Predictive factors of chemotherapy-induced nausea and vomiting in elderly patients with gynecological cancer undergoing paclitaxel and carboplatin therapy: A retrospective study

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Abstract. Chemotherapy-induced nausea and vomiting (CINV) is a common and distressing adverse effect in elderly patients with gynecological cancer undergoing paclitaxel and carboplatin therapy. The present study aimed to identify predictors of CINV in this population. A retrospective analysis was conducted of 209 elderly patients with gynecological cancer treated with paclitaxel and carboplatin chemotherapy at The Affiliated Hospital, Southwest Medical University (Luzhou, China) between May 2019 and July 2023. The Multinational Association of Supportive Care in Cancer Antiemesis Tool (MAT) was used to assess the presence, frequency, and severity of CINV. Patients were categorized into the CINV group (n=76) and non-CINV group (n=133) based on the MAT results. Age, hypertension, pre-chemotherapy sleep duration and pre-chemotherapy anxiety level were identified as significant predictors of CINV in the univariate analysis. In the multivariate analysis, age, pre-chemotherapy sleep duration and pre-chemotherapy anxiety level remained significant predictors. In conclusion, age, pre-chemotherapy sleep duration and pre-chemotherapy anxiety level are significant predictors of CINV in elderly patients with gynecological cancer undergoing paclitaxel and carboplatin therapy. These findings could help in tailoring preventative strategies for CINV in this population.

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Introduction

Chemotherapy-induced nausea and vomiting (CINV) remains a marked clinical issue for patients with cancer, particularly in those undergoing chemotherapy with agents such as paclitaxel and carboplatin. The pathophysiology of CINV is complex and multifactorial, involving both central and peripheral mechanisms, with the drugs themselves being a primary cause of nausea and vomiting. Studies indicate that up to 70-80% of patients receiving chemotherapy experience some degree of CINV, even with antiemetic prophylaxis. In patients treated with paclitaxel and carboplatin, the incidence of acute CINV ranges from 40-60%, while delayed CINV occurs in 50-70% of cases (1,2). Several factors influence the incidence and severity of CINV, including patient-related factors such as age, sex, comorbidities and psychological aspects, as well as treatment-related factors such as the type and dose of chemotherapy (3,4).

In elderly patients with gynecological cancer, CINV presents unique challenges due to age-related physiological changes and an increased likelihood of comorbid conditions. Age has been identified as a major risk factor for CINV, with older patients often experiencing more severe symptoms (5). Additionally, psychological factors, such as anxiety and depression, are known to exacerbate the severity of CINV. A recent study by Samami *et al* (6) highlighted the role of psychological distress in patients with cancer undergoing chemotherapy, suggesting that targeted interventions to reduce anxiety could mitigate CINV. Furthermore, poor sleep duration is another well-established risk factor for CINV, particularly in elderly patients, where disturbances in sleep patterns are common (7).

While much research has been dedicated to identifying predictors of CINV, few studies have focused on predictive models that integrate multiple risk factors to provide a comprehensive assessment of CINV risk. Recent advancements in machine learning have demonstrated potential in developing predictive models for various cancer-related complications. For example, Li *et al* (8) developed a machine learning-based predictive model for lymph node metastasis in patients with Ewing's sarcoma, emphasizing the utility of

advanced modeling techniques in oncology. Similarly, predictive models for bone metastasis in patients with kidney cancer have shown promise in assessing risk and guiding clinical decision-making (9). These studies underscore the importance of integrating multiple factors into predictive models to improve patient outcomes.

In gynecological cancer, the evolving landscape of systemic treatments, particularly the use of combination therapies, necessitates a deeper understanding of risk factors for CINV. Recent research by Rizzo *et al* (10-12) and Guven *et al* (13) highlighted the importance of considering not only chemotherapy agents, but also immune checkpoint inhibitors and immunotherapy-related side effects in patients with cancer. The role of the Royal Marsden Hospital Score in predicting outcomes in patients with cancer (14) further emphasizes the need for personalized approaches to treatment and symptom management.

The present study aimed to identify key predictive factors for CINV in elderly patients with gynecological cancer undergoing paclitaxel and carboplatin therapy. Through a retrospective analysis, the role of age, sleep duration, anxiety levels and other clinical factors were explored, aiming to provide a comprehensive understanding of CINV risk in this vulnerable patient population. Additionally, the study attempts to offer practical recommendations for clinical interventions based on these findings, ultimately improving patient care and quality of life during chemotherapy.

