**INTERNATIONAL JOURNAL OF NURSING SCIENCES**
**(ISSN: 2096-6296)**
**VOL.06 ISSUE01 (2026)**

AMERICAN ACADEMIC PUBLISHER

*Research Article*

# Perceived Burden of Chemotherapy Side Effects among Breast Cancer Patients in a Nigerian Tertiary Hospital

**Chiamaka Chijioke, BNSc**

Department of Nursing Science, Faculty of Health Sciences, National Open University of Nigeria, Owerri Study Centre, Nigeria; and Department of Interdisciplinary Research & Statistics, PENKUP Research Institute, Birmingham, United Kingdom.

**Festa Chinonyerem Onyekwuo, PhD**

Department of Nursing Science, Faculty of Health Sciences, National Open University of Nigeria, Owerri Study Centre, Nigeria

**Kennedy Oberhiri Obohwemu, PhD**

Department of Interdisciplinary Research & Statistics, PENKUP Research Institute, Birmingham, United Kingdom.

**Celestine Emeka Ekwuluo, MPH**

Family Health International, Ukraine; and PENKUP Research Institute, Birmingham, United Kingdom; Department of Multidisciplinary Studies & Statistics, PENKUP Research Institute, Birmingham, United Kingdom.

**Gordon Mabengban Yakpir, PhD**

Faculty of Health, Wellbeing & Social Care, Oxford Brookes University, GBS Partnership, Birmingham Campus, United Kingdom; and PENKUP Research Institute, Birmingham, United Kingdom.

**Chika Oguguo, PhD**

Department of Interdisciplinary Research & Statistics, PENKUP Research Institute, Birmingham, United Kingdom.

**Oluwafemi Emmanuel Ooju, MSc**

World Health Organisation, Abuja, Nigeria; and Department of Interdisciplinary Research & Statistics, PENKUP Research Institute, Birmingham, United Kingdom.

**Ripeitikehe Theresa Oshaka, MSc PHHP**

General Medicine Department, Aberdeen Royal Infirmary, Scotland; and Department of Interdisciplinary Research and Statistics, PENKUP Research Institute, Birmingham, United Kingdom.

**Solomon Obiadi Anigbamkpu, FWACS**

Department of Plastic and Reconstructive Surgery, National Orthopaedic Hospital, Enugu, Nigeria; and Department of Interdisciplinary Research and Statistics, PENKUP Research Institute, Birmingham, United Kingdom

check for updates

Received: 27 May 2026
Revised: 24 June 2026
Accepted: 10 July 2026
Published: 30 July 2026

**Doi:** 10.55640/ijnc-06-01-02

**Page No: 06-16**



## Abstract

This study examined breast cancer patients' awareness of chemotherapy related side effects and explored how women receiving treatment in a Nigerian tertiary hospital perceive the burden of these toxicities. A descriptive cross-sectional design was used, involving 80 patients undergoing systemic chemotherapy. Data were collected using a structured, validated questionnaire and analysed with descriptive statistics. Respondents demonstrated consistently high awareness of common chemotherapy side effects, with hair loss, weakness

due to anaemia, nausea, and vomiting recording the highest mean scores. Awareness of fever and chills was comparatively lower, despite exceeding the predetermined decision threshold, indicating potential gaps in recognising symptoms associated with serious complications such as neutropenia. These variations highlight the need for strengthened, continuous patient education that addresses both frequently anticipated toxicities and those that carry urgent clinical significance. The findings underscore the central role of oncology nurses in reinforcing information, clarifying misconceptions, and supporting symptom self management throughout treatment. Enhancing patient education may reduce the perceived burden of chemotherapy, promote timely reporting of adverse effects, and contribute to safer, more responsive cancer care within low resource settings.

**Keywords:** Breast cancer; Chemotherapy; Side effects; Perceived burden; Patient awareness; Symptom recognition; Oncology nursing; Nigeria; Tertiary hospital; Supportive care

## INTRODUCTION

Breast cancer remains the most commonly diagnosed cancer among women worldwide and continues to pose a major public health challenge despite advances in early detection and treatment. According to the World Health Organisation (2024), approximately 2.3 million women are diagnosed with breast cancer each year, making it the leading cancer diagnosis among females globally. As survival improves through better screening programmes, molecular diagnostics, surgical techniques, systemic therapies, and supportive care, greater attention is being paid to how women experience treatment. Chemotherapy, in particular, shapes much of the day-to-day reality of breast cancer care, and many patients describe this phase as one of the most demanding parts of their journey.

