International Journal of Science and Research Archive
eISSN: 2582-8185
Cross Ref DOI: 10.30574/ijsra
Journal homepage: https://ijsra.net/

(RESEARCH ARTICLE)

Check for updates

Nurse-led interventions on physical activity, supportive care, self-esteem and need experiences among breast cancer survivors

Uma Murugan [1,*], Vijayalakshmi Valveeman [1], Jamuna Madhan [1], Vinitha Wilson [1], Jagadeswari Dhandapani [2] and Shankar Shanmugam Rajendran [3]

[1] *Department of Obstetrics and Gynaecological Nursing, College of Nursing, Madras Medical College, Chennai-03. (Affiliated to TNMGR Medical University, Chennai-32), India.*
[2] *Department of Medical Surgical Nursing, College of Nursing, Madras Medical College, Chennai-03. (Affiliated to TNMGR Medical University, Chennai-32), India.*
[3] *Department of Child Health Nursing, College of Nursing, Madras Medical College, Chennai-03. (Affiliated to TNMGR Medical University, Chennai-32), India.*

International Journal of Science and Research Archive, 2025, 14(02), 914-924

Publication history: Received on 03 January 2025; revised on 10 February 2025; accepted on 13 February 2025

Article DOI: https://doi.org/10.30574/ijsra.2025.14.2.0442

Abstract

Purpose: Breast cancer is a major health issue affecting millions globally, necessitating effective post-treatment care to address the diverse challenges of survivorship. The study explores the efficacy of nurse-led interventions in enhancing physical activity, supportive care, and self-esteem among breast cancer survivors, addressing the comprehensive needs that emerge post-treatment. **Methods:** Employing a mixed-method approach with an Explanatory Sequential design, this study first conducted a quasi-experimental assessment using pre-test and post-test measurements among 90 breast cancer survivors in Chennai. The interventions included structured physical activities and educational sessions on supportive care and confidence-building. Quantitative data were analyzed using SPSS, while qualitative data from semi-structured interviews were assessed through thematic content analysis. **Results:** Post-intervention results indicated a 50% increase in survivors meeting physical activity guidelines, a 42% decrease in reported supportive care needs, and a 57% improvement in self-esteem scores. Themes from qualitative analysis included "Emotional Reactions to Diagnosis," "Impact of the Illness," and "Support Received from the Family," highlighting the critical role of tailored interventions and emotional support in improving survivor outcomes. **Conclusion:** Nurse-led interventions have shown promising results in improving physical, emotional, and social well-being among breast cancer survivors. The study underscores the importance of incorporating structured, comprehensive care models in routine survivorship programs to enhance the quality of life for survivors.

Keywords: Breast Cancer; Survivorship; Nurse-led Interventions; Supportive Care; Quality of Life

1. Introduction

Breast cancer continues to be one of the most common types of cancer impacting women globally.[1] The World Health Organisation (WHO) reports that it constitutes around 25% of all cancer cases in women worldwide, with more than 2.3 million new diagnoses in 2022.[2] Survival rates for breast cancer have markedly improved in recent decades due to breakthroughs in early identification and treatment. The survival phase, after the initial therapy, presents a distinct difficulty necessitating intensive care and support.[3]

Survivorship is a pivotal stage where emphasis transitions from therapy to recuperation and quality of life. With an increasing number of women surviving breast cancer, it is crucial to consider the long-term physical, emotional, and

* Corresponding author: Uma Murugan

social ramifications of the illness.[4] Customised therapies are essential for assisting survivors in efficiently navigating these challenges and enhancing their overall well-being.[5]

Breast cancer survivors encounter numerous challenges that can profoundly affect their quality of life. They may endure persistent discomfort, weariness, and diminished physical functionality.[6] Approximately 60% of breast cancer survivors experience enduring fatigue that may persist for years following treatment.[7] Lymphoedema, a disorder marked by swelling resulting from lymphatic system impairment, impacts roughly 20% of survivors, hindering their capacity to engage in daily activities.[8]

Engagement in physical activity is crucial for breast cancer survivors, as it mitigates fatigue, prevents weight gain, enhances muscle strength, and decreases the likelihood of cancer recurrence by as much as 50%.[9] Notwithstanding these advantages, merely 30% of survivors achieve the prescribed activity levels following treatment, hindered by obstacles such as physical limits, lack of motivation, and fear of damage, underscoring the necessity for supporting, customised interventions.[10] Supportive care is essential for symptom management, emotional assistance, and enhancing overall quality of life. Approximately 70% of survivors indicate unaddressed requirements in domains such as emotional assistance and chronic symptom management.[11] Confidence, shaped by physical constraints and alterations in body image, is essential for survivors to preserve their quality of life and participate in recovery endeavours.[12]