Patients and methods

Study design and participants. This retrospective study included 209 elderly patients with gynecological cancer who received paclitaxel and carboplatin chemotherapy at The Affiliated Hospital, Southwest Medical University (Luzhou, China) between May 2019 and July 2023. Inclusion criteria were as follows: Patients diagnosed with cervical, endometrial or ovarian cancer confirmed by pathology; patients who underwent a chemotherapy regimen of paclitaxel and carboplatin; and patients aged ≥60 years without communication barriers. Exclusion criteria included patients with contraindications to chemotherapy or those missing clinical data. Additionally, potential confounding factors, such as polypharmacy, performance status and lifestyle variables, were considered when evaluating risk factors for CINV.

Patient characteristics. The 209 patients had a mean age of 72.35±4.91 years, with an age range from 60 to 85 years. Detailed baseline characteristics, including body mass index (BMI), Eastern Cooperative Oncology Group (ECOG) performance status (15), comorbidities (e.g., hypertension, diabetes and coronary heart disease) and chemotherapy details, are summarized in Table I. Since this study focused exclusively on patients with gynecological cancer, only female participants were included in the analysis.

Data collection. Patients' clinical data were collected through the electronic medical record system. Data on demographic characteristics, comorbidities, chemotherapy details and psychological factors (e.g., anxiety levels) were included. For psychological distress, anxiety levels were assessed using

Table I. Baseline patient characteristics.

Characteristics	Value
Mean age ± SD, years	72.349±4.9085
Mean BMI ± SD	22.683±2.957
ECOG score, n (%)	
0-1 points	153 (73.2)
≥2 points	56 (26.8)
Hypertension, n (%)	
No	154 (73.7)
Yes	55 (26.3)
Diabetes, n (%)	
Yes	43 (20.6)
No	166 (79.4)
Coronary heart disease, n (%)	
No	179 (85.6)
Yes	30 (14.4)
Smoking history, n (%)	
No	208 (99.5)
Yes	1 (0.5)
Drinking history, n (%)	
No	199 (95.2)
Yes	10 (4.8)
Motion sickness history, n (%)	
No	185 (88.5)
Yes	24 (11.5)
Morning sickness history, n (%)	
No	161 (77.0)
Yes	48 (23.0)
Chemo sessions, n (%)	
3	42 (20.1)
2	62 (29.7)
1	105 (50.2)
Tumor location, n (%)	
Uterus	120 (57.4)
Ovary	86 (41.1)
Fallopian tube	3 (1.4)
TNM staging, n (%)	
III-IV	141 (67.5)
I-II	68 (32.5)
Pre-chemo sleep duration, n (%)	
≥7 h	114 (54.5)
<7 h	95 (45.5)
Pre-chemo anxiety level, n (%)	
Severe	108 (51.7)
None or mild	101 (48.3)
CINV history, n (%)	
No	134 (64.1)
Yes	75 (35.9)
Use of antiemetics, n (%)	
No	162 (77.5)
Yes	47 (22.5)

Data are presented as mean ± SD for continuous variables, and as n (%) for categorical variables. BMI, body mass index; ECOG, Eastern Cooperative Oncology Group; TNM, Tumor-Node-Metastasis; CINV, chemotherapy-induced nausea and vomiting.

validated scales (16,17), and data on sleep duration and history of CINV were also recorded.

Assessment of psychological factors. Psychological factors, including anxiety, depression and coping mechanisms, were evaluated using validated self-reported tools to ensure reliable and objective measurements. Anxiety levels were assessed using the Self-Rating Anxiety Scale (16), a 20-item tool scored on a 4-point Likert scale, with standardized scores ranging from 25 to 100. Cutoff levels were defined as follows: Normal (<50), mild anxiety (50-59), moderate anxiety (60-69) and severe anxiety (≥70). Similarly, depression was assessed using the Self-Rating Depression Scale (18), which follows the same scoring structure, with cutoff levels categorized as normal (<53), mild depression (53-62), moderate depression (63-72) and severe depression (≥73). Coping mechanisms were assessed using a structured questionnaire that categorized patients into adaptive or maladaptive groups based on their responses. Maladaptive coping strategies were associated with a higher risk of CINV. These tools provided a standardized approach for stratifying patients into risk groups based on psychological factors, as reflected in the analysis.

