Nurses' Knowledge of Chemotherapy-Induced Nausea and Vomiting Management in Selected Hospitals in Uasin Gishu County, Kenya

Linner Langat[1], John O. Okoth[2], Damaris A. Ochanda[3]

[1]Department of Nursing Research, Education and Management, Masinde Muliro University of Science and Technology, Kakamega, Kenya.
e-mail: linnerlangat73@gmail.com
[2]School of Nursing, Midwifery and Paramedical Science, Masinde Muliro University of Science and Technology, Kakamega, Kenya.
e-mail: jokoth@mmust.ac.ke
[3]School of Nursing, Midwifery and Paramedical Science, Masinde Muliro University of Science and Technology, Kakamega, Kenya.
e-mail: dochanda@mmust.ac.ke

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ABSTRACT

Context: Chemotherapy-induced nausea and vomiting (CINV) remains one of the most distressing side effects experienced by cancer patients, particularly in low-resource settings. Nurses play a central role in the prevention and management of CINV; however, variations in their knowledge can affect the quality of care, patient experiences, and patient outcomes.

Aim: This study aimed to assess nurses' knowledge of CINV management in selected hospitals in Uasin Gishu County, Kenya.

Methods: A cross-sectional analytical design was adopted, targeting 160 nurses directly involved in cancer care. Data were collected using structured questionnaires aligned with international CINV management guidelines. The study was conducted in selected public and private hospitals within Uasin Gishu County, Kenya, which hosts the Moi Teaching and Referral Hospital—the largest referral facility in the western region—and several county- and faith-based hospitals providing oncology services.

Results: A total of 58.0% of nurses demonstrated adequate knowledge of chemotherapy-induced nausea and vomiting (CINV) management, while 42.0% exhibited knowledge gaps. Male nurses were significantly less knowledgeable than their female counterparts (OR = 0.82; CI = 0.62–0.98; p = 0.05). Regarding work experience, higher knowledge levels were observed among nurses with more years of experience (6-11 years, 73.7%), and (over 10 years, 70%) at $p<0.05$; Knowledge levels increased with years of practice. Nurses with 2–5 years of experience (OR = 1.63; CI = 1.23–2.70; p = 0.01) and those with 6–10 years of experience (OR = 1.69; CI = 1.27–4.03; p = 0.02) were significantly more likely to be knowledgeable. Importantly, nurses with over 10 years of experience constituted 70% of those classified as knowledgeable, and the association between longer experience and higher knowledge levels was statistically significant (OR = 0.94; CI = 0.37-2.36; p = 0.03).

Conclusion: The study concludes that while more than half of the nurses possessed adequate knowledge of CINV management, a considerable proportion lacked the necessary understanding to provide optimal care. Targeted continuous professional development, regular updates on evidence-based guidelines, and integration of standardized CINV protocols in clinical practice are essential to bridge existing knowledge gaps and improve patient outcomes.

Keywords: Chemotherapy-induced nausea, vomiting, nurse knowledge, cancer, Uasin Gishu County

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1. Introduction

The burden of chemotherapy-induced nausea and vomiting (CINV) on patients is substantial, as nausea and vomiting negatively impact quality of life, daily functioning, and treatment adherence *(Molassiotis et al., 2007).* Poorly controlled CINV can result in serious medical complications such as dehydration, electrolyte imbalances, malnutrition, and physical or psychological distress. These symptoms remain among the most feared side effects of chemotherapy, and inadequate management can compromise treatment outcomes and increase healthcare utilization *(Clark-Snow et al., 2018).*

Globally, advances in understanding the physiology of CINV and the development of new antiemetics over the past 25 years have significantly improved its prevention among patients receiving emetogenic chemotherapy *(Navari & Aapro, 2016).*