Chemotherapy remains central to breast cancer management across disease stages. It is used as neoadjuvant, adjuvant, or palliative treatment depending on tumour characteristics and clinical presentation. Modern regimens have contributed to meaningful reductions in recurrence risk and improved survival (Harbeck et al., 2019). Even with these benefits, chemotherapy brings a wide range of adverse effects that influence patients physically, psychologically, and socially. Many women report that these effects are among the most challenging aspects of treatment, shaping how they cope, how they function, and how they perceive their overall wellbeing.

The toxicity profile of chemotherapy is well documented. Commonly reported side effects include nausea, vomiting, fatigue, alopecia, mucositis, peripheral neuropathy, cognitive impairment, weight changes, and haematological complications (Kaur et al., 2022; Yazbeck et al., 2022; Ingole et al., 2024). Although clinicians anticipate and manage these effects, patients often experience them with uncertainty and distress. The burden can feel heavier when women are not fully prepared for what to expect or when their lived experience differs sharply from the information they received.

Patients' awareness has become a central element of contemporary cancer care. Awareness involves more than recognising potential side effects; it reflects an understanding of risks, symptom patterns, expected trajectories, and available management strategies. Women who feel informed are better able to identify symptoms early, engage in self-care, communicate effectively with healthcare providers, and make decisions that support their wellbeing (Mayer et al., 2021; Chijioke et al., 2026). Awareness therefore plays a crucial role in treatment preparedness and patient engagement.

Despite efforts to strengthen patient-centred oncology care, gaps in awareness remain. Studies have shown differences between the information provided by healthcare professionals and what patients retain or understand during chemotherapy (Fahmer et al., 2022; Tanay et al., 2022; Ferraris et al., 2023). Many women are familiar with visible side effects such as hair loss, yet have limited understanding of less obvious complications, including infection risks, cognitive changes, and treatment-related anaemia. These gaps can influence symptom recognition, delay help-seeking, and contribute to avoidable complications.

The issue is particularly pronounced in low-resource and middle-income settings, where educational materials, specialist oncology personnel, and structured supportive care services may be limited. Research across sub-Saharan Africa highlights ongoing challenges related to cancer literacy, treatment communication, and access to reliable health information (Ngwa

et al., 2022; Omotoso et al., 2023; Chepkorir et al., 2024). Many patients rely almost entirely on healthcare professionals for information, placing significant responsibility on oncology teams to ensure that education is clear, accessible, and responsive to individual needs.

Within nursing practice, patient education is fundamental to high-quality cancer care. Oncology nurses play a key role in helping patients understand treatment, reinforcing information, addressing misconceptions, and supporting women throughout the chemotherapy process. Effective communication about side effects has been linked to improved symptom reporting, better adherence, and greater satisfaction with care (Sarbaz et al., 2022; Amafah et al., 2023; Azarabadi et al., 2024). When education is insufficient, patients may feel unprepared for treatment-related challenges, making it harder to respond appropriately when symptoms arise.

This study explores how breast cancer patients in a Nigerian tertiary hospital perceive the burden of chemotherapy side effects. The focus is on patients' awareness and recognition of common toxicities, acknowledging that awareness forms the basis for effective symptom management, self-care, and supportive interventions. Understanding these perceptions within a real-world clinical environment offers insight into where educational support may be strengthened.

The findings provide a window into how women experience chemotherapy in this context and highlight opportunities to enhance patient education and supportive care. As breast cancer incidence rises across sub-Saharan Africa and systemic therapies become more widely used, evidence on patients' awareness is essential for informing nursing practice, shaping educational strategies, and improving treatment experiences for women undergoing chemotherapy.

## METHODS

### Study Design

A descriptive cross-sectional study was conducted to assess awareness of chemotherapy-related side effects among breast cancer patients receiving treatment at a tertiary healthcare facility in South-Eastern Nigeria. The cross-sectional design was considered appropriate because it enables the assessment of participants' knowledge and perceptions at a single point in time without manipulating study variables (Setia, 2016).

### Study Setting

The study was undertaken at the Federal Teaching Hospital, Owerri, Imo State, Nigeria. The hospital is a major tertiary referral centre providing comprehensive oncology services to patients from Imo State and neighbouring states. Breast cancer patients receiving systemic chemotherapy are managed through specialist oncology clinics and inpatient services, providing an appropriate setting for examining patient awareness of treatment-related adverse effects.