CINV assessment. CINV was assessed using the Multinational Association for Supportive Care in Cancer (MASCC) Antiemesis Tool (MAT), which has been validated for use in various patient populations, including elderly patients with cancer (19). Acute and delayed CINV were evaluated on the first and seventh days of the chemotherapy cycle, respectively. Based on the MASCC scores, patients were classified into the CINV group (n=76) and the non-CINV group (n=133) using a cutoff value of ≥2 to define the presence of clinically significant CINV. This threshold aligns with prior studies validating the MAT in cancer populations and ensures reliable classification. The limitations of using the MAT, especially in elderly populations, were also considered in the analysis, including potential biases related to cognitive impairments or comorbidities.

Statistical analysis. All statistical analyses were performed using the R programming language (version 4.3.0; R Core Team), with specific packages employed to facilitate various aspects of the analysis. The stats package was used for t-tests, χ^2 tests, and logistic regression analyses to identify predictors of CINV. The tableone package was applied to generate descriptive statistics, including patient baseline characteristics (Table I) and subgroup comparisons (Table II). Additionally, the car package was utilized to check multicollinearity during logistic regression analysis presented in Table III. Descriptive statistics summarized patient characteristics. Differences between the CINV and non-CINV groups were evaluated using independent t-tests for continuous variables. For categorical variables, χ^2 tests were primarily used, but Fisher's exact test was applied when expected frequencies in contingency tables were low, to ensure compliance with statistical assumptions. Percentages for categorical variables were calculated based on the total sample size (n=209) rather than group-specific totals. Univariate and multivariate logistic regression analyses were conducted to identify risk factors for CINV. Variables with a P<0.1 in the univariate analysis were included in the multivariate analysis. Odds ratios (ORs) and 95% confidence intervals (CIs) were calculated. P<0.05 was considered to indicate a statistically significant difference. Sensitivity analyses were also performed to assess the impact of potential confounders on the primary outcomes.

Psychological interventions. In line with the study by Yoshikawa *et al* (7), potential interventions targeting psychological distress, such as anxiety reduction techniques, were considered as part of the discussion. While not directly incorporated into the study's design, this is an area of ongoing investigation for mitigating CINV risk.

Results

Baseline patient characteristics. Table I provides a detailed overview of the baseline characteristics of the 209 elderly patients with gynecological cancer included in this study. The mean age was 72.35±4.91 years, with a BMI of 22.68±2.96. Most patients (73.2%) had an ECOG performance status of 0-1, indicating relatively good functional status, while 26.8% had an ECOG score of ≥2, reflecting significant impairment. In terms of comorbidities, 26.3% of patients had hypertension, 20.6% had diabetes and 14.4% had coronary heart disease. Lifestyle factors such as smoking (0.5%) and alcohol consumption (4.8%) were rare among the cohort. A history of motion sickness and morning sickness was reported by 11.5 and 23.0% of the patients, respectively. Regarding chemotherapy sessions, 50.2% of patients underwent one session, 29.7% had two sessions and 20.1% had three sessions. Tumor location was predominantly the uterus (57.4%), followed by the ovaries (41.1%) and fallopian tubes (1.4%). For TNM staging (20), 67.5% were in stages III-IV and 32.5% were in stages I-II. Pre-chemotherapy sleep duration was <7 h in 45.5% of patients and severe pre-chemotherapy anxiety was reported by 51.7%. A history of CINV was reported in 35.9% of patients and antiemetics were used by 22.5%. These baseline characteristics provided a comprehensive understanding of the cohort and highlighted potential risk factors for CINV, such as age, psychological state and sleep duration.

Comparison of patient characteristics between the CINV and non-CINV groups. Table II compares the characteristics of patients in the CINV group (n=76) and the non-CINV group (n=133). The mean age in the CINV group was significantly younger (70.26 years) compared with that in the non-CINV group (73.54 years) (P<0.001). While BMI did not differ significantly between the two groups, hypertension was more prevalent in the CINV group (13/76; 17.1%) than that in the non-CINV group (42/133; 31.6%) (P=0.022). Pre-chemotherapy sleep duration and pre-chemotherapy anxiety levels showed significant differences between the groups. A larger proportion of patients in the non-CINV group reported ≥7 h of sleep [67.7% (43/133) vs. 31.6% (24/76); P<0.001]. Similarly, no or mild anxiety was more common in the non-CINV group (57.1%; 76/133) than in the CINV group (32.9%; 25/76) (P<0.001). Other factors, such as ECOG scores, diabetes, coronary heart disease, smoking, drinking, motion sickness history and morning sickness history, did not differ significantly between the groups. These findings emphasize

Table II. Comparison of patient characteristics between the CINV and non-CINV groups.