Nurses play a crucial role in the prevention and clinical management of CINV; however, their knowledge in this area varies depending on demographic factors and opportunities for continuous professional development *(Battah et al., 2024).* In the USA in 2015, oncology nurses applying guideline-recommended antiemetic regimens reduced the prevalence of CINV from 85% to 65% *(National Comprehensive Cancer Network, 2020).*

In Africa, CINV remains a common challenge in everyday clinical practice; the proportion of patients affected is likely higher than documented. A major barrier to effective control is limited knowledge among nurses regarding the prevention and management of CINV, particularly in the application of recommended antiemetic protocols *(Badarudin et al., 2024).*

[1]*Correspondence author: Linner Langat*

2. Significance of the study

In Kenya, the growing cancer burden has expanded chemotherapy services in county and referral hospitals, including those in Uasin Gishu County. Nurses, as the primary caregivers, require adequate knowledge to ensure effective CINV management *(Kenya Ministry of Health, 2020).* However, there is limited empirical evidence assessing nurses' knowledge of CINV management in this region. Currently, there are no standard national clinical guidelines for CINV management, and practices are largely adapted from international recommendations. Even with prophylaxis for moderately emetogenic chemotherapy, 20–30% of patients fail to achieve a complete response or protection *(Molassiotis et al., 2025).*

Local statistics indicate that CINV is highly prevalent in hospitals in Uasin Gishu. At Real Hospital, 75.8% of chemotherapy patients report nausea and vomiting; at Mediheal Hospital, 77.5%; and at Eldoret Hospital, 70.4% *(Thani, 2023).* Despite this high prevalence, gaps persist in nurses' knowledge of evidence-based strategies to prevent and manage CINV. This knowledge deficit undermines patient care, underscoring the need to assess and address nurses' knowledge of CINV management to improve outcomes for cancer patients in Uasin Gishu County.

This study will provide context-specific evidence on nurses' knowledge of CINV management within a low-resource setting. Unlike international studies that focus on guideline development and implementation in high-income countries, this research highlights the unique challenges and gaps faced in Kenyan hospitals, particularly at the county level. The findings will inform the design of targeted training programs, strengthen local capacity for evidence-based nursing practice, and guide policymakers in developing standardized national protocols for CINV management. Ultimately, the study aims to assess nurses' knowledge of the management of chemotherapy-induced nausea and vomiting in selected hospitals in Uasin Gishu County.

3. Aim of the study

This study aimed to assess nurses' knowledge of chemotherapy-induced nausea and vomiting management in selected hospitals in Uasin Gishu County, Kenya.

3.1. Research question

What is the level of knowledge of nurses regarding the management of chemotherapy-induced nausea and vomiting in cancer patients in selected hospitals within Uasin Gishu County, Kenya?

4. Subjects & Methods

4.1. Research Design

The research design employed in this study was a cross-sectional analytical study. A cross-sectional analytical study involves examining individuals who differ on a specific key characteristic *(Setia, 2016).* Data were collected simultaneously from individuals who shared similar characteristics but differed on key factors of interest, such as age, professional discipline, and years of experience. Cross-sectional studies gather data at a single point in time, often to evaluate the prevalence of acute or chronic conditions or to explore questions about the causes of disease or the outcomes of interventions *(Caruana et al., 2015).* Additionally, a longitudinal prospective study design was implemented in this research.

4.2. Study Setting

This study was conducted in selected hospitals in Uasin Gishu County, specifically at Chandaria Cancer Centre and Alexandria Hospital. Uasin Gishu County was chosen because it has the highest number of patients undergoing chemotherapy in its health facilities among counties in the region *(Kenya National Cancer Institute, 2022).*

The county has a well-established healthcare system comprising public, private, faith-based, and national government facilities. In total, there are 44 public health facilities, including one referral hospital, eight hospitals, 16 health centers, and 19 dispensaries owned and managed by the County Government. The private sector contributes 55 health facilities, which include nine private hospitals, two faith-based organization (FBO) hospitals, two private health centers, one non-governmental organization (NGO) health center, one NGO dispensary, seven private dispensaries, and 33 private clinics. In addition, the national government manages two health facilities within the county.