### Study Population and Eligibility Criteria

The study population comprised patients diagnosed with breast cancer who were receiving chemotherapy during the study period. Eligibility was restricted to individuals with a confirmed diagnosis of breast cancer who were actively undergoing chemotherapy and were physically able to participate. Patients who declined participation or were too unwell to complete the questionnaire were excluded.

### Sample Size and Sampling Procedure

The accessible population consisted of 80 eligible patients receiving chemotherapy during the study period. Given the relatively small population, all eligible patients were invited to participate, resulting in a census of the accessible population rather than a sampled subset. Consequently, the final sample comprised 80 participants.

### Data Collection Instrument

Data were collected using a structured questionnaire specifically developed to assess awareness of chemotherapy and its associated side effects. The questionnaire consisted of two sections. The first collected socio-demographic information, while the second assessed participants' awareness of chemotherapy-related side effects using structured Likert-scale items.

Selected items assessing treatment impact were informed by the European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30), although the present paper focuses exclusively on awareness of chemotherapy toxicities.

**Validity and Reliability**

Content and face validity were established through expert review prior to data collection. The instrument was evaluated for relevance, clarity, and alignment with the study objectives before being approved for use.

Internal consistency was assessed during pilot testing using Cronbach's alpha. Reliability coefficients demonstrated good internal consistency across the study domains, with values exceeding the commonly accepted threshold of 0.70, indicating that the instrument was suitable for measuring awareness of chemotherapy-related side effects (Taber, 2018).

**Data Collection Procedure**

Questionnaires were administered directly to eligible participants during clinic attendance and inpatient admission over three weeks. Face-to-face administration enabled clarification of questionnaire items where required and ensured complete responses. All distributed questionnaires were retrieved, yielding a response rate of 100%.

**Data Analysis**

Data were analysed using descriptive statistics. Frequencies and percentages were used to summarise respondents' socio-demographic characteristics, while mean scores were calculated to evaluate awareness of individual chemotherapy-related side effects. Responses were interpreted using a predetermined decision criterion, with higher mean scores indicating greater awareness.

**Ethical Considerations**

Ethical approval was obtained from the Ethics Committee of Federal Teaching Hospital, Owerri, Nigeria, before commencement of the study. Participation was voluntary, and written informed consent was obtained from all participants. Confidentiality and anonymity were maintained throughout the study, and participants were informed of their right to withdraw at any stage without consequence. The study complied with accepted ethical principles governing research involving human participants.

**RESULTS**

A total of 80 questionnaires were distributed to eligible participants, and all were completed and returned, yielding a response rate of 100%. This complete response eliminated the possibility of non-response bias within the accessible study population and ensured that all eligible patients contributed to the analysis. The findings are presented in relation to the study objective, which examined awareness of chemotherapy-related side effects among breast cancer patients receiving treatment.

**Participant Characteristics**

The study population consisted entirely of women, reflecting the patient population receiving chemotherapy for breast cancer during the study period (Table 1). Most respondents (77.5%) were aged 31 years and above, while 22.5% were between 12 and 30 years. Married participants constituted the majority of the sample (71.25%), whereas 28.75% were single. Slightly more than half of the respondents were employed (57.5%), and 55.0% resided in urban areas. Educational attainment was almost evenly distributed between literate (48.75%) and non-literate (51.25%) participants. These characteristics provide the demographic context for interpreting respondents' awareness of chemotherapy-related adverse effects and indicate that the findings represent patients from diverse educational, occupational, and residential backgrounds.

**Table 1: Sociodemographic characteristics of participants (N = 80).**

| Characteristic | n | % |
|---|---|---|
| Age ≥31 years | 62 | 77.50 |
| Female | 80 | 100.00 |
| Married | 57 | 71.25 |
| Urban residence | 44 | 55.00 |

Note. Values are frequencies and percentages.

**Awareness of Chemotherapy-related Side Effects**

Respondents demonstrated a generally high level of awareness of the side effects associated with chemotherapy. The grand mean score of 3.64 exceeded the predetermined decision criterion, indicating that awareness of common treatment-related toxicities was consistently high across the study population (Table 2). Although awareness varied across individual symptoms, all mean scores remained above the acceptance threshold, suggesting that participants were familiar with the principal adverse effects associated with chemotherapy.