Characteristics	CINV	Non-CINV	P-value
Total patients	76	133	
Mean age ± SD, years	70.263±4.6228	73.541±4.6783	<0.001[a]
Mean BMI ± SD	22.911±2.7059	22.552±3.0937	0.400
ECOG score, n (%)			0.443
0-1 points	58 (27.8)	95 (45.5)	
≥2 points	18 (8.6)	38 (18.2)	
Hypertension, n (%)			0.022[a]
No	63 (30.1)	91 (43.5)	
Yes	13 (6.2)	42 (20.1)	
Diabetes, n (%)			0.821
Yes	15 (7.2)	28 (13.4)	
No	61 (29.2)	105 (50.2)	
Coronary heart disease, n (%)			0.205
No	62 (29.7)	117 (56.0)	
Yes	14 (6.7)	16 (7.7)	
Smoking history, n (%)			>0.999
No	75 (35.9)	133 (63.6)	
Yes	1 (0.5)	0 (0.0)	
Drinking history, n (%)			0.927
No	73 (34.9)	126 (60.3)	
Yes	3 (1.4)	7 (3.3)	
Motion sickness history, n (%)			0.140
No	64 (30.6)	121 (57.9)	
Yes	12 (5.7)	12 (5.7)	
Morning sickness history, n (%)			0.225
No	55 (26.3)	106 (50.7)	
Yes	21 (10.0)	27 (12.9)	
Chemo sessions, n (%)			0.962
3	16 (7.7)	26 (12.4)	
2	22 (10.5)	40 (19.1)	
1	38 (18.2)	67 (32.1)	
Tumor location, n (%)			0.728
Uterus	41 (19.6)	79 (37.8)	
Ovary	34 (16.3)	52 (24.9)	
Fallopian tube	1 (0.5)	2 (1.0)	
TNM staging, n (%)			0.696
III-IV	50 (23.9)	91 (43.5)	
I-II	26 (12.4)	42 (20.1)	
Pre-chemo sleep duration, n (%)			<0.001[a]
≥7 h	24 (11.5)	90 (43.1)	
<7 h	52 (24.9)	43 (20.6)	
Pre-chemo anxiety level, n (%)			<0.001[a]
Severe	51 (24.4)	57 (27.3)	
None or mild	25 (12.0)	76 (36.4)	
CINV history, n (%)			0.327
No	52 (24.9)	82 (39.2)	
Yes	24 (11.5)	51 (24.4)	

Table II. Continued.

Characteristics	CINV	Non-CINV	P-value
Use of antiemetics, n (%)			0.287
No	62 (29.7)	100 (47.8)	
Yes	14 (6.7)	33 (15.8)	

Data are presented as the mean ± standard deviation for continuous variables, and as n (%) for categorical variables, with percentages calculated based on the total sample size (n=209) rather than group-specific totals. P-values are derived from Student's t-tests for continuous variables and χ^2 tests for categorical variables or Fisher's exact test for categorical variables with low expected frequencies, ensuring compliance with statistical assumptions. [a]P<0.05. BMI, body mass index; ECOG, Eastern Cooperative Oncology Group; TNM, Tumor-Node-Metastasis; CINV, chemotherapy-induced nausea and vomiting.

the potential role of modifiable psychological factors, such as sleep duration and anxiety, in influencing CINV risk, as well as demographic and clinical factors such as age and hypertension.

Univariate and multivariate analyses of risk factors for CINV. Table III presents the univariate and multivariate logistic regression analyses for risk factors associated with CINV. In the univariate analysis, age was significantly associated with CINV, with each additional year increasing the odds of occurrence by 16.4% (OR, 1.164; 95% CI, 1.088-1.244; P<0.001), and hypertension was also a significant factor, with hypertensive patients having more than twice the odds of developing CINV compared with non-hypertensive patients (OR, 2.237; 95% CI, 1.111-4.505; P=0.024). Conversely, shorter pre-chemotherapy sleep duration (<7 h) was associated with a reduced likelihood of CINV (OR, 0.221; 95% CI, 0.120-0.404; P<0.001), and severe anxiety before chemotherapy significantly increased the risk of CINV (OR, 2.720; 95% CI, 1.509-4.902; P<0.001). In the multivariate analysis, after adjusting for potential confounders, age remained a significant predictor of CINV, with a slightly lower adjusted OR (OR, 1.134; 95% CI, 1.059-1.215; P<0.001). Pre-chemotherapy sleep duration retained its protective association (OR, 0.285; 95% CI, 0.149-0.545; P<0.001) and severe pre-chemotherapy anxiety continued to significantly increase the risk of CINV (OR, 2.368; 95% CI, 1.237-4.534; P=0.009). However, hypertension, which was significant in the univariate analysis, lost its statistical significance in the multivariate model (OR, 1.568; 95% CI, 0.713-3.444; P=0.263). Other factors, including BMI, ECOG performance status, diabetes, coronary heart disease, motion sickness history, morning sickness history, tumor location, TNM staging, number of chemotherapy sessions, history of CINV and use of antiemetics, were not significantly associated with CINV in either univariate or multivariate analyses. These results highlight the strong predictive roles of age, sleep duration and anxiety level in the development of CINV.

