

Clinical and Nursing Outcomes Within a Fundamentals of Care-Oriented Case Management Pathway for Breast Cancer Surgery: The CARE-BOOST Prospective Study

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Abstract

Purpose

To describe and evaluate a Fundamentals of Care-oriented Case Management (FoCCM) pathway for patients undergoing breast cancer surgery, focusing on supportive nursing interventions and the identification and resolution of nursing needs across the perioperative trajectory.

Methods

This prospective observational study included consecutive patients undergoing elective breast cancer surgery within an Enhanced Recovery After Surgery pathway at a single Breast Unit from October 2025 to April 2026. FoCCM comprised multidimensional preoperative assessment, risk stratification, individualized care planning, teach-back education, direct nursing care and reassessment during hospitalization, and structured telephone follow-up. Case Management interventions, identified and resolved nursing needs, 30-day clinical outcomes, and Case Management intensity were evaluated.

Results

Overall, 105 patients were included, all discharged home. Preoperative assessment, risk stratification, and teach-back education were delivered to 97.1% of patients; 89.5% received in-hospital Case Manager evaluation and 91.4% at least three telephone follow-ups. Across the pathway, 642 nursing needs were identified and 630 resolved (98.1%), with resolution exceeding 95% in each care phase. Post-discharge follow-up accounted for the largest number of needs (252), of which 250 (99.2%) were resolved. Within 30 days, 88.5% remained at home without unplanned healthcare utilization and hospital readmission occurred in 1.0%. Case Management intensity differed modestly across surgical complexity groups.

Conclusion

FoCCM was characterized by longitudinal delivery of structured supportive nursing interventions and high resolution of identified nursing needs, particularly after discharge. Further controlled studies are needed to evaluate FoCCM as a model integrating supportive nursing care, direct care, and continuity across perioperative cancer care.

Introduction

With the increase in breast cancer cases and the improvement of diagnostic and therapeutic techniques, optimal patient management is no longer limited to clinical aspects but also includes meeting the individual's needs related to quality of life and continuity of care [1].

However, despite significant advances in oncology, many unmet needs remain [2]. These unmet needs refer to health needs that the current clinical-organisational system cannot fully meet. These may concern physical, practical, and social aspects of the treatment process and include, for example, support in managing daily life, difficulty accessing adequate resources, understanding health information, or the need for ongoing follow-up to ensure the best possible recovery [3].

Patient needs are also central to the Fundamentals of Care framework, a reference model in nursing that encompasses physical comfort, symptom management, relational and educational processes, safety, and continuity of care [4]. In breast cancer care, the Breast Nurse plays a pivotal role in addressing these needs, providing specialist clinical information, emotional support, education, and continuity across the diagnostic, treatment, and follow-up pathway.

Within this context, the Case Manager (CM) is a highly qualified healthcare professional responsible for assessing, planning, coordinating, and monitoring care in a personalised manner, with the aim of reducing care burden and improving quality of care through a comprehensive approach [5]. Case Management represents a concrete response to patients' broader needs by supporting integrated and continuous care from diagnosis through follow-up. However, it has historically focused predominantly on care coordination and may not fully address the full range of patients' fundamental care needs. Integrating the Fundamentals of Care framework into Case Management, while working in close collaboration with the multidisciplinary team, may offer an opportunity to further develop a more comprehensive and person-centred model of breast cancer care.

The Breast Unit at [Anonimization] Hospital, where a Fundamentals of Care-oriented Case Management model has been implemented, provides an ideal setting for describing the implementation of this role in identifying, addressing, and resolving nursing needs across the perioperative pathway

Aim

This study aimed to describe and evaluate a Fundamentals of Care (FoC)-oriented Case Management model (FoCCM) for patients undergoing breast cancer surgery.

Specifically, the study sought to:

- 1) map the delivery of FoCCM interventions across the perioperative pathway, focusing on the identification and resolution of unmet needs;
- 2) assess clinical outcomes within 30 days post-surgery;
- 3) explore variations in Case Management intensity across levels of surgical complexity, as well as the association between baseline patient characteristics and overall need burden.

