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RESEARCH ARTICLE

THE RELATIONSHIP BETWEEN ANTICIPATORY NAUSEA AND VOMITING WITH SOCIAL SUPPORT AND ANXIETY IN CANCER PATIENTS UNDERGOING CHEMOTHERAPY

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ABSTRACT

Purpose: This study aims to investigate the relationship between anticipatory nausea and vomiting in cancer patients undergoing chemotherapy with social support and anxiety.
Material and Methods: This descriptive-correlational study involved 134 cancer patients receiving chemotherapy at a university hospital and experiencing anticipatory nausea. Anxiety levels were measured using the Beck Anxiety Inventory (BAI), while the severity of nausea was assessed using the Visual Analog Scale (VAS-nausea), and social support levels were evaluated using the Cancer Patient Social Support Scale (CPSSS). Descriptive statistics were employed to analyze demographic characteristics. Independent sample t-tests, Kruskal-Wallis, one-way analysis of variance (ANOVA), Mann-Whitney U test, Cronbach's alpha coefficient, and Pearson correlation analysis were used for data analysis.
Results: Results showed that 62.7% experienced moderate to severe nausea post-chemotherapy, with 57.5% having received prior chemotherapy. 61.2% reported minimal anxiety. Patients under moderately emetogenic treatments exhibited higher anticipatory nausea scores. Anxiety inversely correlated with social support, but no significant link was found between anticipatory nausea severity and anxiety/social support levels.
Conclusion: The findings indicate that there is no relationship between anticipatory nausea and vomiting, social support, and anxiety among cancer patients undergoing chemotherapy.

Keywords: anticipatory nausea and vomiting, anxiety, cancer, chemotherapy, nursing, social support

INTRODUCTION

Cancer, characterized by the uncontrolled growth and proliferation of deformed cells due to various etiological factors, represents tumor formation. Chemotherapy stands as a fundamental component in almost every cancer treatment plan (1), though it induces several side effects. One such side effect is nausea and vomiting. It is a debilitating side effect of cancer treatment and affects 40% of patients (2). When left untreated, it affects 60-80% of cancer patients. Early discontinuation of treatment causes dehydration, electrolyte imbalances, increased cost of care, and ultimately a decrease in treatment success (3). In a survey conducted with 212 European oncology nurses, only 19% reported that the majority of their patients had their nausea and

vomiting optimally controlled (4). Nausea and vomiting due to untreated chemotherapy can affect 60% to 80% of cancer patients (3,4). In the study conducted by Yu Sun and colleagues, it was determined that nausea and vomiting occurred at rates of 30.1% in highly emetic chemotherapy regimens, and 21.5% in moderately emetic ones (5).

Anticipatory nausea and vomiting are defined as episodes preceding medication administration (6,7). Investigations suggest that anticipatory nausea and vomiting may arise in approximately 20-30% of patients based on their chemotherapy cycles (8). Being a conditioned response, it emerges subsequent to adverse vomiting experiences during prior chemotherapy sessions (7). A study conducted across eight European countries by Molassiotis et al. (8) suggests a prevalence of approximately 8-14% for anticipatory nausea and vomiting, which escalates in subsequent chemotherapy cycles. It is widely believed that 25% of patients develop this response by the fourth treatment cycle (9).

Anticipatory nausea and vomiting encompass psychologically associated variations of chemotherapy- induced nausea and vomiting. Psychological mechanisms and demographic factors contribute to the onset, frequency, severity, and duration of anticipatory nausea and vomiting. Three distinct yet interrelated contributing factors exist: classical conditioning leading to anticipated gastric distress, demographic, clinical, and treatment-related factors capable of predicting the risk of anticipated gastric distress, and anxiety or negative expectations triggering and exacerbating anticipatory gastric distress (10).

