – 24	9	9.9
25 – 35	2	2.2
36 – 46	0	0.0
47 – 57	1	1.1
$M \pm SD 8.59 \pm 7.480$; Range = 3 – 48		
Surgical breast procedure		
Radical mastectomy procedure	84	92.3
Conservative surgery procedure	7	7.7
Axillary Lymph Node Dissection (ALND)	58	63.7
Sentinel lymph Node biopsy (SN)	5	5.5
Preoperative pain		
No	70	76.9
Yes	21	23.1
Pain start after surgery		
Immediately	91	100
A few days	0	0.0
A few weeks	0	0.0
A few months	0	0.0
Acute pain intensity after surgery		
Experience moderate to severe pain	91	100

Characteristics of Persistent Post-Surgical Pain

Table 3 illustrates the characteristics of persistent post-surgical pain. The majority of patients ($n = 84$, 92.3%) received radical mastectomy as the main surgical procedure ($n = 84$, 92.3%), Axillary Lymph Node Dissection (ALND) ($n = 58$, 63.7%), and Sentinel lymph Node biopsy (SN) ($n = 5$, 5.5%). Every patient ($n = 91$, 100%) experienced moderate to severe pain immediately after breast surgery ($n = 91$, 100%). The majority reported pain at the side of thorax ($n = 86$, 94.5%) followed by the mastectomy scar ($n = 76$, 83.5%) and in the axilla ($n = 63$, 69.2%). The nature of neuropathic pain was experienced by every patient ($n = 91$, 100%). Numbness or reduced ability to sense pressure, touch, heat, or cold in the feet or fingers was reported by the majority of participants ($n = 63$, 69.2%). As shown in Table 3, the key dominant traits of neuropathic pain include being more sensitive to cold or heat, touch or pressure on hands and feet ($n = 15$, 16.5%), trouble using fingers to pick up or hold things; dropping things ($n = 13$, 14.3%), feeling of tingling; itching; and burning, tight, stabbing, sharp (lightning-like), or aching pain in the feet or fingers ($n = 3$, 3.3%), were developed in all patients. Of all the samples that developed pain, 64 patients (70.3%) had taken oral analgesics.

Health-related quality of life of Pakistani women with persistent post-surgical pain

The overall HRQoL mean score of the participants was 62.64 ($SD = 17.20$). The highest HRQoL score was in the social/family well-being subscale ($M \pm SD = 16.58$, ± 3.44), with the lowest score in the physical well-being subscale ($M \pm SD = 6.98$, ± 6.38). The highest concern reported by the overall participants was in the physical well-being subscale ($M \pm SD = 6.98$, ± 6.38), followed by the emotional well-being subscale ($M \pm SD = 8.61$, ± 3.52). Table 4 shows the overall and each subscale HRQoL scores of the participants.

Table 3 Characteristics of persistent post-surgical pain

Characteristics	N = 91	%
Pain lasting more than three months after surgery		
Yes	91	100
No	0	0.0
Presence of pain today		
Yes	80	87.9%
No	11	12.1%
Pain intensity in the last 24 hours		
0-3	31	34.1%
4-6	27	29.7%
7-10	33	36.3%
Pain intensity right now		
0-3	14	15.4%
4-6	24	26.4%
7-10	53	58.2%
Neuropathic pain nature*		
Numbness/ less ability to sense pressure, touch, heat, or cold in the feet or fingers	63	69.2
Being more sensitive to cold or heat, to touch or pressure on hands and feet	15	16.4
Trouble using fingers to pick up or hold things; dropping things	13	14.3
Feeling of tingling; itching; and burning, tight, stabbing, sharp (lightning-like), or aching pain in the feet or fingers	3	3.2
Locations/ sites*		
In the arm	46	50.5
In the axilla	63	69.2
Side of the thorax	86	94.5
In the mastectomy scar	76	83.5
In the breast that has been removed	60	65.9
Other (body pain)	2	2.1
Currently taking analgesics/ analgesic used		
No	27	29.7
Yes	64	70.3

Note. *One participant selected more than one answer

Table 4 The health-related quality of life of Pakistani women with persistent post-surgical pain

FACT-B Subscales	Min-Max	Mean	SD
FACT-B QoL scores	24–109	62.64	17.20
Physical well-being	0–22	6.98	6.38
Social/family well-being	7–25	16.58	3.44
Emotional well-being	2–16	8.61	3.52
Functional well-being	2–21	14.71	3.85
Additional Concerns	6–28	15.52	5.15

Relationship between health-related quality of life and persistent post-surgical pain

After testing the assumptions of normality by using skewness and kurtosis, Spearman's correlation was used to evaluate the

correlation between PPSP and HRQoL. There was a significantly negative correlation between the PPSP score and the FACT-B score ($r = -.43, p < 0.01$). **Table 5** displays the correlation between PPSP and HRQoL.

