EFFECT OF COMPUTER-BASED OREM'S SELF-CARE MODEL ON THE QUALITY OF NURSING CARE FOR BREAST CANCER PATIENTS IN TERTIARY HOSPITALS IN KADUNA STATE

Attahir Ibrahim*[1], Dalhat Sani Khalid[2], Hayat Goma[2], Abdurrahman Salihu Kombo[2], Umar Addakano Bello[2], Halima Musa Abdul[2]

1-Department of Nursing Science, Kaduna State University, Kaduna-Nigeria
2-Department of Nursing Science, Ahmadu Bello University, Zaria-Nigeria

*Corresponding Author
Attahir Ibrahim
https://orcid.org/0009-0006-2532-5305
drhaqqun@gmail.com
08069134559

Abstract

The quality of nursing care is an integral factor in the treatment outcomes and overall well-being of breast cancer patients. Leveraging technological advancements alongside established nursing theories can enhance care delivery. This study evaluates the impact of the Computer-Based Orem's Self-Care Model (CBOSCM) on the quality of nursing care provided to breast cancer patients in tertiary hospitals in Kaduna State. A non-randomized intervention-control design was used, with Ahmadu Bello University Teaching Hospital (ABUTH) as the intervention group (CBOSCM) and Barau Dikko Teaching Hospital (BDTH) as the control group (conventional care). Data were collected from breast cancer patients before and after the intervention using a questionnaire.

The results demonstrated a significant improvement in the quality of nursing care (QNC) in the intervention group, with the mean QNC score increasing from 32.00 (SD = 5.02) in the conventional care group to 37.2 (SD = 4.69) in the CBOSCM group. Additionally, the proportion of patients receiving "Good" QNC rose from 20% to 80%. These improvements were statistically significant ($p = 0.007$), confirming the positive impact of the computer-based model on nursing care quality.

In conclusion, the implementation of the CBOSCM has shown to significantly enhance the quality of nursing care for breast cancer patients. It is recommended that healthcare facilities adopt this model to standardize and improve nursing care delivery to patients with breast cancer.

Keywords: Breast cancer care, computer-based, quality of nursing care, OREM self-care, patient outcomes.

INTRODUCTION

Breast cancer is a common and life-altering disease that impacts millions of women worldwide, with profound implications for healthcare systems, families, and individuals (Roy et al., 2023). In Nigeria, breast cancer is a leading cause of cancer-related morbidity and mortality among women, contributing significantly to the nation's disease burden (Hyuna et al., 2021). Tertiary hospitals play a critical role in managing this burden, offering essential services for diagnosis, treatment, and supportive care (Globocan, 2020; Sung et al., 2021). According to Globocan (2020), breast cancer

accounted for 28,380 cases (22.7% of all cancers) in Nigeria in 2020. As the most prevalent form of cancer in the country, the disease presents challenges that require coordinated and comprehensive care, particularly in the nursing domain.

Nurses are at the forefront of breast cancer care, tasked with providing physical, psychological, and emotional support to patients throughout the treatment continuum. High-quality nursing care is essential for improving patient outcomes, ensuring adherence to treatment plans, and enhancing patients' overall well-being. Breast cancer patients often require complex, multifaceted care, and nurses are responsible for managing non-pharmacological interventions such as movement therapies, patient education, and psychosocial support (Tran et al., 2022). The quality of this nursing care directly affects patient satisfaction, recovery, and quality of life (Dodd & Miaskowski, 2000). However, the complexity of care required can be overwhelming for nurses, leading to challenges in providing consistent and high-quality care.

Inadequate coordination and poorly organized care transitions can diminish the quality of nursing care, leading to unmet needs and reduced patient satisfaction (Wonghongkul et al., 2008). To address these challenges, innovative approaches are needed to support nurses in delivering more structured, individualized, and evidence-based care. The integration of technology, specifically through computerized nursing models, offers promising solutions for enhancing the quality of care. Technological tools can help nurses track patient progress, ensure adherence to care plans, and improve overall patient experiences (Hohmann et al., 2020; Sussman et al., 2017).

The Nigeria National Cancer Control Plan 2018-2022 prioritizes access to high-quality cancer care, emphasizing the need for improved care delivery to enhance patient outcomes and quality of life (Nigeria National Cancer Control, 2019).This strategic focus aligns with the global goals outlined in the Sustainable Development Goals (SDGs), aiming to reduce non-communicable disease mortality by one-third by 2030. As part of this effort, improving the quality of nursing care for breast cancer patients is crucial for achieving better health outcomes and patient satisfaction.