The doctor-patient and nurse-patient ratios in the county currently stand at 1:36099 and 1:2159, respectively, which are higher than the recommended ratios of 1:10000 and 1:450, respectively. Access to quality health care services in rural areas has increased due to the construction of new health facilities, the rehabilitation and equipping of existing ones. The county was selected because it is the only county in western Kenya to host the two cancer hospitals that offer treatment for CINV. Moreover, the county has more cases of CINV than all neighboring counties *(Kenya National Bureau of Statistics (KNBS). (2020).* No study on the clinical management of chemotherapy-induced nausea and vomiting in cancer patients has been done in this region.

4.3. Subjects

The target population included nurses caring for cancer patients receiving CINV treatment at Chandaria Cancer Centre and Alexandria Hospital, totaling 234 nurses. Therefore, the total target population was 160 nurses.

Sample size determination

Fischer's formula *(Fischer, 2011)* was used to determine the sample size of nurses as follows.

$$nf = 1 + \frac{n}{1+\frac{n}{N}}$$

Where;

nf= Sample size (when the population is less than 10,000).

n = Sample size (when the population is less than 10,000); 384.

N= Estimate of the population size; 234

Therefore, the study's sample size for respondents was calculated as follows.

$$nf = 1 + \frac{384}{1 + \frac{384}{234}} = 145.3981$$

=146

The study included 146 respondents.

To address non-response, the study increased the sample size by 10% as suggested by *Suresh and Chandrashekara (2012).* Therefore, the sample size was 160 respondents. Therefore, the sample size was 160 respondents.

Table (1): Proportionate sample distribution.

Category	Chandaria Cancer Centre	Alexandria Hospital	Total
Nurses	**109**	**51**	**160**

Sampling procedures

This study comprised nurses with experience in the clinical management of chemotherapy-induced nausea and vomiting (CINV) in cancer patients at Chandaria Cancer Centre and Alexandria Hospital. Simple random sampling was used to select the nurses who participated in the study. Simple random sampling was applied within each group to select individual participants. This randomization was achieved by assigning each nurse a unique identifier within their respective category. A random number generator was then used to randomly select respondents until the desired sample size for each group was achieved. The sampling frame for this study comprised nurses currently employed at Chandaria Cancer Centre and Alexandria Hospital who were actively involved in cancer patient care and CINV management.

Inclusion criteria

- Nurses with experience of 6 months or above providing direct care to cancer patients on chemotherapy.
- Nurses who consented to participate in the study.

Exclusion criteria

- Nurses who did not consent to participate in the study.
- Those who met the inclusion criteria and were on leave during the data collection period.

4.4. Tools of Data Collection

4.4.1. A Structured Self-Administered Questionnaire

The study utilized a single data collection tool, a structured self-administered questionnaire, to gather information from participating nurses. The instrument was adapted from validated tools based on international guidelines for the management of chemotherapy-induced nausea and vomiting (CINV), including those of the 2024 Multinational Association of Supportive Care in Cancer/European Society for Medical Oncology (MASCC/ESMO) and the American Society of Clinical Oncology (ASCO) issued in 2020 *(Herrstedt et al., 2024)*. However, it was modified to fit the Kenyan hospital context. The questionnaire was designed to assess nurses' knowledge of CINV management and to capture demographic characteristics, including age, gender, qualifications, and years of experience in the oncology unit.

It consisted of two sections: Section A with six items on demographics, and Section B with 8 items covering nurses' knowledge of clinical management, such as the most difficult CINV to control, chemotherapy emetogenicity classification, and Triple therapy constituents. Question formats included multiple-choice and closed-ended items, yielding quantitative data for analysis.

Scoring system

Knowledge was scored by awarding 1 point for each correct response and 0 for each incorrect response, with a 50% cut-off used to distinguish between adequate and inadequate knowledge.