Study design

Prospective observational study.

Materials and methods

The study population included all consecutive patients who underwent breast surgery in an elective setting at the University Division of Obstetrics and Gynecology of [Anonimizazion], from October 1, 2025, to April 30, 2026.

To ensure the anonymity of the participants, an alpha-numeric code was assigned to each patient and the processing of data was conducted in aggregate form. The study adhered to the STROBE guidelines for reporting observational studies. Eligible participants were adults who had provided written informed consent. Patients with cognitive or sensory impairment, even when temporary, who required the assistance of a carer were also included. Patients discharged to other healthcare facilities, precluding follow-up at the implanting centre, were excluded. All patients undergoing elective surgery were managed according to the Enhanced Recovery After Surgery (ERAS) protocol.

Data collection

Data were obtained from electronic medical records and during scheduled outpatient follow-up visits. Investigators extracted demographic, clinical and needs-related information according to the predefined protocol. Data entry was performed using a dedicated electronic Case Report Form (eCRF) developed on the REDCap platform that is only accessible to registered investigators with authenticated credentials. Prior to study initiation, an inter-rater reliability assessment was conducted: evaluators independently extracted data from ten clinical records to verify the consistency and completeness of the data collection tool. All of the data were anonymised at the source through the assignment of a unique alphanumeric code, and no identifiable information was stored in the eCRF.

Variables collected

Sociodemographic information was recorded, including age, gender, employment status, and the presence of a caregiver. Clinical data were collected to document comorbidities, the oncological diagnosis, neoadjuvant treatments, and the type of surgical procedure performed. These elements were integrated with hospitalisation-related indicators such as length of stay, complications, completion of the pre-admission assessment, and the occurrence of 30-day readmissions or complications.

Surgical procedures were categorised as low complexity (breast-conserving surgery without axillary surgery), intermediate complexity (breast-conserving surgery with sentinel lymph node biopsy or simple mastectomy without axillary surgery), or high complexity (breast-conserving surgery with axillary lymph node dissection, isolated axillary lymph node dissection, mastectomy with sentinel or axillary lymph node surgery, mastectomy with immediate reconstruction, and bilateral mastectomy). The surgical complexity classification adopted in this study was developed internally within the Breast Unit to ensure

consistent stratification of procedures according to their technical and perioperative care requirements. Although grounded in clinical practice and multidisciplinary consensus, this classification is not a validated or universally standardised scale. Its use was strictly operational, aimed at grouping procedures into homogeneous categories.

Baseline functional status was assessed through standardized measures, including preoperative Activities of Daily Living (ADL) [6], Instrumental Activities of Daily Living (IADL) scales [7] and World Health Organization Performance Status (WHO) [8]. Along with a complete risk stratification for conditions such as delirium or postoperative nausea, and a composite clinical complexity index derived from the patients' overall clinical characteristics. The study also monitored how the teach-back method was applied and the percentage of information actually retained by patients [9]. An unmet need was defined as a care need documented in the patient's medical record. A need is considered fully resolved when the goal related to it is achieved. These goals, were identified at every stage of the process. The total number of unmet needs identified throughout the Case Management pathway was calculated by summing the needs documented during the perioperative assessment. Clinical issues emerging before admission were also recorded. Case Management intensity was operationalised as the total number of documented CM interventions per patient across the perioperative period. Postoperative outcomes were measured through ADL, IADL, and Medication Adherence Report Scale (MARS-5) [10] and any post-discharge interventions triggered by clinical issues were recorded to provide a comprehensive picture of recovery and continuity of care.