Table 5 Correlation between health-related quality of life and persistent post-surgical pain in Pakistani women

Variables	Total HRQoL	PWB	SWB	EWB	FWB	AC
PPSP	-0.43**	-0.75**	-0.02	-0.31**	-0.27**	-0.27**

Abbreviations: PPSP (Persistent Post-Surgical Pain), HRQoL (Health-related Quality of Life), PWB (Physical Well-Being), SWB (Social/family Well-Being), EWB (Emotional Well-Being), FWB (Functional Well-Being), AC (Additional Concerns). ** $p < 0.01$

Discussion

The present study investigated the characteristics of PPSP and its association with HRQoL among Pakistani women. The

study results revealed a much higher prevalence of PPSP than the prevalence rate reported in the literature, ranging from 25% to 68% (Cui et al., 2018; Gong et al., 2020). The wide range of the reported PPSP prevalence might be caused by the various definitions of PPSP used in this study and previous

studies. In this study, PPSP is defined as pain that lasts longer than three months following breast surgery; it is located around the excised breast area, ipsilateral thorax, the axilla, and /or medial upper half of the arm. The pain definitions in other studies also included pain intensity, frequency of pain with duration lasts at least six months as a cut off; it occurs at least 50% of the time; and it can be exacerbated by shoulder girdle motions (Cui et al., 2018; Gong et al., 2020). The socio-demographic, clinical, and treatment characteristics of tumor staging, radical mastectomy, and axillary lymph node dissection (ALND) in this study were consistent with the independent risk factors of PPSP determined in a previous study (Gong et al., 2020). The neuropathic pain character of PPSP experienced and reported by participants in this study provides additional support for its nature and etiology. Damage to the intercostobrachial nerve (ICBN) and the thoracic intercostal nerves following breast cancer surgery or as a result of radiation or chemotherapy as adjuvant treatment received increased the likelihood of developing neuropathic pain character (Haidinger & Bauerfeind, 2019; Matsuoka et al., 2020).

Moderate to severe acute pain immediately after surgery experienced by the participants in this study could be the significant factor underpinning the existence of persistent pain following breast cancer surgery. Previous evidence has found the influence of the higher levels of acute postoperative pain to a higher risk of developing persistent pain after surgery (Okamoto et al., 2018). Also, the majority of participants presented with advanced tumor stage and received radical mastectomy procedure and Axillary Lymph Node Dissection (ALND), which have been reported as important factors associated with persistent pain after surgery (Gong et al., 2020). In addition, the study participants reported locations of pain around the surgical site or surgical scar, ipsilateral shoulder or shoulder-arm, and removed breast, corresponding with the results in previous studies (Chiang et al., 2019; Cortés-Samacá et al., 2018).

As anticipated, this study highlights the negative correlations between persistent pain and HRQoL in breast cancer survivors reported in the literature (Arslan et al., 2018; Gallaway et al., 2020; Jayasinghe & Nandasena, 2018). Persistent pain resulted from the late effect of breast cancer treatments that impaired the sense of well-being in breast cancer survivors (Arslan et al., 2018; Bjerkeset et al., 2020; Ho et al., 2018). One of the strongest predictors of quality of life is persistent pain (American Cancer Society, 2020; Arslan et al., 2018) which directly affects and greater impacts the physical well-being of breast cancer survivors (Chen et al., 2018; Hamood et al., 2018; Ho et al., 2018; Ozair et al., 2019).

This study reveals the first evidence in a Pakistani context to address the characteristics of persistent post-surgical pain and its association with health-related quality of life. The proof of a certain amount of the existing cases assists in recognizing the size of the impact on survivors. A detailed description of pain characteristics helps better understand the experience and impact of pain on individual survivors. This basic knowledge will guide nurses and health care professionals to pay more attention to pain management and regular evaluation of persistent pain following breast cancer surgery to improve patients' HRQoL. Continuing education and training programs about pain management after surgery should be provided for

nurses and health care professionals to enhance the quality of life of breast cancer survivors. Breast cancer survivors require ongoing and adequate pain management strategies throughout their follow-up care in order to relieve pain, improve their sense of well-being, and increase their quality of life. The single provincial setting in the study poses a limitation for generalization to other breast cancer survivor populations.

Conclusion

The present study results reveal a high prevalence of persistent pain long-lasting than three months after breast cancer surgery. Neuropathic pain nature with sensory disturbances was experienced by the majority of participants. Pain frequently occurred around the surgical site, the ipsilateral shoulder or shoulder-arm, and the removed breast. Breast cancer survivors with persistent pain reported a lower level of quality of life. Furthermore, persistent post-surgical pain negatively affected the HRQoL of Pakistani survivors. The high prevalence of persistent pain with negative consequences on quality of life evidenced in this study calls attention to health care professionals as well as survivors to assess, report and manage pain following breast cancer surgery. To improve their HRQoL, nurses and healthcare providers will use this basic knowledge to focus more on pain management and regular evaluation of persistent pain following breast cancer surgery. In addition, tailored standardized instruments with outstanding sensitivity and specificity for breast cancer survivors in a particular context are crucial to describe the characteristics of persistent pain and HRQoL after breast cancer surgery. Therefore, the foreseeable study to develop a national comprehensive context-based care program to manage persistent pain and enhance HRQoL for breast cancer survivors is worth conducting.

Declaration of Conflicting Interest

The authors report no declarations of interest.

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Authors' Contributions

RB wrote, analyzed, and revised the manuscript. KM designed the study, analyzed the data, and wrote and revised the manuscript. HS designed the study and wrote the manuscript. WSS analyzed the data. All authors agreed with the final version of the article to be published.

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Data Availability

The dataset generated during and/or analyzed during the current study is available from the corresponding author on reasonable request.

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