4.5. Procedures

Ethical considerations: To uphold ethical standards in the research process, approval to conduct the study was obtained from the relevant authorities. The principle of beneficence was observed by ensuring that participants were protected from any form of harm, whether physical, psychological, social, or economic. This principle was achieved by carefully phrasing questions in a neutral, non-judgmental way and by allowing participants to withdraw if they felt uncomfortable. All interviews were rescheduled based on respondents' convenience. Before they were researched, nurses signed a consent form after the researcher thoroughly explained the procedures they would undertake. The nurses may not directly benefit from participating in this study.

The researchers respected human dignity and allowed participants to voluntarily consent to participate in the study, with no penalties. Participants could ask questions, and the consent form included a section to specify whether they would like to take part after the researcher fully disclosed the study's intent, procedures, and significance. The principles of informed consent were fully followed; all necessary disclosures were made, participation was voluntary, participants understood the information provided, and they had the right to withdraw from the study at any time. Regarding this, the researcher sent each nurse a written consent form for their participation in the study, which they signed.

The principle of justice was followed by ensuring that all nurses who qualified for the study had an equal opportunity to participate without discrimination. Anonymity was ensured by coding the questionnaires rather than recording participants' names, and initials were used only to identify participants. This principle protected the respondents from prejudice and discrimination and respected their privacy. Lastly, confidentiality was ensured by informing participants that personal identifiers would not be included in the data and that access to the data would be limited to researchers.

The tool's validity and reliability were carefully established to ensure the accuracy of the findings. Content validity was reviewed by two oncology nursing specialists and three physicians at Moi Teaching and Referral Hospital, leading to minor revisions for clarity. Reliability testing was conducted via a pilot study with 16 nurses (10% of the target sample), which yielded a Cronbach's alpha of 0.82, indicating good internal consistency. The

questionnaire was administered once, in English, the professional language of nursing practice in Kenya.

To facilitate the study, the researcher first obtained an introductory letter from the University and formal research authorization from both the Chandaria Cancer Centre and Alexandria Hospital. Upon receiving approval, the researcher visited the two health facilities to schedule appropriate dates and times for data collection.

The researcher personally distributed these questionnaires to ensure clarity and consistency in the administration process. Before completing the questionnaire, each participant was given the study's purpose and an information leaflet attached to the first page. The leaflet provided the study's purpose, the confidentiality measure, and the voluntary nature of participation, all of which were reviewed prior to participation. The researcher and participants had to review the information and develop informed consent before participating in the study. The researcher collected the completed questionnaires at designated times, ensuring prompt and complete data retrieval.

4.6. Data Analysis

Upon return, the completed questionnaires were checked for accuracy and completeness, then labeled using code numbers to maintain confidentiality and ensure anonymity. The data were prepared for analysis by coding the responses and converting them to numerical values. Descriptive statistics were used to summarize the data and describe the respondents' basic characteristics. These included frequencies, percentages, means, and standard deviations. These measures provided an overview of the distribution of variables. All analyses were conducted using the Statistical Package for Social Sciences (SPSS) version 26.0. In addition to descriptive statistics, inferential analyses, such as the Odds Ratio (OR), were used to assess the strength and direction of association between independent variables (e.g., nurses' knowledge and adherence to guidelines) and the occurrence of CINV. The statistical significance level was set at $p \leq 0.05$.

5. Results

Table 2 reveals the socio-demographic characteristics of nurses; 160 participants completed the questionnaires, yielding a 100% response rate. The participants' ages ranged from 25 to 60 years, with a mean age of 42.25±6.98, and no nurses were aged below 25 years. The largest age group was those aged 55 and over, accounting for 41.9% of participants. This result was followed by the 25-35 age group, which included 38 participants (23.8%). 86(53.7%) were males, and 74 (46.3%) were females. Regarding educational qualifications, 96 participants (60.0%) held diplomas, while 55(34.4%) were B.Sc. graduates. The majority of nurses had worked in the oncology unit for 2-5 years, accounting for 66 participants (41.3%). Those who had worked for 6-10 years and over 10 years comprised 19 (11.9%) and 30(18.8%) of the participants, respectively.