FoC-Oriented Case Management in the Breast Unit

The CM followed the Fundamentals of Care Oriented Case Management Model [11], a structured nurse-led framework integrating care coordination with direct provision of fundamental nursing care across the surgical pathway. The model comprises five operational phases: identification and referral, comprehensive assessment, individualised care planning, implementation and coordination, and continuous monitoring and evaluation, applied consistently from pre-admission to post-discharge. In the Breast Unit, the CM actively collaborates with the care team to ensure early and proactive patient care. In the preoperative phase, the CM conducted a standardised multidimensional nursing assessment including functional status, comorbidities, psychosocial and relational needs, caregiver availability, and educational requirements. Structured risk stratification was performed for frailty, loss of autonomy, delirium, postoperative nausea/vomiting, and other perioperative vulnerabilities. Assessment outputs were reviewed with the multidisciplinary team to identify unmet needs and establish individualized care priorities. Care plans were developed with patients, incorporating shared goals, discharge planning, and tailored interventions. During hospitalization, the CM ensured longitudinal coordination and direct nursing care through scheduled reassessments, monitoring of clinical evolution, and adaptation of care plans based on emerging needs. Operational activities included patient assessment, symptom management, mobilisation and lymphedema risk assessment and prevention counselling, therapeutic education, discharge preparation, and communication with family caregivers. After discharge, continuity

of care was provided through a structured telephone follow-up programme. A first contact occurred within 48 hours, followed by scheduled calls according to clinical evolution and individual needs. Each follow-up included reassessment of functional recovery, medication adherence, symptom progression, self-care ability, and new clinical or psychosocial concerns. Care plans were updated when required, additional educational support was provided, specialist referrals were activated, and communication with community healthcare professionals was facilitated.

Data analysis

Continuous variables were assessed for completeness and distribution and are presented as mean and standard deviation (SD) or median and interquartile range (IQR), as appropriate. Categorical variables are presented as frequencies and percentages. The total number of identified unmet needs across the Case Management pathway was treated as a count outcome. Associations with baseline patient characteristics were examined using a multivariable Poisson regression model with a log link function. The model included age, comorbidity count, preoperative ADL score, and neoadjuvant therapy. IADL and WHO Performance Status were not included because of their limited variability in the study population. Results are reported as incidence rate ratios (IRRs) with 95% confidence intervals (CIs). Model fit and overdispersion were assessed. Case Management intensity, defined as the total number of documented CM interventions per patient across the preoperative, in-hospital, and post-discharge phases, was compared across surgical complexity groups using pairwise Cliff's delta estimates with 95% CIs. Effect sizes were interpreted as negligible (< 0.147), small ($0.147 - < 0.330$), medium ($0.330 - < 0.474$), or large (≥ 0.474). Analyses were conducted on available data. The amount of missing data for each variable was reported where applicable. All analyses were performed using R (R Foundation for Statistical Computing, Vienna, Austria). Statistical significance was set at a two-sided p value < 0.05 .

Results

A total of 105 consecutive patients undergoing breast cancer surgery and managed according to the Breast Unit FoC-Oriented Case Management pathway were included in the study. No patients were excluded because of incomplete follow-up. Patients underwent a broad range of breast surgical procedures, reflecting the heterogeneous clinical complexity of the cohort. Baseline demographic, clinical and surgical variables are summarized in Table 1.

Table 1
Baseline demographic, clinical and surgical characteristics

Characteristic	Value n (%)
Age, years, mean $\pm$ SD	63.0 $\pm$ 14.4
Age $\geq$ 70 years	35 (33.3)
Neoplasm	105 (100.0)
Caregiver available	91 (86.7)
Employed	49 (46.7)
Neoadjuvant therapy	15 (14.3)
Comorbidities	
Cardiovascular	44 (41.9)
Neurologic	14 (13.3)
Diabetes	11 (10.4)
Respiratory	8 (7.6)
Renal	0
$\geq$ 2 comorbidities	19 (18.1)
Baseline functional status	
ADL score, median (IQR)	6 (6–6)
IADL score, median (IQR)	8 (8–8)
WHO Performance Status	
0	61 (58.1)
1	39 (37.1)
2	5 (4.8)
Surgical complexity	
Low complexity	
Breast-conserving surgery without axillary surgery	32 (30.5)
Intermediate complexity	
Breast-conserving surgery with sentinel lymph node biopsy	36 (34.3)
Simple mastectomy without axillary surgery	6 (5.7)
High complexity	