Nurse-led interventions have proven to be an effective approach for meeting the intricate requirements of breast cancer survivors. Nurses, utilising their holistic approach to patient care, are ideally suited to deliver complete survivorship care encompassing physical therapy, education, and emotional support. [13] Nurse-led physical therapy programs assist survivors in safely participating in physical activity, managing symptoms such as lymphoedema, and alleviating fatigue.[14]

Comprehending the requirements and experiences of breast cancer survivors is essential for formulating effective survivorship care strategies. Survivors frequently express insufficient information regarding the management of long-term side effects, apprehension about recurrence, and a necessity for emotional support. This study aimed to evaluate the impact of nurse-led interventions on improving physical activity, supportive care needs, and enhancing self-esteem among breast cancer survivors and to explore their need experiences.

2. Materials and methods

2.1. Research Approach and Design

This study utilized a mixed-method approach with an Explanatory Sequential design. Initially, a quantitative assessment was conducted using a quasi-experimental one-group pre-test post-test design to evaluate the impact of nurse-led interventions on physical activity, supportive care, and confidence among breast cancer survivors. This was followed by a qualitative exploration using a phenomenological design to gain an in-depth understanding of survivors' needs and personal experiences. The study was conducted in the Oncology Outpatient Department at Rajiv Gandhi Government General Hospital, Chennai over four weeks between March 2024 to April 2024. The study received approval from the Institutional Ethics Committee of Madras Medical College-wide No.30102023. Informed consent was obtained from all participants, ensuring confidentiality and the right to withdraw.

2.2. Study Population and Sample

The target population consisted of all breast cancer survivors attending the Oncology OPD at Rajiv Gandhi Government General Hospital, Chennai. 90 survivors were selected for the quantitative component using a non-probability convenient sampling technique using the

$$\text{Formula N} = \frac{Z^2{}_{\times}(1-p)}{p \times e^2}$$

where z = 1.96 = 5 % level, p = 59.1% = 0.59, e = 17.4% = 0.174

For the qualitative component, seven survivors were chosen through purposive sampling, focusing on extreme or deviant cases to capture varied impacts of the intervention and survivorship needs.

2.3. Inclusion and Exclusion Criteria

Inclusion criteria for the quantitative study were female breast cancer survivors aged 18 and above, who had undergone surgery and were undergoing treatment for more than six months, could engage in physical activity, and were able to understand Tamil or English. Exclusion criteria included survivors with severe physical disabilities, cognitive impairments, or those critically ill during data collection. For the qualitative study, participants willing to share personal experiences and undergo audio or video recordings were included, while those not participating in the intervention or with severe psychiatric conditions were excluded.

2.4. Data Collection Tools

Quantitative data were collected using three tools: the Groningen Activity Restriction Scale (GARS) to measure functional independence, the Supportive Care Needs Survey Short-Form (SCNS-SF34) to assess unmet supportive care needs across five domains, and the Rosenberg Self-Esteem Scale (RSES) to evaluate self-esteem levels among survivors. Qualitative data were gathered through semi-structured interviews in a designated room, exploring participants' experiences related to physical activity, supportive care, and confidence. These interviews provided in-depth insights into the personal perceptions and impacts of the nurse-led intervention on their daily lives, offering a comprehensive understanding of survivors' needs and experiences.

2.5. Intervention

A nurse-led intervention was implemented, consisting of physical activities such as walking, diaphragmatic breathing, and arm exercises, alongside educational sessions on supportive care and confidence-building strategies.

2.6. Data Analysis

Quantitative data were analyzed using SPSS version 22. Descriptive statistics (percentages, means, standard deviations) and inferential tests (paired t-test, Chi-square test) were employed to assess the pre-and post-intervention differences. Qualitative data were analyzed using thematic content analysis to identify and categorize themes and sub-themes.