Table 3 presents the results of the assessment of nurses' knowledge regarding the clinical management of chemotherapy-induced nausea and vomiting (CINV); 94 (58.8%) of respondents answered incorrectly stated CINV is the most difficult adverse effect to control. Similarly, incorrect responses were observed among 130(81.3%) of nurses regarding factors influencing CINV, 98(61.3%) regarding receptors involved in the pathophysiology of CINV, and 105(65.6%) regarding the emetogenic potential of chemotherapy agents.

On the other hand, respondents demonstrated relatively strong knowledge in other areas. A large majority, 132(82.5%), correctly identified chemotherapy emetogenicity classifications, while 128(80.0%) correctly recognized the constituents of triple therapy. Additionally, more than three-quarters (82.5%) provided correct responses regarding the indicators of CINV.

Figure 1 illustrates the nurses' overall knowledge of CINV management. A majority (98, 58.0%) of the nurses achieved ≥50% in the management of CINV. The overall mean knowledge was 4.69±1.26.

Table 4 demonstrates the association between socio-demographic factors and nurses' knowledge of CINV management. Nurses' knowledge of clinical management of CINV varied considerably by gender and professional background. Results show a borderline significant difference by gender ($p=0.05$). Of the 93 nurses who demonstrated adequate knowledge, 40 (59.7%) were aged 55 years or older, while 23 (60.5%) were aged 25–35 years, with no statistically significant association between knowledge and age groups. Knowledge levels were also relatively high among nurses with a bachelor's degree (34, 61.8%) and those with a diploma qualification (56, 58.3%), with a non-statistically significant association between knowledge and educational level.

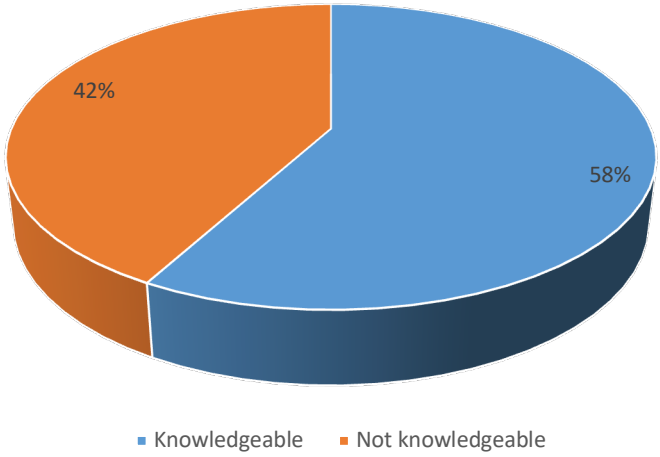
Further analysis using multivariable regression indicated that male nurses were significantly less likely to be knowledgeable compared to their female counterparts (OR = 0.82; CI = 0.62–0.98; p = 0.05). Regarding work experience, knowledge levels increased with years of practice. Nurses with 2–5 years of experience (OR = 1.63; CI = 1.23–2.70; p = 0.01) and those with 6–10 years of experience (OR = 1.69; CI = 1.27–4.03; p = 0.02) were significantly more likely to be knowledgeable. Importantly, nurses with over 10 years of experience constituted 70% of those classified as knowledgeable, and the association between longer experience and higher knowledge levels was statistically significant (OR = 0.94; CI = 0.37-2.36; p = 0.03).

Table (2): Frequency and percentage distribution of the demographic characteristics of nurses (n=160).