Feeling anxious immediately before a chemotherapy appointment has been associated with an increased tendency toward anticipatory nausea and vomiting, as it reflects a general predisposition to feel anxious in various situations. These anticipatory symptoms, commencing one or more days before a patient's clinical appointment, significantly escalate the burden experienced during chemotherapy, intensify concerns, and prolong discomfort (11).The dual-process model in a study by Montgomery and Bovbjerg (2003) asserts a strong contribution of concurrent emotional distress to this experience. Social learning theory supports the notion that expectations of involuntary consequences should be based on prior experiences (12). These researchers tested the impact of emotional distress and prior experience on patients' expectations of side effects within a sample of 80 breast cancer patients receiving outpatient adjuvant chemotherapy. Bivariate analyses suggested an early contribution of emotional distress to the treatment process (13).

Social support, aiding individuals in navigating their illness-related processes, constitutes assistance obtained from their surroundings when faced with stressful circumstances (14). Notably, support from immediate family members influences cancer patients' coping strategies (15). A study revealed that family support mediates patients' anxiety levels and the severity of post-treatment nausea, and it is associated with the severity of anticipatory nausea directly (16). Changes in family relationships, including adaptation, expression, and conflict, were examined for their impact on patients' physical adherence to chemotherapy. An increase in family conflict was found to correlate with prolonged post-treatment nausea and a higher degree of anticipatory nausea in younger adult patients and women (17).

Several factors may influence the development of depression and anxiety among individuals with cancer, yet these remain poorly understood and require further investigation. Among individual risk factors that may elevate the risk of depression and anxiety, similar to the general population, include demographic factors like age and gender, along with social and economic factors such as unemployment, lower educational qualifications, and a lack of social support (18). Consequently, the deficiency in social support can be construed to correlate with anxiety. Studies have also supported the notion that anxiety forms a basis for anticipatory nausea and vomiting.

Social support significantly influences cancer patients' coping strategies (19), while family support mediates anxiety levels and post-treatment nausea severity (3). Changes in family relationships impact patients' physical adherence to chemotherapy (7). Various factors can affect the development of depression and anxiety among cancer patients (7), with social support deficiency correlating with anxiety (8).

In Turkey, no study has been encountered examining the relationship between anticipatory vomiting, social support, and anxiety in cancer patients undergoing treatment. Other country are limited to a very small number of studies, and there is no existing research conducted using the scales we could utilize. Therefore, our study contributes new data to the literature.

Table 1. Patient Characteristic (n:134)

Variables (n:134)	$\overline{X}$	**SD**
Age	57.2	13.9
Characteristic	**n**	**%**
Gender		
Woman	79	59.0
Male	55	41.0
Marital Status		
Married	99	73.9
Single	35	26.1
Level of education		
Primary education and below	49	36.6
Secondary education	25	18.7
High school	36	26.9
Undergraduate and above	24	17.9
Working Status		
Working	20	14.9
Not working	114	85.1
Moderate or severe nausea and vomiting after the last chemotherapy course		
Yes	84	62.7
No	50	37.3
Emetogenic risk status of current chemotherapy treatment		
Low	54	40.3
Middle	64	47.8
High	16	11.9
Having a chronic illness		
Yes	66	49.3
No	68	50.7
Previous chemotherapy treatment		
Yes	70	52.2
No	64	47.8
Nausea and vomiting during previous chemotherapy sessions		
Yes	77	57.5
No	57	42.5
Drinking alcohol		
Yes	23	17.2
No	111	82.8

Table 2. Anxiety and Social Support Levels of Patients (n:134)

Scales and Sub-Dimensions	Mean±SS	Min- Max	α
Beck Anxiety Scale	7.50±7.67	00.0-40.0	.88
Cancer Patient Social Support Scale	144.29±20.58	48.0-174.0	.85
CPSSS Sub-Dimensions			
Trust Support	57.44±9.57	13.0-65.0	.94
Emotional Support	49.89±8.42	16.0-60.0	.83
Information Support	36.94±6.73	18.0-50.0	.62

α: Cronbach Alfa

MATERIAL AND METHODS

Ethical Dimension of the Study

This study was approved by the Non-Interventional Research Ethics Committee of Dokuz Eylul University (Date: 17.11.2021, Decision Number: 2021/33-07). Permission was obtained from the Dokuz Eylül University Oncology Service and Day Treatment Center for the collection of data. Permissions from researchers who conducted the Turkish validity and reliability studies of the scales were obtained for their use. Additionally, prior to their participation, individuals volunteering for the research were verbally informed about the purpose of the study and provided written consent through an "Informed Consent Form" before the administration of surveys and scales.