3. Results

3.1. Sociodemographic Characteristics of Study Participants

The study included 90 breast cancer survivors. The mean age of the study participants is 51.8 ± 10.93 years. More than half of the participants 47 (52.2%) had two children, and educational attainment was predominantly at the primary and middle school levels 35 (38.9% each). A significant portion of participants 72 (80.00%) were unemployed, and 61 (67.8%) reported a monthly family income below Rs. 9307. Most participants resided in urban areas 57 (63.3%) and lived in nuclear families (73.3%). Menarche occurred between 10 and 15 years for 71(78.9%) of participants, while 65 (72.2%) were post-menopausal. Additionally, 57 (63.3%) reported no co-morbidities. A large proportion 78 (86.7%) followed a non-vegetarian diet, 44 (48.9%) maintained a healthy weight, and 69 (76.7%) reported sleeping between 4 and 8 hours per night. Most participants were in the early stages of survivorship 66 (73.3%) up to five years, with 40 (44.4%) diagnosed at Stage I and 43(47.8%) having tumors primarily in the left breast (Table 1).

Table 1 Demographic variables of the breast cancer survivors

Demographic variables		**Breast cancer survivors (n=90)**	**Percentage %**
Age	18-38 years	7	7.8
	39-59 years	64	71.1
	60 years and above	19	21.1
Marital status	Married	67	74.4
	Unmarried	2	2.2
	Divorced	0	0.00
	Separated	2	2.2

	Widow	19	21.2
Number of children	Nil	7	7.8
	One	12	13.3
	Two	47	52.2
	Three	24	26.7
Educational Status	Non-Formal education	3	3.3
	Primary Education	35	38.9
	Middle school	35	38.9
	High School	12	13.3
	Intermediate/diploma	5	5.6
	Graduate	0	0.0
	Professional degree	0	0.0
Occupation	Un Employed	72	80.0
	Un skilled working	11	12.2
	Semi-skilled working	4	4.4
	Skilled working	3	3.4
	Clerical/ shop	0	0.00
	Semi professional	0	0.00
	Semi professional	0	0.00
Family income per month in Rupees	≤Rs. 9307	61	67.8
	Rs.9308-27882	25	27.8
	Rs.27883-46474	4	4.44
	Rs 46475-69534	0	0.00
	Rs 69535-92950	0	0.00
	Rs 92951-185894	0	0.00
	Rs >185895	0	0.00
Place of residence	Urban	57	63.33
	Rural	33	36.67
Type of family	Nuclear family	66	73.3
	Joint family	24	26.7
	Extended family	0	0.00
Age of Menarche	10-15 years	71	78.9
	> 15 years	19	21.1
Menstrual cycle	Regular	10	11.1
	Irregular	15	16.7
	Cessation	65	72.2
Co -morbidity	Yes	33	36.7
	No	57	63.3

Food pattern	Vegetarian	10	11.1
	Non Vegetarian	78	86.7
	Eggetarian / Ova vegetarian	2	2.2
	Others	0	0.00
BMI	Underweight	30	33.3
	Healthy weight	44	48.9
	Overweight	13	14.5
	Unhealthy overweight(obese)	3	3.3
Duration of sleep	< four hours	11	12.2
	4 to 8 hours	69	76.7
	8 hours	10	11.1
Duration of survivorship	Up to five years	66	73.3
	More than five years	24	26.7
Stages of cancer	Stage I	40	44.4
	Stage II	27	30.00
	Stage III	16	17.8
	Stage IV	7	7.8
Tumour location.	Left breast	43	47.7
	Right breast	42	46.7
	Both	5	5.6

3.2. Pre-Test Levels of Physical Activity, Supportive Care, and Confidence

Before the intervention, none of the participants were classified as active or sufficiently active. The majority 52 (57.8%) were categorized as insufficiently active, while 38 (42.2%) were inactive. A significant 75 (83.3%) of participants reported a need for supportive care, and 79 (87.8%) had low self esteem, with only 11 (12.2%) exhibiting medium self-esteem and no participants reporting high self-esteem. These findings underscore the critical need for targeted interventions to improve physical activity levels and psychological support among breast cancer survivors (Table 2, 3 & 4).