Variables	Frequency	Percent
Age		
25-35	38	23.8
36-45	25	15.6
46-55	30	18.8
Over 55	67	41.9
Range	25-60	
Mean±SD	42.25±6.98	
Gender		
Female	74	46.3
Male	86	53.7
Education		
Diploma	96	60
B.Sc Graduate	55	34.4
Masters	7	4.4
PhD	2	1.3
Experience in oncology		
0.5-1 years	45	28.1
2-5 years	66	41.3
6-10 years	19	11.9
Over 10year	30	18.8

Table (3): Frequency and percentage distribution of nurses' knowledge of clinical management of CINV (n=160).

Clinical Management Item	Frequency	Percentage (%)
Most difficult CINV to control		
Correct	66	41.3
Incorrect	94	58.8
Chemotherapy emetogenicity classification		
Correct	132	82.5
Incorrect	28	17.5
Triple therapy constituents		
Correct	128	80.0
Incorrect	32	20.0
CINV indicators		
Correct	132	82.5
Incorrect	28	17.5
Tests before chemotherapy		
Correct	145	90.6
Incorrect	15	9.4
Chemotherapy agent emetogenicity potential		
Correct	55	34.4
Incorrect	105	65.6
Receptors involved in CINV		
Correct	62	38.8
Incorrect	98	61.3
Factors influencing CINV		
Correct	30	18.8
Incorrect	130	81.3



The overall mean knowledge score =4.69±1.26

Figure (1): Percentage distribution of the level of knowledge of the nurses in CINV (n=160).

Table (4): Association between socio-demographics and knowledge of nurses on management of CINV (n=160).

Variables	Knowledgeable		Not Knowledgeable		OR (95% CI)	p-value
	No.	%	No.	%		
Age						
25–35	23	60.5	15	39.5	Ref	–
36–45	14	56.0	11	44.0	0.98 (0.42–2.27)	0.97
46–55	16	53.3	14	46.7	1.27 (0.49–3.33)	0.62
Over 55	40	59.7	27	40.3	1.05 (0.43–2.58)	0.91
Gender						
Female	47	63.5	27	36.5	Ref	–
Male	46	53.5	40	46.5	0.82 (0.62–0.98)	0.05
Education Level						
Diploma	56	58.3	40	41.7	Ref	–
B. Sc Graduate	34	61.8	21	38.2	0.82 (0.58–11.56)	0.88
Masters	2	28.6	5	71.4	1.08 (0.07–15.56)	0.96
PhD	1	50.0	1	50.0	1.99 (0.08–19.06)	0.67
Experience						
0.5–1 year	22	48.9	23	51.1	Ref	–
2–5 years	36	54.5	30	45.5	1.63 (1.23–2.70)	0.01
6–10 years	14	73.7	5	26.3	1.69 (1.27–4.03)	0.02
Over 10 years	21	70.0	9	30.0	0.94 (0.37–2.36)	0.03

6. Discussion

Chemotherapy-induced nausea and vomiting (CINV) remains one of the most distressing and debilitating side effects of cancer treatment, significantly impairing patients' quality of life and treatment adherence. Despite advances in antiemetic therapies, studies show that a considerable proportion of patients still experience nausea and vomiting during chemotherapy, particularly in low-resource settings where standardized guidelines are limited *(Navari & Aapro, 2016).*

Nurses, as frontline caregivers, play a pivotal role in assessing, preventing, and managing CINV; however, their level of knowledge directly influences the effectiveness of the care they provide. In Kenya, the lack of national CINV management guidelines and reliance on adapted international protocols have further highlighted the importance of evaluating nurses' competency in this area *(Kenya Ministry of Health, 2020).* Against this backdrop, this study aimed to assess nurses' knowledge of CINV management in selected hospitals in Uasin Gishu County, Kenya.