**Table 2: Awareness of chemotherapy-related side effects among breast cancer patients (N = 80).**

| Side effect | Mean | Interpretation |
|---|---|---|
| Hair loss | 3.95 | High |
| Weakness due to anaemia | 3.91 | High |
| Nausea | 3.79 | High |
| Vomiting | 3.65 | High |
| Headache | 3.59 | High |
| Weight change | 3.46 | High |
| Fever and chills | 3.15 | Moderate |
| Grand mean | 3.64 | High awareness |

Note: Decision criterion = 2.50. Mean scores ≥2.50 indicate awareness.

Among the individual side effects assessed, hair loss recorded the highest level of awareness (M = 3.95), making it the most widely recognised chemotherapy-related toxicity. This finding indicates that alopecia remains one of the most prominent and readily identifiable adverse effects from the patients' perspective. Awareness of weakness associated with anaemia was similarly high (M = 3.91), suggesting that respondents readily associated persistent weakness and reduced physical strength with chemotherapy treatment.

Recognition of nausea (M = 3.79) and vomiting (M = 3.65) was also consistently high. These symptoms represent some of the most frequently anticipated toxicities of systemic chemotherapy and were recognised by most respondents as expected

treatment effects. The relatively high scores observed for these gastrointestinal symptoms indicate that participants possessed substantial knowledge of the immediate physical consequences commonly experienced during chemotherapy.

Awareness remained high for headaches (M = 3.59) and weight changes (M = 3.46), although the corresponding mean scores were modestly lower than those observed for alopecia and weakness. This pattern suggests that while respondents recognised these complications as potential treatment effects, they may not have perceived them to be as universally experienced or as strongly associated with chemotherapy as other symptoms.

The lowest awareness score was observed for fever and chills (M = 3.15). Despite representing the least recognised adverse effect within the present study, the mean score remained above the predetermined decision threshold, indicating moderate to high awareness among respondents. The comparatively lower score suggests that systemic symptoms associated with infection or treatment-induced immunosuppression may be less readily recognised than more visible or frequently discussed toxicities.

Figure 1 provides a visual summary of respondents' awareness of the chemotherapy-related side effects assessed in this study. Hair loss (M = 3.95) and weakness due to anaemia (M = 3.91) recorded the highest awareness scores, followed by nausea (M = 3.79) and vomiting (M = 3.65). Awareness of headaches (M = 3.59), weight changes (M = 3.46), and fever with chills (M = 3.15) was comparatively lower, although all mean scores exceeded the predefined decision criterion. The relatively narrow range of scores indicates that respondents demonstrated consistently high awareness across the side effects examined, with only modest variation in the extent of recognition between individual symptoms.