Table 2 Pretest level of physical activity score

Level of physical activity	**Breast cancer survivors**	
	n=90	%
Active	0	0.0
Sufficiently active	0	0.0
Insufficiently active	52	57.8
Inactive	38	42.2
Total	90	100

Table 3 Pretest level of supportive care score

Level of supportive care score	Breast cancer survivors	
	n=90	%
No need	15	16.7
Some need	75	83.3
Total	90	100

Table 4 Pretest level of self-esteem score

Level of self-esteem	Breast cancer survivors	
	n=90	%
Low Self Esteem	79	87.8
Medium Self Esteem	11	12.2
High Self Esteem	0	0.00
Total	90	100

3.3. Effectiveness of Nurse-Led Interventions

The nurse-led intervention demonstrated significant improvements across all measured outcomes. The mean physical activity score decreased from 30.91 (SD = 3.12) pre-intervention to 15.93 (SD = 1.12) post-intervention, indicating a substantial reduction in disability levels (t = 41.37, p = 0.001). Supportive care needs also decreased significantly, with the mean score dropping from 118.36 (SD = 6.88) to 69.23 (SD = 1.25) post-intervention (t = 67.88, p = 0.001). In contrast, self-esteem scores increased markedly, from a pre-test mean of 19.28 (SD = 2.95) to 32.76 (SD = 2.27) post-intervention, reflecting enhanced participant confidence and self-worth. (Table 5,6 & 7)

Table 5 Comparison of physical activity score between pretest and post-test

Physical activity score				Mean difference	Student paired t-test	p value
Pretest		Post-test				
Mean	SD	Mean	SD			
30.91	3.12	15.93	1.12	14.98	t=41.37	p=0.001***(S)

p≤0.001 ***very high significant, S= significant

Table 6 Comparison of supportive care score between pretest and post-test

Supportive care score				Mean difference	Student paired t-test	p value
Pretest		Post-test				
Mean	SD	Mean	SD			
118.36	6.88	69.23	1.25	49.13	t=67.88	p=0.001***(S)

p≤0.001 ***very high significant, S= significant

Table 7 Comparison of self-esteem score between pretest and post-test

Self-esteem care score				Mean difference	Student paired t-test	p value
Pretest		Post-test				
Mean	SD	Mean	SD			
19.28	2.95	32.76	2.27	13.48	t=39.25	p=0.001***(S)

p≤0.001 ***very high significant, S= significant

3.4. Associations Between Post-Test Levels and Sociodemographic Variables

Post-test analyses revealed significant associations between physical activity levels and comorbidity and survivorship duration ($p < 0.05$). Supportive care needs were significantly correlated with monthly family income and comorbidities ($p < 0.05$). Similarly, self-esteem was significantly associated with family income and comorbidity ($p < 0.05$). These findings indicate that financial and health-related factors play a crucial role in determining the outcomes of supportive care and self-esteem among breast cancer survivors (Table 8, 9 & 10).

Table 8 Association between post-test level of physical activity score and breast cancer survivors

Demographic variable		Post-test level of physical activity				n=90	Chi-square test	p value
		Active		Sufficiently active				
		n	%	n	%			
Co -morbidity	Yes	7	21.2	26	78.8	33	$\chi 2=6.82$	p=0.01**(S)
	No	28	49.1	29	50.9	57		
Duration of survivorship	Up to five years	21	31.8	45	68.2	66	$\chi 2=5.20$	p=0.05*(S)
	More than five years	14	58.3	10	41.7	24		

p≤0.001 **highly significant, *Significant, S= significant $\chi 2$

Table 9 Association between post-test level of supportive care score and breast cancer survivors

Demographic variable		Post-test level of supportive care				n=90	Chi-square test	p value
		No need		Some need				
		n	%	n	%			
Family income per month in Rupees	Rs.<9307	33	54.1	28	45.9	61	$\chi 2=9.02$	p=0.01**(S)
	Rs.9308-27882	19	76.0	6	24.0	25		
	Rs.27883-46474	4	100.0	0	0.0	4		
	Rs. 46475-69534	0	0.0	0	0.0	0		
	Rs. 69535-92950	0	0.0	0	0.0	0		
	Rs. 92951-185894	0	0.0	0	0.0	0		
	Rs >185895	0	0.0	0	0.0	0		

Co -morbidity	Yes	17	51.5	16	48.5	33	$\chi 2=3.84$	p=0.01*(S)
	No	41	71.9	16	28.1	57		

p≤0.001 **highly significant, *Significant, S= significant

Table 10 Association between post-test level of self-esteem score and breast cancer survivors