Characteristic	Value n (%)
Breast-conserving surgery with axillary lymph node dissection	9 (8.6)
Mastectomy with immediate reconstruction	15 (14.3)
Bilateral mastectomy	2 (1.9)
Mastectomy with sentinel lymph node biopsy	1 (1.0)
Mastectomy with axillary lymph node dissection	1 (1.0)
Isolated axillary lymph node dissection	3 (2.9)

Table 1. **Baseline demographic, clinical and surgical characteristics**

Among patients with available data, the median proportion of information retained following the educational intervention was 95% (IQR 90–98). Table 2 summarises the delivery of Case Management interventions across the perioperative pathway.

Table 2
Delivery of Case Management interventions across
preoperative counseling, in-hospital phase, and follow-up

Intervention	n (%)
Preoperative assessment	102 (97.1)
Risk stratification	102 (97.1)
Teach-back education	102 (97.1)
In-hospital evaluation	94 (89.5)
Telephone Follow-up > = 3	96 (91.4)
Total telephone Follow-up; median (range)	371; 3 (2–10)

Table 2. **Delivery of Case Management interventions across preoperative counseling, in-hospital phase, and follow-up**

Unmet needs frequencies and resolution rates are reported in Table 3. The greatest absolute number of identified unmet needs was documented during post-discharge follow-up, and resolution rates exceeded 95% in all phases, with 98.1% resolved overall. Almost all identified unmet needs were documented and managed within the Case Management pathway.

Table 3
Identification and resolution of nursing needs throughout the Case Management pathway

Care phase	Patients with ≥ 1 identified need n (%)	Total identified needs	Resolved needs	Resolution rate
Preoperative	102 (97.1)	208	204	98.1
In-hospital stay	74 (70.5)	182	176	96.7
Post-discharge follow-up	105 (100.0)	252	250	99.2
Overall	105 (100.0)	642	630	98.1

Table 3. Identification and resolution of patients' needs throughout the Case Management pathway

Postoperative clinical outcomes are summarised in Table 4. Overall, postoperative hospitalisation was short, and most patients completed the 30-day follow-up without unplanned healthcare utilisation.

Table 4
Clinical outcomes

Outcome within 30 days	N 105 (%)
Clavien-Dindo classification ≤ 2	102 (97.2)
Clavien-Dindo Dindo classification > 2	3 (2.9)
Length of stay, days, median (IQR)	1 (1–2)
Lymphedema	5 (4.8)
MARS-5 score at follow-up, mean $\pm$ SD (range)	24.6 $\pm$ 2.7 (5–25)
Hypertrophic axillary scar	10 (9.5)
Seroma	3 (2.8)
Home discharge without unplanned healthcare utilization	93 (88.5)
Emergency department visit (discharged without treatments)	8 (7.7)
Hospital access requiring treatment (without admission)	3 (2.9)
Hospital readmission	1 (1.0)

Table 4. Clinical outcomes

Pairwise comparisons using Cliff's delta were performed to evaluate differences in Case Management intensity across surgical complexity groups. As shown in Table 5, effect sizes were negligible to small. These findings indicate that the intensity of Case Management varied only modestly across surgical complexity categories.

Table 5
Case Management intensity by surgical complexity: pairwise Cliff's delta comparisons

Group 1	Group 2	Cliff's delta	Lower 95% CI	Upper 95% CI	Magnitude
High complexity	Low complexity	0.085	-0.193	0.350	negligible
High complexity	Intermediate complexity	0.174	-0.088	0.412	small
Low complexity	Intermediate complexity	0.124	-0.129	0.361	negligible
Positive Cliff's delta values indicate a higher number of Case Management interventions in Group 1 compared with Group 2. Effect-size magnitude was classified according to established thresholds. CI, confidence interval.					