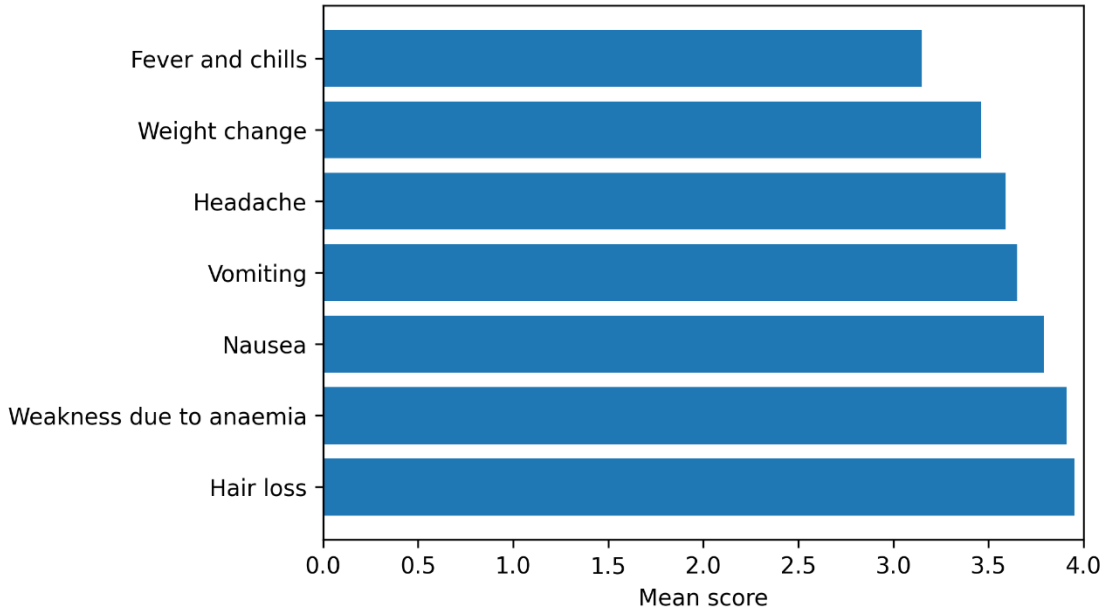


**Figure 1: Mean awareness scores for chemotherapy-related side effects among breast cancer patients.**

## DISCUSSION

This study examined awareness of chemotherapy-related side effects among breast cancer patients receiving treatment in a Nigerian tertiary hospital, with particular attention to how women perceive the burden of these toxicities during treatment. The findings indicate that respondents possessed a generally high level of awareness of common adverse effects, although differences were evident in the extent to which individual toxicities were recognised. These patterns offer insight into the perceived burden of chemotherapy, highlighting the symptoms that patients anticipate most readily and those that may generate uncertainty or delayed reporting.

Hair loss emerged as the most widely recognised chemotherapy-related side effect, followed closely by weakness associated with anaemia. Nausea and vomiting also attracted high awareness scores, whereas fever and chills recorded comparatively lower recognition. This pattern is consistent with research demonstrating that patients tend to recognise adverse effects that are visible, frequently experienced, or routinely discussed during treatment consultations more readily than less

obvious complications (Di Meglio et al., 2025; Chijioke et al., 2026). Alopecia remains one of the most visible consequences of systemic chemotherapy and often becomes a defining feature of the treatment experience, making it highly memorable for patients and their families. Similarly, fatigue and physical weakness frequently accompany chemotherapy and are repeatedly identified as among the most prevalent and burdensome symptoms experienced during treatment (Kasgri et al., 2024).

The comparatively lower awareness of fever and chills suggests a potential mismatch between clinical risk and perceived burden, as patients may not immediately associate these symptoms with serious complications. Fever during chemotherapy may indicate treatment-induced neutropenia, which constitutes a medical emergency requiring prompt clinical assessment. Failure to recognise this complication may delay presentation to healthcare facilities and increase the risk of serious infection. This finding suggests that educational interventions should extend beyond frequently anticipated symptoms to include potentially life-threatening toxicities that require immediate reporting. Recent reviews have similarly highlighted persistent deficiencies in patient understanding of treatment-related complications that demand urgent medical attention despite improvements in routine chemotherapy education (Kasgri et al., 2024; Rashidi et al., 2024).

The consistently high awareness observed across most side effects may reflect the cumulative influence of repeated interactions with oncology professionals during successive chemotherapy cycles. Information provided before treatment initiation is often reinforced through subsequent clinical encounters, enabling patients to relate education directly to lived experience. Nevertheless, awareness acquired through personal experience differs from structured understanding of symptom management. Patients may recognise that a side effect exists without necessarily possessing adequate knowledge regarding its prevention, severity, or appropriate response. This distinction is increasingly emphasised within oncology nursing research, where patient education is viewed not merely as information provision but as a continuous process that supports informed participation throughout the treatment pathway (Hyatt et al., 2022; Tolotti et al., 2022; Oakley & Ream, 2024).

The findings also highlight the central contribution of oncology nurses to patient education. Nurses frequently represent the healthcare professionals with whom patients have the greatest contact during chemotherapy. Consequently, they occupy a unique position to reinforce information, assess patient understanding, correct misconceptions, and encourage early reporting of symptoms. Contemporary evidence suggests that structured educational approaches, including teach-back methods and repeated counselling, improve patients' understanding of chemotherapy-related adverse effects and strengthen symptom self-management behaviours (Gucuyener & Karabacak, 2025). Rather than relying exclusively on information delivered before the first chemotherapy cycle, education that continues throughout treatment appears more likely to improve patient preparedness and confidence in managing adverse effects.

These findings also have implications for supportive cancer care within low-resource settings. Healthcare systems in many low- and middle-income countries continue to experience shortages of specialist oncology personnel and educational resources, limiting opportunities for comprehensive patient counselling. Under such circumstances, educational interventions should prioritise symptoms that contribute most to perceived burden while ensuring that patients recognise toxicities requiring urgent medical review. Standardised educational materials, reinforced through nurse-led consultations, may provide a practical and sustainable approach for improving awareness across diverse patient populations.

Although awareness was generally high, the findings should not be interpreted as indicating complete preparedness for chemotherapy. Awareness represents only one dimension of effective treatment management and should be considered alongside health literacy, communication quality, emotional readiness, and access to supportive services. Future research should therefore examine how awareness translates into actual symptom reporting, self-care practices, treatment adherence, and clinical outcomes. Longitudinal studies would also provide valuable insight into how awareness evolves throughout successive chemotherapy cycles and whether educational interventions produce sustained improvements in patient knowledge and behaviour.