Demographic variable		**Post-test level of self esteem**				**n=90**	**Chi square test**	**p value**
		Medium Self Esteem		High Self Esteem				
		n	%	n	%			
Family income per month in Rupees	≤Rs. 9307	18	29.5	43	70.5	61	\chi=5.99	p=0.05*(S)
	Rs.9308-27882	2	8.0	23	92.0	25		
	Rs.27883-46474	0	0.0	4	100.0	4		
	Rs 46475-69534	0	0.0	0	0.0	0		
	Rs 69535-92950	0	0.0	0	0.0	0		
	Rs 92951-185894	0	0.00	0	0.0	0		
	>Rs 185895	0	0.0	0	0.0	0		
Co -morbidity	Yes	12	36.4	21	63.6	33	\chi=6.03	p=0.01**(S)
	No	8	14.4	49	85.6	57		

p≤0.001 **highly significant, *Significant, S= significant

3.5. Need Experiences During Survivorship

Qualitative analysis revealed several themes related to the experiences of breast cancer survivors. The theme "Narratives of diagnosis" encompassed their journey from diagnosis through initial treatment responses. The subtheme "Emotional Reactions to Diagnosis" and “Initial Response to Treatment Plan” explored the primary emotional impacts upon receiving a diagnosis.

"When the doctor said 'breast cancer,' it felt like my world was crumbling. I was numb and couldn't process anything beyond those words." -Participant 2

"Hearing about the chemotherapy and surgery I would need was daunting, but I knew I had to stay strong and follow through." Participant 5

Under the theme "Impact of the illness," both "Emotional impact" and "Financial impact" were detailed, highlighting the comprehensive effects on patients’ lives.

“I was shocked when I heard this. I did not know how I was going to spend the rest of my days.”- Participant 2

“Earlier I was very active. I was very busy. But now I don’t have any earnings. Only my children are spending.”- Participant 1

The theme "Support received from the family" described the support system involving the "Husband," "family," and "friends."

"My husband was my rock throughout the entire process. He attended every appointment with me and made sure I never felt alone."-Participant 2

"My family rallied around me from day one. My parents would cook meals and help with household tasks, making it easier for me to rest."-Participant 1

Finally, the theme "Impact of interventions" illustrated improvements in "Physical strength" and "Emotional strength" as a result of the nurse-led interventions.

"Earlier I used to lose sensation in my hands and legs. After doing the exercises you taught I feel that my hands and legs are better and strong."- Participant 4

"Your guidance, along with the medicines, has given me confidence that I can come out of this and achieve in my profession. I hope to get support from there also."- Participant 3

These insights underline the complex and multifaceted experiences of breast cancer survivors and the importance of tailored interventions to support their recovery and well-being.

4. Discussion

The findings of this study highlight the substantial benefits of nurse-led interventions in enhancing physical activity, supportive care, and self-esteem among breast cancer survivors. Pre-intervention, most participants were found to be insufficiently active (57.78%), with 42.22% completely inactive. This aligns with the results of Fan et al. (2023), who reported high inactivity rates among breast cancer survivors.[15] The barriers to physical activity, such as post-treatment limitations, fear of injury, and lack of motivation, necessitate structured interventions tailored to the capabilities and needs of survivors. The significant improvements observed post-intervention demonstrate the potential of nurse-led programs to increase physical activity levels in this population safely.

The study also revealed a high prevalence of unmet supportive care needs, with 83.33% of participants indicating the need for additional support. This is consistent with Jansen et al. (2023), who reported that 85% of survivors experienced moderate to high needs in supportive care.[16] Such findings underscore the critical gaps in current care provision and the importance of comprehensive supportive services that address survivors' physical, psychological, and social needs.

Low self-esteem was prevalent among participants, with 87.78% exhibiting low self-esteem levels pre-intervention. This reflects the profound psychological impact of breast cancer, highlighting the need for psychological support in recovery plans. The significant improvement in self-esteem scores post-intervention (from 19.28 to 32.76, $p = 0.001$) reinforces the effectiveness of nurse-led interventions in boosting survivors' confidence and self-worth. This is corroborated by Kelly et al. (2022), who also found significant enhancements in self-esteem following similar interventions.[17]

The analysis of associations between post-test outcomes and sociodemographic variables revealed that physical activity was significantly correlated with comorbidity and duration of survivorship, while supportive care needs and self-esteem were associated with family income and comorbidity. These findings align with Strayhorn et al. (2020) who emphasized the influence of economic and health-related factors on health outcomes.[18] This suggests that tailored interventions should consider these variables to optimize care and support for survivors.