Type of Study

This study was conducted in a descriptive correlational design. Social support, anxiety levels, and anticipatory nausea and vomiting were measured among cancer patients receiving chemotherapy at a university hospital, and their correlations were assessed.

Research Questions

- What is the level of anticipatory nausea and vomiting in cancer patients undergoing chemotherapy?
- What is the level of social support among cancer patients undergoing chemotherapy?
- What is the level of anxiety among cancer patients undergoing chemotherapy?
- Is there a relationship between the anxiety level and the level of social support among cancer patients undergoing chemotherapy?
- Is there a relationship between anticipatory nausea and vomiting and social support among cancer patients undergoing chemotherapy?
- Is there a relationship between anticipatory nausea and vomiting and anxiety among cancer patients undergoing chemotherapy?

Study Design and Sample

Participant data was collected through face-to-face interviews. The rules of social distancing, mask-wearing, and hygiene were adhered to due to Covid-19. The study population comprised all patients receiving chemotherapy treatment in the Oncology Service and Day Treatment Center between April 2021 and September 2022. The study sample included cancer patients aged 18 and above, undergoing chemotherapy, and having a VAS-nausea score of 5 or higher. The sample size was determined using the G*Power-3.1.9.7. program, conducting a power analysis. The power analysis indicated that to detect a Pearson correlation coefficient of r =.30 with 95% power (alpha = .05, two-tailed), the study needed to reach 134 participants. Consequently, 134 patients meeting the inclusion criteria constituted the study sample.

Data Collection Instruments

Data Collection Tools: The data were collected using various tools including the "Descriptive Information Form," prepared by reviewing relevant literature, encompassing 15 questions related to sociodemographic characteristics and factors contributing to anticipatory nausea (3,10,12,16). Within the demographic information, the emetogenic risk of chemotherapy received by patients was

Table 3. Anxiety Levels of Patients (n:134)

Anxiety Classification	n	%
Minimal anxiety symptoms (0-7 point)	82	61.2
Mild anxiety symptoms (8-15 point)	37	27.6
Moderate anxiety symptoms (16-25 point)	10	7.5
Severe anxiety symptoms (26-63 point)	5	3.7

classified using the Multinational Association of Supportive Care in Cancer (MASCC) guidelines, categorizing each chemotherapy drug into minimal, low, moderate, or high emetogenic potential. The regimen's emetogenicity was categorized into three groups (low/minimal, moderate, high) based on the chemotherapy drug with the highest emetogenic potential (10,12).

Beck Anxiety Scale (BAS): The Turkish validity and reliability study of the scale, which was originally developed by Doctor Aaron T. Beck and his colleagues in 1988, was conducted by Ulusoy et al. This 21-item scale was created to measure the severity of anxiety and evaluate the frequency of anxiety symptoms. The reliability of the scale is α = .93. Participants answer the questions as “not at all (not at all = 0)”, “mildly (mild = 1), “moderately (moderate = 2)” and “serious (serious = 3)” (20). The score varies between 0 and 63, with 0-7 points indicating minimal anxiety symptoms, 8-15 points indicating mild anxiety symptoms, 16-25 points indicating moderate anxiety symptoms, and 26-63 points indicating severe anxiety symptoms. In this study, Cronbach's alpha coefficient was found to be .93.

Cancer Patient Social Support Scale (CPSSS): The validity, reliability and factor structure study of the Cancer Patient Social Support Scale is a 5-point Likert type scale developed by Eylen in 2002. It is a 35-item 5-point Likert scale measuring the perceived level of social support from family members among cancer patients. The scale consists of three subscales: "trust support," "emotional support," and "information support." The Cronbach's alpha values for the subscales are 0.88 for trust support, 0.88 for emotional support, and 0.87 for information support. The score of perceived social support is calculated by reversing the scores obtained from negative items and adding them to the scores obtained from positive items. A higher score on the scale indicates a higher perceived level of social support from the cancer patient's family (21).