**Implications for Nursing Practice**

The findings of this study have important implications for oncology nursing practice, particularly in relation to patient education, symptom management, and supportive care. Although respondents demonstrated a generally high level of awareness of chemotherapy-related side effects, variations across individual toxicities suggest that nurses should not assume uniform understanding of all treatment-related complications. A structured and comprehensive approach to chemotherapy education is therefore essential, one that addresses both commonly anticipated symptoms and those that contribute most to the perceived burden of treatment.

The comparatively lower awareness of fever and chills is especially significant because these symptoms may indicate treatment-related neutropenia and serious infection. Limited recognition of such symptoms can delay presentation for medical assessment and increase the risk of avoidable morbidity. Nursing education should emphasise early identification of symptoms that require urgent clinical review, ensuring that patients understand not only what may occur during treatment but also which signs warrant immediate contact with healthcare providers. Standardised education protocols, supported through written information and repeated verbal reinforcement, may strengthen patient preparedness throughout the treatment pathway and reduce the perceived burden associated with uncertainty.

The findings also highlight the value of continuous rather than one-off education. Information provided before chemotherapy begins may not be fully absorbed, particularly when patients are still processing the emotional impact of a recent diagnosis. Reinforcing key messages during subsequent cycles creates opportunities to clarify misconceptions, respond to emerging concerns, and tailor education to patients' evolving experiences and perceived burden of treatment. Nurses are uniquely positioned to provide this continuity because they maintain regular and sustained contact with patients throughout chemotherapy.

Patient education should incorporate practical guidance on symptom monitoring and self-management. Clear advice on hydration, nutritional support, infection prevention, fatigue management, and appropriate reporting of adverse effects can enhance confidence and encourage active participation in care. Educational interventions that invite patients to ask questions and confirm their understanding may further strengthen communication and help reduce the perceived burden of managing symptoms independently.

The findings also support wider integration of patient-centred educational strategies within oncology services. Structured chemotherapy education delivered through evidence-based communication approaches, including teach-back techniques and personalised counselling, has been shown to improve patient understanding and satisfaction while promoting earlier recognition of treatment-related complications. Healthcare organisations should consider embedding standardised education pathways into routine oncology practice to ensure consistency in the information provided, regardless of clinician or treatment setting, and to minimise variations in the perceived burden of treatment across different care environments.

Finally, the study underscores the importance of continuing professional development among oncology nurses. As systemic therapies evolve, nurses require regular updating to ensure that patient education reflects current treatment protocols and emerging toxicity profiles. Investment in specialist oncology nursing education will strengthen the capacity of healthcare professionals to deliver accurate, timely, and patient-centred information that supports safe chemotherapy delivery and helps reduce the perceived burden experienced by women undergoing treatment.

## CONCLUSION

This study examined awareness of chemotherapy-related side effects among breast cancer patients receiving treatment in a tertiary healthcare facility in Nigeria, offering insight into how women understand and interpret the perceived burden of these toxicities during treatment. The findings demonstrate that respondents generally possessed a high level of awareness of common adverse effects associated with chemotherapy. Hair loss, weakness related to anaemia, nausea, and vomiting were the most widely recognised toxicities, while awareness of fever and chills was comparatively lower despite remaining above the predefined awareness threshold. These patterns suggest that patients are familiar with the more visible and frequently experienced consequences of chemotherapy, although important differences remain in the recognition of individual adverse effects and in how the perceived burden of these symptoms is understood.

The variation observed across specific side effects highlights opportunities for strengthening patient education within routine oncology practice. Awareness of symptoms that may indicate serious treatment-related complications should receive greater emphasis during chemotherapy counselling, particularly where delayed recognition could adversely affect clinical outcomes. Structured education that continues throughout successive treatment cycles may be more effective than relying solely on information delivered before treatment commences, and may help reduce the perceived burden associated with uncertainty or incomplete understanding.

The study also reinforces the central role of oncology nurses in preparing patients for chemotherapy. Regular contact between nurses and patients throughout treatment provides repeated opportunities to reinforce information, clarify misconceptions, assess understanding, and encourage timely reporting of adverse effects. Strengthening these educational interactions has the potential to improve patient preparedness, support safer management of chemotherapy-related toxicities, and lessen the perceived burden experienced during treatment.