Nursing theory plays a pivotal role in advancing care quality by offering a structured approach to patient care. Dorothea Orem's Self-Care Deficit Nursing Theory is particularly relevant in this context, as it provides a framework for nurses to guide patients in meeting their self-care needs. Orem's theory has been shown to positively influence the quality of care and patient outcomes in

individuals with chronic diseases, including cancer (Nasiri et al., 2022). However, there has been limited exploration of its application in breast cancer care.

Recent advances in healthcare technology offer the potential to optimize nursing care through the Computer-Based Orem's Self-Care Model (CBOSCM). Studies have demonstrated that integrating Orem's theory with technological platforms can improve the quality of care for cancer patients by enhancing care coordination and patient monitoring (Karbaschi et al., 2015). This study seeks to explore how the computerized Orem's Self-Care Model can enhance the quality of nursing care for breast cancer patients. By utilizing a computer-based platform, this model can improve nursing efficiency, care systematization, and adherence to care plans, ultimately leading to better patient outcomes and satisfaction (Gumbs, 2020; Nasiri et al., 2022).

Statement of the Problem

Breast cancer remains a major global health challenge, affecting millions of women and placing immense strain on healthcare systems worldwide (Globocan, 2020; World Health Organization, 2021). In Nigeria, tertiary hospitals with oncology centers are at the forefront of caring for breast cancer patients, yet the complexity of care often leads to uncoordinated efforts, unmet patient needs, and poor continuity of care. These issues contribute to distress among healthcare providers, particularly nurses, and hinder the delivery of high-quality nursing care (Facts et al., 2023). This fragmentation in care affects the overall patient experience and reduces the effectiveness of treatment outcomes.

Effective management and synchronization of care are critical for improving patient outcomes, as highlighted by Sussman et al. (2017) and Hohmann et al. (2020). Better coordination can enhance nursing care by promoting comprehensive support and reducing the challenges associated with fragmented care. Despite this, the integration of innovative models and technologies to support nurses in delivering care remains limited in many healthcare settings in Nigeria, including Kaduna State.

Various interventional programs have been introduced in tertiary hospitals, focusing primarily on providing informational and psychological support for breast cancer patients (Gabriel & Mayers, 2019; Olasehinde et al., 2021). These interventions typically involve educational sessions, often delivered through verbal or written content, to help nurses manage patient care. However, the use

of advanced information and communication technology (ICT) as a tool for enhancing nursing care is still underutilized (van Egdom et al., 2019).

The Computer-Based Orem's Self-Care Model (CBOSCM) offers a potential solution for improving the quality of nursing care by providing a structured and systematic approach to patient management. This model, rooted in nursing theory, emphasizes self-care and patient-centered care, allowing nurses to better meet the complex needs of breast cancer patients. However, there is limited empirical evidence on how this technology-driven model affects the quality of nursing care in breast cancer care within tertiary hospitals in Kaduna State. Additionally, the perceptions of nurses regarding the usefulness and ease of integrating such models into their practice remain underexplored.

MATERIALS AND METHODS

Study Design

A non-randomized intervention-control design was used to assess the effect of the Computer-Based Orem's Self-Care Model (CBOSCM) on the quality of nursing care for breast cancer patients. The intervention group consisted of nurses trained to use CBOSCM, while the control group used conventional nursing care methods. The study aimed to measure the improvement in quality of nursing care in the intervention group compared to the control group.

Study Area

The study was conducted in two tertiary hospitals in Kaduna State:

Ahmadu Bello University Teaching Hospital (ABUTH): This hospital served as the intervention group, where nurses used the CBOSCM in caring for breast cancer patients.

Barau Dikko Teaching Hospital (BDTH): This hospital served as the control group, where patients received conventional nursing care.

Target Population

The study involved two groups of participants:

Nurses: Nurses from the female surgical ward in ABUTH and oncology ward in BDTH.

Patients: Breast cancer patients admitted to the respective wards during the study period.

Sample Size

Nurses: All nurses working in the relevant wards of the two hospitals participated in the study (9 nurses in the intervention group).

Patients: A total of 30 patients (15 from ABUTH and 15 from BDTH) were included in the study through census sampling.