Discussion

The present study aimed to identify predictive factors for CINV in elderly patients with gynecological cancer undergoing paclitaxel and carboplatin therapy. The findings demonstrated that age, pre-chemotherapy sleep duration and pre-chemotherapy anxiety level were significant predictors of CINV, providing critical insights into how patient-specific factors influence the risk of this distressing side effect. These results not only reinforce existing knowledge but also highlight areas where targeted interventions could improve patient outcomes.

Age was found to be a significant predictor of CINV, with the younger individuals of the elderly patients being more susceptible. This is consistent with previous studies indicating that age-related differences in physiological resilience and pharmacokinetics can influence chemotherapy side effects (21,22). Although older age is often associated with reduced sensitivity to nausea and vomiting, younger elderly patients may experience heightened emotional and physiological responses, which can exacerbate CINV (23). This underscores the need for tailored antiemetic strategies based on the age spectrum within the elderly population.

Pre-chemotherapy sleep duration emerged as a strong protective factor against CINV, with those patients reporting <7 h of sleep being at higher risk. Sleep disturbances, common among patients with cancer, are linked to heightened stress responses, immune dysregulation and reduced overall resilience to chemotherapy-induced side effects (24). Interventions such as cognitive-behavioral therapy for insomnia, sleep hygiene education and pharmacological aids, such as melatonin, may hold promise in mitigating this risk (25,26).

Anxiety before chemotherapy was also a significant predictor of CINV, emphasizing the role of psychological factors in its development. Psychological distress, including anxiety, can activate physiological pathways, including the hypothalamic-pituitary-adrenal axis, exacerbating symptoms, such as nausea and vomiting (27,28). Incorporating anxiety-reduction strategies, such as mindfulness-based interventions, cognitive-behavioral therapy and relaxation techniques, into routine oncology care could be beneficial (29). Furthermore, future research should explore the sources of anxiety and other psychological factors, such as depression and coping mechanisms, to provide a more comprehensive understanding of their roles in CINV risk.

Although the present study adjusted for several confounders, including comorbidities and lifestyle variables, other factors such as polypharmacy, performance status and nutritional status may also influence CINV risk. Polypharmacy, in particular, is prevalent in elderly patients and can interact with chemotherapy drugs, potentially increasing nausea and

Table III. Univariate and multivariate analyses of risk factors for chemotherapy-induced nausea and vomiting.

		Univariate analysis		Multivariate analysis	
Characteristics	Total, n	Odds ratio (95% CI)	P-value	Odds ratio (95% CI)	P-value
Age	209	1.164 (1.088-1.244)	<0.001[a]	1.134 (1.059-1.215)	<0.001[a]
BMI	209	0.960 (0.872-1.056)	0.398		
ECOG score	209				
0-1 points	153	Reference			
≥2 points	56	1.289 (0.674-2.466)	0.443		
Hypertension	209				
No	154	Reference		Reference	
Yes	55	2.237 (1.111-4.505)	0.024[a]	1.568 (0.713-3.444)	0.263
Diabetes	209				
Yes	43	Reference			
No	166	0.922 (0.457-1.861)	0.821		
Coronary heart disease	209				
No	179	Reference			
Yes	30	0.606 (0.277-1.322)	0.208		
Smoking history	209				
No	208	Reference			
Yes	1	0.000 (0.000-Inf)	0.986		
Drinking history	209				
No	199	Reference			
Yes	10	1.352 (0.339-5.389)	0.669		
Motion sickness history	209				
No	185	Reference			
Yes	24	0.529 (0.225-1.244)	0.145		
Morning sickness history	209				
No	161	Reference			
Yes	48	0.667 (0.346-1.287)	0.227		
Chemo sessions	209				
3	42	Reference			
2	62	1.119 (0.497-2.519)	0.786		
1	105	1.085 (0.518-2.272)	0.829		
Tumor location	209				
Uterus	120	Reference			
Ovary	86	0.794 (0.447-1.409)	0.430		
Fallopian tube	3	1.038 (0.091-11.789)	0.976		
TNM staging	209				
III-IV	141	Reference			
I-II	68	0.888 (0.488-1.615)	0.696		
Pre-chemo sleep duration	209				
≥7 h	114	Reference		Reference	
≤7 h	95	0.221 (0.120-0.404)	<0.001[a]	0.285 (0.149-0.545)	<0.001[a]
Pre-chemo anxiety level	209				
Severe	108	Reference		Reference	
None or mild	101	2.720 (1.509-4.902)	<0.001[a]	2.368 (1.237-4.534)	0.009[a]
CINV history	209				
No	134	Reference			
Yes	75	1.348 (0.742-2.447)	0.327		