Table 5. Association between surgical complexity and Case Management intensity

Associations between baseline patient characteristics and the total number of identified unmet needs were examined using a multivariable Poisson regression model with a log link function. The model included age, comorbidity count, preoperative ADL score, and neoadjuvant therapy. IADL and WHO Performance Status were not included in the multivariable model because of their limited variability in the study population as shown in Table 6.

Table 6
Determinants of total identified unmet needs across the Case Management pathway

Total identified unmet needs			
Predictors	Incidence Rate Ratios	95% CI	p
Age	1.00	0.990–1.002	0.207
Comorbidity count	1.12	1.01–1.25	0.038
ADL preoperative	1.10	0.55–2.63	0.800
No Neoadjuvant therapy	0.75	0.60–0.94	0.013
Observations	105		

Table 6. Determinants of total nursing needs identified throughout the Case Management pathway

Discussion

The literature describes that unmet care needs are common among women undergoing breast cancer surgery and may arise at multiple points across the perioperative and post-discharge trajectory [12]. In our cohort, several unmet needs similarly emerged throughout the perioperative pathway, with a marked concentration during post-discharge follow-up, when structured healthcare support is less readily

available [13]. Most identified unmet needs were documented and addressed within the Fundamentals of Care Oriented CM pathway, with an overall high resolution rate. The Case Manager role described in our pathway shares core functions with the internationally recognised Breast Care Nurse role, patient education, care coordination, and psychosocial support [14], and aligns with evidence from randomised trials showing that specialist nurse-led coordination and information provision can improve physical and psychological outcomes in breast cancer care [15]. Within our Breast Unit, this overlap suggests that the FoC-oriented Case Management role may operate as an extension rather than a replacement of the Breast Nurse's traditional responsibilities, embedding relational and educational components and direct care on fundamentals needs within a broader coordinating function that builds on, rather than duplicates, this established body of practice. Although baseline functional independence was high, as reflected by ADL and IADL scores close to the maximum possible values, a substantial proportion of patients nonetheless required at least one identified nursing intervention, suggesting that standardized functional scales alone may not fully capture patients' perioperative care needs. The needs identified frequently concerned domains such as mobility, activities of daily living, medication and therapy management, and nutritional aspects, areas that, while often considered secondary to the surgical episode itself, appear central to patients' perioperative experience. Patients also showed a favorable overall clinical course, with high levels of medication adherence and engagement with the educational content provided during the pathway. These findings are consistent with the relational and continuity-based principles of the Fundamentals of Care framework, which emphasize sustained patient engagement, individualized education, and the early identification of emerging needs; however, because the study did not include a comparison group, these outcomes cannot be attributed specifically to the model, and this interpretation should be regarded as hypothesis-generating rather than confirmatory [4]. The outcomes observed in this cohort are also broadly consistent with those reported for rapid rehabilitation nursing models, such as the approach described by Wu et al. Although direct comparisons cannot be made, both approaches emphasize systematic needs assessment, structured patient education, and coordinated follow-up as potentially relevant components of perioperative recovery and transitional care [16]. This aligns with the point described by Perdomo et al., who highlight the importance of individualized, multimodal, and repeated education for breast-cancer-related lymphedema across the survivorship trajectory [17]. In continuity with these principles, the FoCCM pathway incorporated structured education, risk assessment, and postoperative surveillance for breast cancer-related lymphedema. In the present cohort, five patients developed lymphedema within the observation period. Although the study design does not allow conclusions regarding the preventive effectiveness of the model, systematic surveillance may facilitate the timely recognition of early signs and the activation of appropriate specialist assessment. Integrating systematic surveillance into the perioperative pathway may help address the critical subclinical window described in the recent lymphedema literature by supporting the early recognition of subtle functional changes and timely referral to physiotherapy services when indicated [18]. The results regarding the retention of information through the teach-back method indicate the feasibility and consistent implementation of structured educational communication within the Case Management pathway. Although the present study was not designed to isolate the effects of teach-back on self-management or clinical outcomes, this approach may support patients'