The findings indicate that while a majority of nurses correctly identified chemotherapy emetogenicity classifications and the constituents of triple therapy, there were significant gaps in knowledge regarding other aspects of CINV management. Notably, more than half answered questions about the difficulty of controlling CINV incorrectly, and a substantial proportion had incorrect knowledge of the receptors involved in CINV and the emetogenic potential of chemotherapy agents. This finding clarifies that although nurses were familiar with some aspects of CINV management, they lacked a comprehensive understanding, which could hinder effective treatment and adherence to guidelines. These results align with findings of *Xiao et al. (2023),* who similarly observed

that, despite recognizing the common pharmacological agents for CINV, nurses in Hong Kong reported inadequate knowledge of CINV, particularly in standardized assessment tools and management protocols.

These results reflect a strong grasp of fundamental aspects of CINV management, which aligns with findings by *Hesketh et al. (2020)*, who established clinical guidelines that emphasize the importance of understanding emetogenicity for effective treatment planning. Despite the strengths, there are significant gaps suggesting potential misconceptions about the challenges of managing CINV.

Moreover, a higher proportion of respondents incorrectly identified the factors influencing CINV and lacked accurate knowledge of the receptors involved in CINV and the emetogenic potential of chemotherapy agents. This finding suggests that many nurses lack a comprehensive understanding of the mechanisms and risk factors underlying CINV, which may hinder their ability to implement effective preventive measures. Consequently, inadequate knowledge about receptor pathways and chemotherapy emetogenicity could contribute to suboptimal management of CINV among patients undergoing treatment. *Badarudin et al. (2024)* agreed that these gaps are critical because they suggest a lack of familiarity with the underlying mechanisms of CINV, which is essential for selecting appropriate treatments.

The overall mean knowledge score and the fact that more than half of nurses were deemed knowledgeable are consistent with the need for ongoing education. *Ning et al. (2024)* highlighted the need for oncology nurses to stay up to date with the latest guidelines and developments in CINV management. This finding is crucial, as nurses in this study also expressed a need for further education and standardization in CINV management. These findings highlight the importance of continuous education and targeted training to bridge knowledge gaps in CINV management. Another study emphasized that ongoing professional development is crucial for keeping nurses up to date on the latest advancements and evidence-based practices *(Matlhaba, 2025).*

The analysis reveals that bachelor's degree holders (with no statistically significant association between nurses' education level and knowledge) and those with 2->10 years of experience (with statistically significant association between nurses' experience level and knowledge) were more knowledgeable about CINV management. This finding supports previous research by *Johnson et al. (2025),* which highlighted that nurses with more education and experience had a better grasp of CINV management. However, it is important to note that knowledge level was significantly influenced by years of experience, as this study found. This finding suggests that while education and practical experience contribute to knowledge, other factors may affect its application in clinical practice.

The finding that male nurses were 18% less knowledgeable than their female counterparts highlights a potential gender disparity in knowledge of CINV management. Addressing gender disparities in knowledge and ensuring that educational resources are equally accessible to all nurses can further enhance the quality of care. Additionally, leveraging the experience of seasoned practitioners to mentor less experienced colleagues could help disseminate practical knowledge and improve overall competency in managing CINV. This finding contrasts with *Mazzega-Fabbro et al. (2023),* who did not report significant gender differences in knowledge levels. It suggests that targeted educational interventions might be necessary to address these discrepancies.

7. Conclusion

While nurses demonstrated greater knowledge of CINV, gaps remain in understanding its pathophysiology and management strategies. Years of experience positively impact knowledge levels. There is a gender disparity in nurses' knowledge of CINV management.

8. Recommendations

To address the gaps identified in nurses' knowledge regarding chemotherapy-induced nausea and vomiting (CINV), health facilities should implement regular and structured training programs. These programs should focus on enhancing understanding of CINV pathophysiology, updating nurses on the latest antiemetic therapies, and promoting evidence-based management protocols. In addition, nurses should be encouraged to engage in continuous professional development through workshops, seminars, and online courses, ensuring that they remain current with emerging practices in managing CINV. Furthermore, educational interventions should consider gender differences in knowledge acquisition, with programs designed to provide equitable learning opportunities for all nurses.

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