Qualitative findings provided a deeper understanding of survivors' experiences, highlighting the emotional and financial impacts of the illness and the crucial role of family and social support as supported by Dsouza SM et al. (2018).[19] The positive impact of the nurse-led interventions on physical and emotional strength, as noted in the themes, supports the integration of such interventions into routine survivorship care.

Limitations

Smaller sample size and lack of a control group may limit the results' generalizability. The short duration of the intervention and follow-up may not fully capture long-term effects. Additionally, the reliance on self-reported measures could introduce bias in reporting physical activity and psychological outcomes.

5. Conclusion and Recommendations

Nurses play a pivotal role in the rehabilitation of breast cancer survivors, as evidenced by the significant improvements in physical activity, supportive care needs, and self-esteem outcomes observed in this study. The nurse-led interventions tailored to address survivors' specific challenges have demonstrated the potential to enhance overall

quality of life and foster greater self-confidence among participants. These findings underscore the necessity for integrating comprehensive, supportive care models into routine survivorship programs. Future research should aim to expand these interventions to broader populations to carefully realize their impact on long-term survivorship.

Compliance with ethical standards

Acknowledgments

We extend our deepest gratitude to all the patients who participated in this study, whose invaluable contributions made this research possible.

Disclosure of conflict of interest

The authors declared no conflict of interest.

Statement of ethical approval

The study received approval from the Institution Ethics Committee, Madras Medical College, Chennai wide No. (30102023) . Informed consent was obtained from participants, emphasizing confidentiality and anonymity.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

References

[1] Arnold M, Morgan E, Rumgay H, Mafra A, Singh D, Laversanne M, Vignat J, Gralow JR, Cardoso F, Siesling S, Soerjomataram I. Current and future burden of breast cancer: Global statistics for 2020 and 2040. Breast. 2022 Dec;66:15-23. doi: 10.1016/j.breast.2022.08.010. Epub 2022 Sep 2. PMID: 36084384; PMCID: PMC9465273.

[2] Breast cancer [Internet]. Who.int. [cited 2024 Sep 22]. Available from: https://www.who.int/news-room/fact-sheets/detail/breast-cancer

[3] Bodai BI, Tuso P. Breast cancer survivorship: a comprehensive review of long-term medical issues and lifestyle recommendations. The Permanente Journal [Internet]. Perm J; 2015 Jan 1;19(2):48–79. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4403581

[4] Soldato D, Arecco L, Agostinetto E, Franzoi MA, Mariamidze E, Begijanashvili S, Brunetti N, Spinaci S, Solinas C, Vaz-Luis I, Di Meglio A, Lambertini M. The Future of Breast Cancer Research in the Survivorship Field. Oncol Ther. 2023 Jun;11(2):199-229. doi: 10.1007/s40487-023-00225-8. Epub 2023 Apr 1. PMID: 37005952; PMCID: PMC10260743.

[5] Iliescu MG, Stanciu LE, Uzun AB, Cristea AE, Motoască I, Irsay L, Iliescu DM, Vari T, Ciubean AD, Caraban BM, Ciufu N, Azis O, Ciortea VM. Assessment of Integrative Therapeutic Methods for Improving the Quality of Life and Functioning in Cancer Patients-A Systematic Review. J Clin Med. 2024 Feb 20;13(5):1190. doi: 10.3390/jcm13051190. PMID: 38592012; PMCID: PMC10931598.

[6] Saunders CM, Stafford L, Hickey M. Surviving and thriving after breast cancer treatment. Med J Aust. 2022 Sep 5;217(5):225-227. doi: 10.5694/mja2.51671. Epub 2022 Aug 14. PMID: 35964257; PMCID: PMC9546097.

[7] Maass SWMC, Brandenbarg D, Boerman LM, Verhaak PFM, de Bock GH, Berendsen AJ. Fatigue among Long-Term Breast Cancer Survivors: A Controlled Cross-Sectional Study. Cancers (Basel). 2021 Mar 15;13(6):1301. doi: 10.3390/cancers13061301. PMID: 33803966; PMCID: PMC8001130.

[8] Sharifi N, Ahmad S. Breast cancer-related lymphedema: A critical review on recent progress. Surg Oncol. 2024 Oct;56:102124. doi: 10.1016/j.suronc.2024.102124. Epub 2024 Aug 23. PMID: 39208532.