understanding of perioperative instructions and facilitate the communication of emerging post-discharge concerns [19, 20]. Differences in Case Management intensity across surgical complexity groups were modest, with effect sizes ranging from negligible to small. This suggests that the documented intensity of Case Management was not strongly determined by surgical complexity alone and may have been influenced by other individual care needs. However, no causal interpretation regarding postoperative outcomes can be drawn from this observational analysis [21].

Strengths and Limitations

The main strength of this study is its real-world clinical cohort embedded within a structured care pathway, enabling a comprehensive analysis of the perioperative care trajectory in breast cancer surgery. However, several limitations should be acknowledged. The absence of a control group limits causal inference and prevents distinguishing the effects of Case Management (CM) from confounding factors or routine postoperative recovery. Moreover, the single-center setting, characterized by a highly structured pathway and dedicated CM, may limit generalizability to other healthcare settings. The locally developed, non-validated surgical complexity classification further restricts comparability across clinical contexts. Finally, the 30-day follow-up precludes conclusions on longer-term recovery, adherence, lymphedema, and healthcare utilization. Future prospective controlled studies are needed to validate these findings and define clinical indications for implementing and scaling FoCCM models across diverse settings.

Conclusions

In conclusion, this prospective observational study describes the implementation of a Fundamentals of Care-oriented Case Management model across the perioperative breast cancer surgery pathway. The model was characterized by high delivery of structured preoperative interventions, systematic identification and management of unmet needs, and continued monitoring after discharge. Most identified needs were resolved within the pathway, while Case Management intensity varied only modestly across surgical complexity groups. Although the absence of a comparison group precludes attributing the observed clinical and care outcomes to the model, these findings provide a foundation for its further evaluation in larger, multicenter controlled studies.

Declarations

Ethics declarations

The study was approved by the Ethics Committee of A.O.U. Città della Salute e della Scienza di Torino (Protocol No. 0004152, 15 September 2025).

Consent to participate:

Written informed consent was obtained from all participants.

Competing interests:

The authors declare no competing interests.

Clinical trial number

not applicable.

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Author Contribution

Conceptualization: AIR, AV, AF; Methodology: AIR, AV; Formal analysis: AnR; Data curation: MF; Writing – original draft: AIR, AV; Writing – review and editing: AIR, AV, MF, AnR, GC, AF. All authors read and approved the final manuscript.

References

1. American Cancer Society. Breast Cancer Facts & Figs. 2023–2024. Atlanta: American Cancer Society; 2024. Available from: <https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/breast-cancer-facts-and-figures/2024/breast-cancer-facts-and-figures-2024.pdf>
2. Wang T, Molassiotis A, Chung BPM, Tan JY. Unmet care needs of advanced cancer patients and their informal caregivers: a systematic review. *BMC Palliat Care*. 2018;17(1):96. doi: 10.1186/s12904-018-0346-9
3. Hasan S, Chew KS. Unmet Psychosocial Needs and Quality of Life of Young Women with Breast Cancer: A Scoping Systematic Review. *Asian Pac J Cancer Prev*. 2024;25(11):3781–3788. doi: 10.31557/APJCP.2024.25.11.3781.
4. Kitson A. The Fundamentals of Care Framework as a point-of-care nursing theory. In: Alligood MR, editor. *Nursing theorists and their work*. 9th ed. St. Louis: Elsevier; 2018. p. 85–102
5. Joo JY, Liu MF. Effectiveness of Nurse-Led Case Management in Cancer Care: Systematic Review. *Clin Nurs Res*. 2019;28(8):968–991. doi: 10.1177/1054773818773285.
6. Katz S. Assessing self-maintenance: activities of daily living, mobility, and instrumental activities of daily living. *J Am Geriatr Soc*. 1983;31(12):721–7. doi: 10.1111/j.1532-5415.1983.tb03391.x.
7. Lawton MP, Brody EM. Assessment of older people: self-maintaining and instrumental activities of daily living. *The Gerontologist*. 1969;9(3):179–186.