Inclusion and Exclusion Criteria

Inclusion Criteria for Nurses: Nurses who worked in the female surgical ward, were available during the study, and were trained on using the CBOSCM.

Exclusion Criteria for Nurses: Nurses not trained on the CBOSCM or unavailable during the study period.

Inclusion Criteria for Patients: Patients with a definitive diagnosis of breast cancer admitted to the wards during the data collection period and willing to participate.

Exclusion Criteria for Patients: Patients unwilling to participate.

Instruments

Computer-Based Orem Self-Care Application: A digital application developed specifically for this study to guide nursing care according to Orem's Self-Care Model.

Quality of Nursing Care (QNC) Questionnaire: Adapted from Laschinger et al. (2005), this tool assessed multiple dimensions of nursing care, including nursing competence, care process, patient safety, and resource utilization.

Procedure

Pre-intervention Phase: Baseline data on QNC were collected from patients in both groups using the QNC questionnaire.

Intervention Phase: Nurses in ABUTH were trained to use the CBOSCM. Training involved data entry, patient assessment, and care planning based on the model's recommendations.

Post-intervention Phase: After 12 weeks, post-intervention data were collected using the same QNC questionnaire from both groups.

Data Analysis

Data were analyzed using SPSS version 27. Descriptive statistics (mean and standard deviation) were used to summarize the QNC scores. A comparative analysis using ANOVA was employed to determine if there were statistically significant differences in QNC between the intervention and control groups. Statistical significance was set at $p < 0.05$.

Ethical Considerations

Ethical approval was obtained from the relevant committees of ABUTH and BDTH. The respective approved ethical clearance numbers are ABUTHZ/HREC/H22/2023 and BDTH/HREC/DEC/2023/142/VOL.1 respectively. Informed consent was acquired from all participants, and strict confidentiality was maintained throughout the study.

RESULTS

Table 1: Distribution of patients with breast cancer according to Socio-demographic characteristics

Variables		Conventional Group		Computer-based Group	
		F	%	F	%
Gender	Female	15	100	15	100
Age	18-24	-		1	7
	25-34	1	7	1	7
	35-44	4	27	4	27
	45-54	4	27	5	33
	55-64	3	20	3	20
	65 and above	3	20	1	7
Marital Status	Single	1	7	2	13
	Married	12	12	11	73
	Widowed	2	13	2	13
Educational Level	Primary School	1	7	2	13
	Secondary School	3	20	4	27
	College/Diploma	2	13	3	20
	Bachelor's Degree	5	33	5	33
	Master's Degree	2	13	1	7
	Informal	2	13	-	-
Employment status	Employed full-time	5	33	2	13
	Employed part-time	3	20	2	13
	Unemployed	2	13	5	33
	Retired	-	-	1	7
	House wife	5	33	5	33

Mean age conventional group 45.2±12.19, Mean age computer-based group 38.9±12.53, F= frequency, % = percentage

Table 1 shows that all respondents in the groups were female (100%). In the conventional group, the majority were married (80%), with the highest educational level being Bachelor's degree for 33% of participants. Additionally, 33% identified as housewives, while another 33% were employed. In the computer-based group, respondents were predominantly aged 39 years based on the mean age. The majority were married (73%), with the highest educational level being a Bachelor's degree (33%). Additionally, 33% identified as housewives, and 33% were unemployed

Effect of usage of the computer-based Orem's Self-Care Model on the QNC provided to patients with breast cancer.

Table 2: Quality of nursing care provided to patients with breast cancer in the groups

Variables		Mean	
		Conventional	Computer-based
Patient outcome	Information you were given	28.7	39.3
	Informing Family or Friend	26.0	33.3
	Concern and Caring by Nurses	32.0	35.3
Nursing care process	Consideration of your Needs	30.7	32.7
	Skill and Competence of Nurses	32.0	39.3
Nursing competence and skill	Coordination of Care	32.0	38.7
	Restful Atmosphere provided by nurses	42.0	41.3
	Privacy	36.0	38.7
Patient's safety	Overall Quality of Care and Services you received in the hospital	29.3	36.0
	Overall QNC	31.3	37.3

Conventional Avg. Mean = 32.00 (SD = 5.02), Computer-based Avg. Mean = 37.2 (SD = 4.69)

In Table 2, the mean QNC provided to patients with breast cancer significantly increased from 32.00 (SD = 5.02) in the conventional group to 37.2 (SD = 4.69) in the computer-based group.