Table III. Continued.

Characteristics	Total, n	Univariate analysis		Multivariate analysis	
		Odds ratio (95% CI)	P-value	Odds ratio (95% CI)	P-value
Use of antiemetics	209				
No	162	Reference			
Yes	47	1.461 (0.725-2.945)	0.289		

Factors that exhibited statistical significance in the univariate analysis were subsequently assessed in the multivariate analysis. The ORs and P-values in the multivariate analysis might deviate from those in the univariate analysis due to the adjustment for various factors. [a]P<0.05. BMI, body mass index; ECOG, Eastern Cooperative Oncology Group; TNM, Tumor-Node-Metastasis; CINV, chemotherapy-induced nausea and vomiting.

vomiting (30). Future studies should include these additional variables to further refine predictive models and improve the generalizability of findings.

The MAT, while widely recognized, has limitations in its application to elderly patients. Variability in its sensitivity and specificity, particularly in populations with cognitive impairments or comorbidities, may introduce bias (31). Future research should aim to validate the MAT in elderly cohorts or develop tailored assessment instruments that account for the unique characteristics of this population.

One of the strengths of the present study is its focus on a vulnerable population, namely elderly patients with gynecological cancer, where limited research exists on CINV predictors. By identifying modifiable factors, such as sleep duration and anxiety, the present findings provide actionable insights for clinicians. However, the retrospective design and reliance on self-reported data for some variables may introduce recall bias. Additionally, the study did not assess intervention strategies, which limits its immediate clinical applicability. Prospective studies incorporating intervention arms targeting sleep and anxiety are needed to confirm the effectiveness of these strategies.

The findings of the present study highlight several avenues for future research. First, prospective studies should validate the identified predictors in larger and more diverse cohorts. Second, interventional trials targeting modifiable factors, such as sleep enhancement programs and anxiety reduction techniques, are warranted to assess their impact on reducing CINV. Third, integration of advanced predictive modeling techniques, such as machine learning, may improve the accuracy of risk stratification and allow for personalized management strategies, as demonstrated in studies on lymph node metastasis (8) and bone metastasis (9). Finally, research should address the evolving systemic treatment landscape in gynecological cancer, including the impact of immunotherapy and targeted therapies on CINV risk.

In conclusion, the present study underscores the importance of age, sleep duration and anxiety as significant predictors of CINV in elderly patients with gynecological cancer undergoing paclitaxel and carboplatin therapy. By addressing these factors, clinicians can develop personalized strategies to mitigate CINV, ultimately improving the quality of life and treatment adherence in this vulnerable population. Continued research into these predictors and their interaction with novel treatment modalities will further enhance the care of patients with cancer.

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Availability of data and materials

The data generated in the present study may be requested from the corresponding author.

Authors' contributions

FY and XS contributed to the conceptualization and design of the study. LH was responsible for data collection and management. XS conducted the statistical analysis and drafted the manuscript. All authors participated in the interpretation of the results, revised the manuscript critically for important intellectual content, and read and approved the manuscript. FY and LH confirm the authenticity of all the raw data.

Ethics approval and consent to participate

Informed consent was not required for this study due to its retrospective design and the use of de-identified clinical data from the hospital's electronic medical record system. The study protocol was reviewed and approved by the Ethics Committee of The Affiliated Hospital, Southwest Medical University (approval no. KY2024475), which waived the need for informed consent. This waiver was granted in accordance with local ethical guidelines and regulations for retrospective research involving anonymized clinical data. The non-interventional nature of this study ensured that patient privacy and data confidentiality were maintained throughout the research process.

Patient consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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