Visual Analog Scale (VAS): This scale was used to subjectively evaluate the severity of nausea experienced by patients before or during chemotherapy. The scale consists of a horizontal line measuring 100 mm/10 cm in length. The left end of the line represents 0, indicating "No Nausea," while the right end represents 10, indicating "Severe Nausea." The distance of the patient's mark from the left end was measured using a ruler. This measured distance in millimeters was considered as the "score" and recorded. A measurement of 5 mm or less indicates "no nausea," whereas values above 5 mm suggest that the individual "experienced nausea" (8,22,23).

Data Analysis

The obtained data in the study were analyzed using the "SPSS (Statistical Package for Social Sciences) for Windows 25.0" software (24). Descriptive statistical methods (number, percentage, mean, standard deviation) were employed for data evaluation. Normal distribution was checked through normality tests and examining kurtosis and skewness values. To assess the consistency of expressions within CPSSS and BAS and to determine if they measure the same construct, reliability analysis was conducted, and Cronbach's Alpha values were examined. For the comparison of mean scores of CPSSS, BAS, and VAS-nausea according to patients' descriptive characteristics, the Kruskal-Wallis test was used for age, cancer type, education status, emetogenic risk of current chemotherapy, and number of chemotherapy cycles. Independent sample t-tests were utilized for the analysis of gender, marital status, experiencing moderate or severe nausea-vomiting after the last chemotherapy cycle,

Table 4. Comparison of Patients' Descriptive Characteristics and Visual Analogue Scale Total Score Averages

Patient Characteristic	n	Visual Analogue Scale Total Score $\bar{X}$±SS	Test	P value
Gender			t test	.27
Woman	79	6.10±1.43	.65	
Male	55	6.38±1.49		
Marital Status			t test	.54
Married	99	6.26±1.47	.03	
Single	35	6.09±1.44		
Level of education			H test	
Primary education and below	49	6.24±1.54	2.47	
Secondary education	25	5.80±1.11		.48
High school	36	6.28±1.48		
Undergraduate and above	24	6.50±1.56		
Working Status				
Working	20	6.85±2.00	Z testi	.16
Not working	114	6.11±1.32	-1.40	
Moderate or severe nausea and vomiting after the last chemotherapy course			t test	.21
Yes	84	6.33±1.55	5.17	
No	50	6.02±1.28		
Emetogenic risk status of current chemotherapy treatment			H test	**.01***
Low	54	5.91±1.33	8.44	
Middle	64	6.59±1.55		
High	16	5.75±1.18		
Having a chronic illness			t test	.88
Yes	66	6.20±1.47	.05	
No	68	6.24±1.40		
Previous chemotherapy treatment			t testi	.71
Yes	70	6.17±1.43	.63	
No	64	6.27±1.50		
Nausea and vomiting during previous chemotherapy sessions			T test	.16
Yes	77	6.06±1.27	1.20	
No	57	6.42±1.49		
Drinking alcohol			U test	.09
Yes	23	6.74±1.73	-1.65	
No	111	6.11±1.38		

*p<.05 t: Independent Samples t-test, H test: Kruskal Wallis test, U test: Mann Whitney U testi

additional medical conditions, additional medication use, history of prior chemotherapy, and experiencing nausea during past chemotherapy. Mann-Whitney U test was applied for the analysis of employment status and alcohol use. The relationship between CPSSS, BAS, VAS-nausea scales, and their subscales was examined using "Pearson correlation analysis".

RESULTS

It was determined that the mean age of 57,2±13,9 (years). It was determined that 59.0% of them were woman and 73.9% of them were married. It was determined that 88.1% of the patients received chemotherapy treatment with medium or low emetogenic risk. 57.5% of patients reported experiencing nausea and vomiting during previous chemotherapy treatment, and 62.7% reported experiencing moderate or severe nausea and vomiting after their last course. Data regarding the descriptive characteristics of the patients are given in Table 1.