Although the findings demonstrate encouraging levels of awareness within this patient population, awareness alone should not be regarded as the endpoint of patient education. Effective cancer care requires that awareness is translated into appropriate health-seeking behaviour, timely symptom reporting, and active participation in treatment decisions. Future studies should therefore examine how awareness and perceived burden interact to influence symptom self-management, healthcare utilisation, and treatment adherence using longitudinal and multi-centre designs. Such evidence would provide a more comprehensive understanding of how patient awareness contributes to safer chemotherapy delivery and improved supportive cancer care across diverse healthcare settings.

## AUTHOR CONTRIBUTION

All authors played a substantive role in shaping this study and developing the manuscript. C.C. conceptualised the work and designed the overall study framework under the supervision of F.C.O. Data analysis, interpretation of data and validation of findings were carried out collaboratively, with each author contributing to the discussions that informed the final results. G.M.Y., C.E.E. and K.O.O. prepared the initial manuscript draft, covering the introduction, methods, results and discussion. Co-authors strengthened the analysis, offered detailed revisions and enhanced the clarity and coherence of the final document. Every author reviewed the complete manuscript, approved the final version and accepted responsibility for the integrity of the work.

## CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

## FUNDING

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

## ACKNOWLEDGEMENT

The authors would like to acknowledge the management and technical staff of PENKUP Research Institute, Birmingham, United Kingdom for their excellent assistance and for providing manuscript writing/editorial support in accordance with Good Publication Practice (GPP3) guidelines.

## REFERENCES

1. Amafah, J., Temedie-Asogwa, T., Atta, J. A., & Al Zoubi, M. A. M. (2023). The Impacts of Treatment Summaries on Patient-Centered Communication and Quality of Care for Cancer Survivors. *Int. J. Med All Body Heal. Res*, *4*(10.54660).
2. Azarabadi, A., Bagheriyeh, F., Moradi, Y., & Orujlu, S. (2024). Nurse-patient communication experiences from the perspective of Iranian cancer patients in an outpatient oncology clinic: a qualitative study. *BMC nursing*, *23*(1), 682.

3. Chepkorir, J., Guillaume, D., Lee, J., Duroseau, B., Xia, Z., Wyche, S., ... & Han, H. R. (2024). The role of health information sources on cervical cancer literacy, knowledge, attitudes and screening practices in Sub-Saharan African women: A systematic review. *International journal of environmental research and public health*, *21*(7), 872.

4. Chijioke, C., Onyekwuo, F. C., Obohwemu, K. O., Yakpir, G. M., Ekwuluo, C. E., Madubuike, K. C., Iyevhobu, K. O., Oseji, D. I., Ituah, F., Meruo, L. N., Ooju, O. E., Ike, K. G., Akadiri, M. O., Emegoakor, C. O., Adeyemo, T. M., Ugwu, E. O., Ajayi, O. S., Ojo, B. J., Anazodo, N. G., Oraemeka, C. A., Chukwu, J. A., Akwolu, C. C., & Odiegwu, E. A. (2026). Awareness of Chemotherapy and Its Side Effects and Their Influence on Quality of Life Among Breast Cancer Patients in a Nigerian Teaching Hospital. International Research Journal of Medical Sciences and Health Care, 3(04), 16-29. https://doi.org/10.55640/irjmshc-v03i04-03

5. Di Meglio, A., Hamy, A. S., Charles, C., Deluche, E., Arnedos, M., & colleagues. (2025). Experiences and preferences about information on treatment-related side effects among patients with breast cancer. *The Breast*, 2025; 80.

6. Fahmer, N., Faller, H., Engehausen, D., Hass, H. G., Reuss-Borst, M., Duelli, K., ... & Meng, K. (2022). Patients' challenges, competencies, and perceived support in dealing with information needs–A qualitative analysis in patients with breast and gynecological cancer. *Patient Education and Counseling*, *105*(7), 2382-2390.

7. Ferraris, G., Monzani, D., Coppini, V., Conti, L., Maria Pizzoli, S. F., Grasso, R., & Pravettoni, G. (2023). Barriers to and facilitators of online health information-seeking behaviours among cancer patients: a systematic review. *Digital Health*, *9*, 20552076231210663.

8. Gucuyener, B. G. and Karabacak, B. G., (2025) Effect of Chemotherapy Patient Education Using the Teach-Back Method on Symptom Management and Quality of Life: A Randomized Controlled Trial. J Cancer Educ. 2025 Oct;40(5):700-712. https://doi.org/10.1007/s13187-024-02564-0.