Table 3: Level of quality of nursing care in study group

Level of QNC		Conventional		Computer-based	
		F	%	F	%
Poor	**(<2.5)**	-		-	
Fair	**(2.5-3.4)**	12	80%	3	20%
Good	**(3.5-4.4)**	3	20%	12	80%
Excellent	**(>4.5)**	-		-	

F= frequency, % = percentage

In table 3, the overall level of quality of nursing care increased from 3(20%) in the conventional group t to 12 (80%) in the computer-based group as "Good QNC"

DISCUSSION

The study's respondents were all female, consistent with breast cancer primarily affecting women. In terms of marital status, 80% of the conventional group and 73% of the computer-based group were married, indicating the presence of familial support, which is known to enhance patient outcomes. Regarding education, 33% of participants in both groups held a Bachelor's degree, which could positively influence health literacy and the effective use of the computer-based Orem Self-Care Model.

Employment status varied, with 33% of conventional group participants employed and 33% of the computer-based group unemployed. This variation highlights the importance of making healthcare interventions accessible to patients across different economic situations.

For nurses, the average age was 31 years, with most being single, reflecting a trend of younger professionals focusing on career development. Most nurses held a Bachelor of Nursing Science (BNSc) degree and had 0-5 years of experience, which aligns with broader trends of high turnover and early-career nurses entering the workforce. Notably, the majority of nurses reported good computer skills, essential for using the computer-based Orem Self-Care Model effectively.

The study findings demonstrate a significant improvement in the quality of nursing care (QNC) after implementing the computer-based Orem's Self-Care Model. The mean QNC scores rose from 32.00 (SD = 5.02) in the conventional group to 37.2 (SD = 4.69) in the computer-based group. Furthermore, the proportion of nurses delivering high-quality care increased from 20% in the

conventional group to 80% in the computer-based group, underscoring the model's effectiveness in enhancing nursing practices and patient outcomes.

The improvement in QNC suggests that the computer-based model provided a structured, systematic approach that helped nurses perform more accurate patient assessments, identify care needs better, and implement more effective interventions. It likely enhanced critical thinking and decision-making by offering a clear framework for care delivery, reducing inconsistencies and ensuring consistent, high-quality care.

This finding aligns with previous research showing that structured nursing models and technology-assisted interventions, such as electronic health records (EHRs), improve care coordination, accuracy, and overall quality (Cocchieri et al., 2023). In summary, the increase in QNC scores and the proportion of nurses delivering high-quality care highlight the model's success in standardizing and elevating nursing practice standards.

CONCLUSION

In conclusion, the use of the computer-based Orem's Self-Care Model brought meaningful improvements to the quality of nursing care for breast cancer patients. By providing a clear and structured approach, the model helped nurses deliver more personalized and precise care. It enabled them to better assess patient needs and apply the right interventions, ensuring that care was consistent and of high quality. The significant rise in both care quality scores and the number of nurses delivering top-tier care highlights how effective the model was in enhancing nursing practices and patient outcomes. This study demonstrates the real potential of incorporating technology into nursing care, offering a practical way for healthcare institutions to raise their care standards and better serve their patients.

REFERENCES

Cocchieri, A., Cesare, M., Anderson, G., Zega, M., Damiani, G., & D'agostino, F. (2023). Effectiveness of the Primary Nursing Model on nursing documentation accuracy: A quasi-experimental study. *Journal of Clinical Nursing*, *32*(7-8), 1251-1261.

Dodd, M. J., & Miaskowski, C. (2000). The PRO-SELF program: a self-care intervention program for patients receiving cancer treatment...including commentary by Moore JB and Pollock BH. *Seminars in Oncology Nursing*, *16*(4), 300-314. http://linker.worldcat.org/?rft.institution_id=129922&spage=300&pkgName=sciDirectathens&issn=0749-2081&linkclass=to_article&jKey=07492081&issue=4&provider=elsevier&date=2000-

11&aulast=Dodd+MJ%3B+Miaskowski+C&atitle=The+PRO-
SELF+program%3A+a+self-care+inte

Facts, F., Vaidya, J. S., & Patkar, V. (2023). Early breast cancer.

Gabriel, I. O., & Mayers, P. M. (2019). Effects of a psychosocial intervention on the quality of life of primary caregivers of women with breast cancer. *European Journal of Oncology Nursing*, *38*, 85-91.