When examining the descriptive statistics related to the scales utilized, it was observed that the average total score for the Beck Anxiety Scale (BAS) was 28.50±7.67. Cancer Patient Social Support Scale

Table 5. Relationship between Patients' Visual Analog Scale, Beck Anxiety Scale, Cancer Patient Social Support Scale and Sub-Dimensions Scores (n:134)

	1	*2*	*3*	*4*	*5*	*6*
1)Visual Analogue Scale	1					
2)Cancer Patient Social Support Scale	-.06	1				
3)Trust Support Sub-Dimension	-.07	.86**	1			
4)Emotional Support Sub-Dimension	-.04	.94**	.80**	1		
5)Information Support Sub-Dimension	-.05	.63**	.22**	.50**	1	
6) Beck Anxiety Scale	.11	-.22**	-.17*	-.22*	-.16	1

*p<.05 **p<.01

(CPSSS) displayed an average total score of 144.29±20.58, and the Visual Analog Scale for nausea (VAS-nausea) showed an average total score of 6.22±1.46.

Upon further inspection of the CPSSS subdimensions, the mean score for the confidence support dimension was identified as 57.44±9.57, the emotional support dimension yielded a mean score of 49.89±8.42, and the information support dimension exhibited a mean score of 36.94±6.73 (Table 2).

Upon comparison of the descriptive characteristics of patients and the average scores obtained from the visual analog scale used to measure the severity of nausea and vomiting, factors such as gender, marital status, level of education, working status, emetogenic risk status of current chemotherapy treatment, having a chronic illness, number of chemotherapy courses, previous chemotherapy treatment, nausea and vomiting during previous chemotherapy sessions, drinking alcohol no statistically significant relationship was observed (Table 4).

However, upon assessing the emetogenic risk associated with patients' ongoing chemotherapy treatments in correlation with the mean visual analog scale scores, a statistically significant association emerged (p<.05). Notably, patients undergoing chemotherapy with a moderate emetogenic risk demonstrated higher visual analog scale scores, suggesting an elevated severity in reported nausea and vomiting symptoms.

A statistically significant and positive relationship was found between the patients' level of social support and its subdimensions: confidence support (p<.01: r=.86), emotional support (p<.01: r=.94), and information support (p<.01: r=.63). As the scores on the Cancer Patient Social Support Scale increased, the total scores for information support, emotional support, and confidence support also increased. Furthermore, a statistically significant and negative relationship was observed between the total scores of the Cancer Patient Social Support Scale and the Beck Anxiety Inventory scores (p<.01: r= -.22). As the total scores on the Cancer Patient Social Support Scale decreased, the Beck Anxiety Inventory scores increased. Moreover, a statistically significant and positive relationship was identified between the subdimensions of the Cancer Patient Social Support Scale, specifically confidence support (p<.01: r= .80), and the emotional support dimension. As the score for confidence support increased, the scores for emotional support also increased.Similarly, a statistically significant and positive relationship was observed between the subdimensions of the Cancer Patient Information Support Scale, particularly confidence support (p<.01: r= .22), and the emotional support dimension. As the score for confidence support increased, the scores for emotional support also increased.Additionally, a statistically significant and positive relationship was found between the subdimensions of the Cancer Patient Information Support Scale, specifically information support (p<.01: r= .50), and the emotional support dimension. As the score for information support increased, the scores for emotional support also increased. Finally, when comparing the scores of the subdimension of confidence support in the Cancer Patient Social Support Scale with the Beck Anxiety Inventory (p<.05: r=-.17), a statistically significant and negative relationship was established. This indicated that as confidence support scores increased, anxiety scores decreased. Likewise, a statistically significant and negative relationship was determined when

comparing the scores of the subdimension of emotional support in the Cancer Patient Social Support Scale with the Beck Anxiety Inventory (p<.05: r=-.22). As emotional support scores increased, anxiety scores decreased (Table 5).

DISCUSSION

The mean age of the patients was 57.26±13.95, with 59.0% being female and 73.9% being married. Consistent with several studies, the high prevalence of female gender and married status among patients experiencing anticipatory nausea and vomiting aligns with findings from this investigation (8,25,26,27,28).