9. Harbeck, N., Penault-Llorca, F., Cortes, J., Gnant, M., Houssami, N., Poortmans, P., Ruddy, K., Tsang, J., & Cardoso, F. (2019). Breast cancer. *Nature Reviews Disease Primers, 5*(1), 66. https://doi.org/10.1038/s41572-019-0111-2

10. Hyatt, A., Shelly, A., Cox, R., Humphries, E., Lock, G., & Varlow, M. (2022). How can we improve information for people affected by cancer? A national survey exploring gaps in current information provision, and challenges with accessing cancer information online. *Patient education and counseling*, *105*(8), 2763-2770.

11. Ingole, S., Vasdev, N., Tekade, M., Gupta, T., Pawar, B., Mhatre, M., ... & Tekade, R. K. (2024). Toxic effects of cancer therapies. In *Public health and toxicology issues in drug research* (pp. 353-379). Academic Press.

12. Kasgri, K. A., Abazari, M., Badeleh, S. M., Badeleh, K. M., & Peyman, N. (2024). Comprehensive review of breast cancer consequences for the patients and their coping strategies: a systematic review. *Cancer Control*, *31*. https://doi.org/10.1177/10732748241249355

13. Kaur, S., Mayanglambam, P., Bajwan, D., & Thakur, N. (2022). Chemotherapy and its adverse effects-A systematic review. *International Journal of Nursing Education and Research*, *10*(4), 399-402.

14. Mayer, D. K., Nasso, S. F., & Earp, J. A. (2021). Defining cancer survivors, their needs, and perspectives on survivorship health care in the USA. *The Lancet Oncology, 18*(1), e11–e18. https://doi.org/10.1016/S1470-2045(16)30573-3

15. Ngwa, W., Addai, B. W., Adewole, I., Ainsworth, V., Alaro, J., Alatise, O. I., ... & Kerr, D. (2022). Cancer in sub-Saharan Africa: a lancet oncology commission. *The Lancet Oncology*, *23*(6), e251-e312.

16. Oakley, C., & Ream, E. (2024, February). Role of the nurse in patient education and engagement and its importance in advanced breast cancer. In *Seminars in oncology nursing* (Vol. 40, No. 1, p. 151556). WB Saunders.

17. Omotoso, O., Teibo, J. O., Atiba, F. A., Oladimeji, T., Paimo, O. K., Ataya, F. S., ... & Alexiou, A. (2023). Addressing cancer care inequities in sub-Saharan Africa: current challenges and proposed solutions. *International journal for equity in health*, *22*(1), 189.

**18.** Rashidi, A., Thapa, S., Kahawaththa Palliya Guruge, W. S., & Kaur, S. (2024). Patient experiences: a qualitative systematic review of chemotherapy adherence. *BMC cancer*, *24*(1), 658.

**19.** Sarbaz, M., Monazah, F. M., Eslami, S., Kimiafar, K., & Baigi, S. F. M. (2022). Effect of mobile health interventions for side effects management in patients undergoing chemotherapy: A systematic review. *Health policy and technology*, *11*(4), 100680.

**20.** Setia, M. S. (2016). Methodology series module 3: Cross-sectional studies. *Indian Journal of Dermatology*, *61*(3), 261-264. https://doi.org/10.4103/0019-5154.182410

**21.** Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education*, *48*(6), 1273-1296. https://doi.org/10.1007/s11165-016-9602-2

**22.** Tanay, M. A. L., Robert, G., Rafferty, A. M., Moss-Morris, R., & Armes, J. (2022). Clinician and patient experiences when providing and receiving information and support for managing chemotherapy-induced peripheral neuropathy: A qualitative multiple methods study. *European Journal of Cancer Care*, *31*(1), e13517.

**23.** Tolotti, A., Barello, S., Vignaduzzo, C., Liptrott, S. J., Valcarenghi, D., Nania, T., ... & Bonetti, L. (2022). Patient engagement in oncology practice: a qualitative study on patients' and nurses' perspectives. *International journal of environmental research and public health*, *19*(18), 11644.

**24.** World Health Organisation. (2024). *Breast cancer*. World Health Organisation. Available at: https://www.who.int/news-room/fact-sheets/detail/breast-cancer [Accessed: 16 November 2025]

**25.** Yazbeck, V., Alesi, E., Myers, J., Hackney, M. H., Cuttino, L., & Gewirtz, D. A. (2022). An overview of chemotoxicity and radiation toxicity in cancer therapy. *Advances in cancer research*, *155*, 1-27.