Globocan. (2020). Global Cancer Observatory.

Gumbs, J. (2020). OREM'S select basic conditioning factors and health promoting self-care behaviors among African American Women with type 2 diabetes. *Journal of Cultural Diversity*, *27*(2), 47-52. https://proxy.lib.ohio-state.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=sih&AN=144 269714&site=ehost-live

Hohmann, N. S., McDaniel, C. C., Mason, S. W., Cheung, W. Y., Williams, M. S., Salvador, C., Graves, E. K., Camp, C. N., & Chou, C. (2020). Patient perspectives on primary care and oncology care coordination in the context of multiple chronic conditions: a systematic review. *Research in Social and Administrative Pharmacy*, *16*(8), 1003-1016.

Hyuna, S., Ferlay, J., Siegel, R. L., Laversanne, M., Soerjomataram, I., Jemal, A., & Bray, F. (2021). Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. *CA: A Cancer Journal for Clinicians*, *71*(3), 209-249. https://doi.org/10.3322/CAAC.21660

Karbaschi, K., zareiyan, A., dadghari, F., & siyadati, S. A. (2015). The Effect of Self-Care Program based on Orem's Theory on quality of Life of Cancer Patients Undergoing Chemotherapy in Military Personnel. *Military Caring Sciences*, *2*(2), 69-77. https://doi.org/10.18869/ACADPUB.MCS.2.2.69

Nasiri, M., Jafari, Z., Rakhshan, M., Yarahmadi, F., Zonoori, S., Akbari, F., Sadeghi Moghimi, E., Amirmohseni, L., Abbasi, M., Keyvanloo Sharstanaki, S., & Rezaei, M. (2022). Application of Orem's theory-based caring programs among chronically ill adults: A systematic review and dose–response meta-analysis. *International Nursing Review*. https://doi.org/10.1111/INR.12808

Nigeria National Cancer Control. (2019). *Nigeria National Cancer Control Plan 2018 – 2022*.

Olasehinde, O., Alatise, O., Omisore, A., Wuraola, F., Odujoko, O., Romanoff, A., Akinkuolie, A., Arowolo, O., Adisa, A., & Knapp, G. (2021). Contemporary management of breast cancer in Nigeria: Insights from an institutional database. *International Journal of Cancer*, *148*(12), 2906-2914.

Roy, N., Villavisanis, D. F., & Taub, P. J. (2023). Mitigating financial toxicity in breast cancer from diagnosis to treatment and reconstruction. *Clinical Breast Cancer*, *23*(1), e32-e36.

Sung, Ferlay, J., Siegel, R. L., & al, e. (2021). Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin*, *71*, 209-249.

Sussman, J., Bainbridge, D., & Evans, W. K. (2017). Towards integrating primary care with cancer care: a regional study of current gaps and opportunities in Canada. *Healthcare Policy*, *12*(3), 50.

Tran, K. B., Lang, J. J., Compton, K., Xu, R., Acheson, A. R., Henrikson, H. J., Kocarnik, J. M., Penberthy, L., Aali, A., Abbas, Q., Abbasi, B., Abbasi-Kangevari, M., Abbasi-Kangevari, Z., Abbastabar, H., Abdelmasseh, M., Abd-Elsalam, S., Abdelwahab, A. A., Abdoli, G., Abdulkadir, H. A.,…Murray, C. J. L. (2022). The global burden of cancer attributable to risk factors, 2010–19: a systematic analysis for the Global Burden of Disease Study 2019. *The Lancet*, *400*(10352), 563-591. https://doi.org/10.1016/S0140-6736(22)01438-6

van Egdom, L. S. E., Oemrawsingh, A., Verweij, L. M., Lingsma, H. F., Koppert, L. B., Verhoef, C., Klazinga, N. S., & Hazelzet, J. A. (2019). Implementing patient-reported outcome measures in clinical breast cancer care: a systematic review. *Value in Health*, *22*(10), 1197-1226.

Wonghongkul, T., Sawasdisingha, P., Aree, P., Thummathai, K., Tungpunkom, P., & Muttarak, M. (2008). Effect of educative -- supportive program on quality of life in breast cancer survivors. *Thai Journal of Nursing Research*, *12*(3), 179-193. http://search.ebscohost.com/login.aspx?direct=true&db=jlh&AN=2009998628&site=ehost-live

World Health Organization. (2021). Cancer. Inc.