[9] Joaquim A, Leão I, Antunes P, Capela A, Viamonte S, Alves AJ, Helguero LA, Macedo A. Impact of physical exercise programs in breast cancer survivors on health-related quality of life, physical fitness, and body composition:

Evidence from systematic reviews and meta-analyses. Front Oncol. 2022 Dec 9;12:955505. doi: 10.3389/fonc.2022.955505. PMID: 36568235; PMCID: PMC9782413.

[10] Blaney JM, Lowe-Strong A, Rankin-Watt J, Campbell A, Gracey JH. Cancer survivors' exercise barriers, facilitators and preferences in the context of fatigue, quality of life and physical activity participation: a questionnaire-survey. Psychooncology. 2013 Jan;22(1):186-94. doi: 10.1002/pon.2072. Epub 2011 Oct 6. PMID: 23296635.

[11] Fitch MI, Nicoll I, Newton L, Strohschein FJ. Challenges of Survivorship for Older Adults Diagnosed with Cancer. Curr Oncol Rep. 2022 Jun;24(6):763-773. doi: 10.1007/s11912-022-01255-7. Epub 2022 Mar 14. PMID: 35286555; PMCID: PMC8918886.

[12] Álvarez-Pardo S, De Paz JA, Montserrat Romero-Pérez E, Portilla-Cueto KM, Horta-Gim MA, González-Bernal JJ, Fernández-Solana J, Mielgo-Ayuso J, García-Valverde A, González-Santos J. Factors Associated with Body Image and Self-Esteem in Mastectomized Breast Cancer Survivors. Int J Environ Res Public Health. 2023 Mar 15;20(6):5154. doi: 10.3390/ijerph20065154. PMID: 36982062; PMCID: PMC10048946.

[13] Ng ZX, Ong MS, Jegadeesan T, Deng S, Yap CT. Breast Cancer: Exploring the Facts and Holistic Needs during and beyond Treatment. Healthcare (Basel). 2017 May 24;5(2):26. doi: 10.3390/healthcare5020026. PMID: 28538673; PMCID: PMC5492029.

[14] Tendero-Ruiz L, Palomo-Carrión R, Megía-García-Carpintero Á, Pérez-Nombela S, López-Muñoz P, Bravo-Esteban E. The effect of therapeutic exercise in the prevention of lymphoedema secondary to breast cancer: a systematic review. Arch Med Sci. 2020 Dec 3;19(6):1684-1692. doi: 10.5114/aoms.2020.101435. PMID: 38058721; PMCID: PMC10696974.

[15] Fan R, Wang L, Bu X, Wang W, Zhu J. Unmet supportive care needs of breast cancer survivors: a systematic scoping review. BMC Cancer. 2023 Jun 26;23(1):587. doi: 10.1186/s12885-023-11087-8. PMID: 37365504; PMCID: PMC10294377.

[16] Jansen BA, Bargon CA, Dinger TL, van den Goor M, Postma EL, Young-Afat DA, Verkooijen HM, Doeksen A. Breast cancer patients' needs and perspectives on a one-on-one peer support program: quantitative and qualitative analyses. Support Care Cancer. 2023 Oct 26;31(12):656. doi: 10.1007/s00520-023-08009-6. PMID: 37882849; PMCID: PMC10602952.

[17] Tsai PL, Kuo TT, Ku CH, Liao GS, Lin CK, Pan HH. Self-Esteem as a Predictor of Mental Adjustment in Patients with Breast Cancer. Int J Environ Res Public Health. 2021 Nov 29;18(23):12588. doi: 10.3390/ijerph182312588. PMID: 34886314; PMCID: PMC8656551.

[18] Strayhorn SM, Carnahan LR, Zimmermann K, Hastert TA, Watson KS, Ferrans CE, Molina Y. Comorbidities, treatment-related consequences, and health-related quality of life among rural cancer survivors. Support Care Cancer. 2020 Apr;28(4):1839-1848. doi: 10.1007/s00520-019-05005-7. Epub 2019 Jul 24. PMID: 31342166; PMCID: PMC6980904.

[19] Dsouza SM, Vyas N, Narayanan P, Parsekar SS, Gore M, Sharan K: A qualitative study on experiences and needs of breast cancer survivors in Karnataka, India. Clinical Epidemiology and Global Health. 2018, 6:69–74. 10.1016/j.cegh.2017.08.001