8. World Health Organization. WHO Handbook for Reporting Results of Cancer Treatment. Geneva: WHO; 1979.
9. Dinh TTH, Bonner A, Clark R et al. The effectiveness of the teach-back method on adherence and self-management in health education for people with chronic disease: a systematic review. *JBHI Database System Rev Implement Rep* 2016; 14:210–47 doi: 10.11124/jbisrir-2016-2296
10. Chan AHY, Horne R, Hankins M, Chisari C. The Medication Adherence Report Scale: A measurement tool for eliciting patients' reports of nonadherence. *Br J Clin Pharmacol.* 2020;86(7):1281–1288. doi: 10.1111/bcp.14193.
11. Rizzo A, Valenti A. The Case Management FoC Model [Internet]. OSF; 2026. Available from: osf.io/hf92a.
12. 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;23(1):587. doi: 10.1186/s12885-023-11087-8.
13. Ke Q, Timmins F, Furlong E, Stokes D. Unmet care needs of women who have undergone breast cancer surgery: A scoping review. *J Adv Nurs.* 2024;80(5):1732–1749. doi: 10.1111/jan.15953. Epub 2023 Nov 10.
14. Luck L, Chok HN, Scott N, Wilkes L. The role of the breast care nurse in patient and family care. *J Clin Nurs.* 2017;26(21–22):3422–3429. doi: 10.1111/jocn.13704.
15. Hussain Rawther SC, Pai MS, Fernandes DJ, Mathew S, Chakrabarty J, Devi ES. Specialist nurse initiated interventions in breast cancer care: A systematic review of randomised controlled trials. *J Clin Nurs.* 2020;29(13–14):2161–2180. doi: 10.1111/jocn.15268.
16. Wu M, Zhao L, Chen M, Li S, Liao Y. The effects of rapid rehabilitation nursing on improving postoperative rehabilitation effect and life quality of early breast cancer patients. *Medicine (Baltimore).* 2023;102(5):e32763. doi: 10.1097/MD.00000000000040533
17. Perdomo M, Davies C, Levenhagen K, Ryans K, Gilchrist L. Patient education for breast cancer-related lymphedema: a systematic review. *J Cancer Surviv.* 2023;17:384–398. doi: 10.1007/s11764-022-01262-4.
18. Wu T, Li B, Ma B, Zhao F, Li Y, Liu Z. Breast cancer-related lymphedema of the upper limb: integrating early surveillance and functional surgery into a synergistic management paradigm. *Front Surg.* 2026;13:1810682. doi: 10.3389/fsurg.2026.1810682.
19. Scott C, Andrews D, Bulla S, Loerzel V. Teach-Back Method: Using a Nursing Education Intervention to Improve Discharge Instructions on an Adult Oncology Unit. *Clin J Oncol Nurs.* 2019;23(3):288–294. doi: 10.1188/19.CJON.288-294.
20. Shersher V, Haines TP, Sturgiss L, Weller C, Williams C. Definitions and use of the teach-back method in healthcare consultations with patients: A systematic review and thematic synthesis. *Patient Educ Couns.* 2021;104(1):118–129. doi: 10.1016/j.pec.2020.07.026.
21. D'Alessandro L, Palomares SM, Mancin S, Sguanci M, Cattani D, Cosmai S, Lopane D, Gjelošhi M, Cangelosi G, Mazzoleni B. Professional Roles, Skills and Advanced Educational Programs of Breast Cancer Nurses: A Scoping Review. *Nurs Open.* 2025;12(10):e70251. doi: 10.1002/nop2.70251.

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