It was identified that 88.1% of the patients received chemotherapy treatments categorized as having moderate or low emetogenic risk. This finding resonates with Hunter et al.'s research, which yielded similar results (26). When comparing the emetogenic risk of the current chemotherapy treatment with VAS-nausea scores, a statistically significant relationship (p<.05) was established. Patients undergoing treatments with moderate emetogenic risk exhibited higher levels of nausea. However, no significant correlation was found with other sociodemographic factors. Additionally, 57.5% of patients reported experiencing nausea and vomiting during previous chemotherapy treatments, while 62.7% reported moderate or severe symptoms after their last cycle. Similar studies have supported that experiencing nausea and vomiting during previous chemotherapy cycles constitutes the strongest risk factor for anticipatory nausea and vomiting (8,29). Consequently, while patients' negative experiences were influential in the development of anticipatory nausea and vomiting, these factors were not correlated with the severity of nausea.

Nurses play a critical role in managing symptoms such as nausea and vomiting throughout patients' treatment processes. Data indicating that a majority of patients are female and married suggests the necessity for a more tailored approach in managing symptoms within this group. Additionally, nurses should consider evaluating parameters such as patients' previous experiences of moderate or severe nausea, aiming to personalize treatment plans accordingly. Therefore, the correlation between the emetogenic risk levels of patients' forthcoming chemotherapy and the severity of nausea emphasizes the necessity for nurses to personalize their treatment plans. Nurses should evaluate patients' emetic risks before treatment and determine suitable therapeutic strategies.

The mean score for the Beck Anxiety Inventory (BAI) was 7.50±7.67, with 61.2% experiencing minimal anxiety. Similar findings have been observed in various studies involving cancer patients undergoing chemotherapy (30,31,32).

Patients' chemotherapy treatments were evaluated from the 1st to the 57th cycle. As the number of cycles increased, the number of patients experiencing anticipatory nausea and vomiting decreased. In a study conducted by Kurt (2021), it was concluded that as the number of chemotherapy cycles increased, the likelihood of experiencing anticipatory nausea and vomiting also increased (33). Patients undergoing a higher number of cycles seemed to experience more symptoms related to chemotherapy. Effectively managing common symptoms like nausea and vomiting can prevent the onset of anticipatory symptoms. While past mismanagement of nausea and vomiting might lead to anticipatory symptoms, finding the correct management strategy could subsequently alleviate future expectations.

A statistical analysis revealed a significant negative correlation (p<.01: r= -.22) between patients' social support and anxiety levels. However, no direct correlation was observed between the severity of nausea and vomiting and either social support or anxiety. This finding holds significant implications for nursing care. Nurses should understand that there is no direct relationship between the severity of nausea and vomiting and either anxiety or social support while managing patients' symptoms. Therefore, a different focus might be required for effective symptom management. Nurses should continue to monitor patients' anxiety levels while focusing on managing symptoms and provide appropriate support and counseling when needed.

The absence of a direct link between anxiety or social support levels and nausea and vomiting underlines the necessity for nurses to approach treatment strategies and patient support from a different perspective. Nurses can concentrate more on symptom management and effective treatment options to cope with patients' symptoms. This approach might require a focus on effectively controlling symptoms to enhance patients' quality of life.

The limitation of this research lies in the evaluation of data obtained from a single institution. Therefore, parameters should also be assessed in larger sample

sizes and sample groups that encompass institutional diversity. Despite the constraints regarding the sample size and institutional scope, this study contributes to the literature on a relatively underexplored topic in the field.

Limitations

Findings related to anticipatory nausea and vomiting in cancer patients undergoing chemotherapy were limited to the oncology ward and daytime treatment center.

CONCLUSION

In this study, factors contributing to anticipatory nausea and vomiting in cancer patients undergoing chemotherapy were identified. Previous chemotherapy treatment, negative vomiting experiences during prior chemotherapy sessions, a lower number of chemotherapy cycles, and experiencing moderate to severe nausea and vomiting after the last chemotherapy session were determined as potential influential factors. However, it was observed that the severity of anticipatory nausea and vomiting did not exhibit a significant relationship with anxiety levels and social support alongside these factors.

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