Predicting Quality of Life from Symptom Experience and Symptom Management Behaviors in Women with Ovarian Cancer Receiving Chemotherapy: A Cross-Sectional Study

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Abstract: Women with ovarian cancer receiving chemotherapy commonly experience multiple distressing symptoms that adversely affect quality of life; however, empirical evidence on symptom experiences and management behaviors, and their influence on quality of life among this population in Thailand, remains limited. Thus, this cross-sectional study in Thailand aimed to describe these experiences and behaviors, to predict quality of life in women with ovarian cancer receiving chemotherapy. Ninety-six women with ovarian cancer receiving chemotherapy at a university hospital were recruited using purposive sampling. Instruments used were the M.D. Anderson Symptom Inventory–Ovarian Cancer, a Modified Self-Care Diary, and the Functional Assessment of Cancer Therapy–Ovarian. Data were analyzed using descriptive statistics, Spearman's rho correlation, and hierarchical multiple regression.

Participants experienced multiple concurrent symptoms, with numbness/tingling and fatigue reported most frequently. Overall symptom severity and interference were mild; however, neuropathy and fatigue were perceived as the most severe symptoms. Symptom management effectiveness was moderate, with hair loss and nausea showing the greatest improvement, whereas neuropathy remained poorly managed. Overall quality of life was rated as good.

Symptom experiences—occurrence, severity, and interference—were significantly associated with overall quality of life. However, the association between symptom management effectiveness and quality of life was not significant. Combined, symptom experiences and management effectiveness explained 28.6% of the variance in quality of life. Only symptom interference was a significant negative predictor of quality of life. These findings emphasize the need for nurses to conduct routine and comprehensive symptom assessments and implement targeted interventions, particularly to reduce symptom interference, neuropathy, and fatigue, to improve quality of life in women with ovarian cancer receiving chemotherapy.

Keywords: Chemotherapy, Ovarian cancer, Quality of life, Self-management, Symptom experience, Symptom management

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Introduction

Cancer is a leading cause of morbidity and mortality worldwide, with ovarian cancer representing one of the most lethal gynecologic malignancies due to its often-late diagnosis and aggressive clinical course. In 2022, ovarian cancer accounted for approximately 206,956 deaths globally, with an age-standardized

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mortality rate of 5.1 per 100,000 population in Southeast Asia.[1] In Thailand, ovarian cancer ranks seventh among the most common cancers in women, representing 3.4% of all newly diagnosed female cancers.[2] The absence of specific early symptoms often delays diagnosis, resulting in a high proportion of individuals presenting with advanced-stage disease. Women with ovarian cancer (WW-OCA) commonly experience a wide range of disease and treatment-related symptoms that substantially affect their QOL. Common presenting symptoms include abdominal bloating, abdominal pain, urinary frequency, abdominal discomfort, and gastrointestinal disturbances.[3,4]

Standard treatment for ovarian cancer involves surgical staging followed by chemotherapy. However, in advanced cases, neoadjuvant chemotherapy with paclitaxel and carboplatin is commonly administered to reduce tumor burden prior to surgery, thereby improving the likelihood of optimal cytoreduction.[5] These agents are associated with multiple adverse effects, including hypersensitivity reactions, peripheral neuropathy, nausea, vomiting, alopecia, and myelosuppression.[5] Such complex and distressing symptoms can substantially impair the physical, emotional, and functional well-being of WW-OCA. Therefore, effective symptom management is essential for maintaining and enhancing quality of life (QOL).

Previous studies have demonstrated associations among symptom frequency, severity, distress, interference, and management behaviors with QOL in general cancer populations.[6] In Thailand, most research has examined QOL among women with gynecological cancers as a heterogeneous group.[7] Research specifically focusing on symptom experience, symptom management behaviors, and QOL among WW-OCA undergoing chemotherapy in Thailand remains limited and relatively outdated. Furthermore, many recent studies emphasize demographic and clinical factors—such as disease stage and age—as determinants of QOL,[8] without grounding their investigations in established symptom management frameworks. Differences in cultural, healthcare system, and family support may influence symptom perception, management practices, and QOL outcomes.

Given these gaps, context-specific, theory-informed evidence is needed to guide effective nursing interventions and supportive care strategies. Accordingly, this study was undertaken to address the paucity of context-specific evidence in Thailand by examining symptom experiences, management behaviors, and QOL among Thai WW-OCA undergoing chemotherapy. Using the University of California, San Francisco (UCSF) symptom management theory[9,10] as a framework, this study provides a theory-based analysis of these variables. Specifically, it examines how these constructs interrelate within the Thai cultural and healthcare context.

Literature Review and Conceptual Framework

This study used the UCSF symptom management theory[9,10] to examine symptom experience, symptom management behaviors, and QOL in WWOCA receiving chemotherapy. The theory's three core concepts are symptom experience, symptom management strategies, and outcomes. Symptom experience refers to an individual's perception of illnessrelated symptoms, including assessments of severity, cause, treatment, and impact; responses may be physical, psychological, social, or behavioral and vary between individuals. Symptom management strategies are actions—biological treatments and selfcare—intended to prevent or reduce symptoms and delay adverse outcomes; these strategies begin with symptom appraisal and may change over time. Outcomes result from the interaction of symptom experience and management strategies; in this study, outcomes were defined as QOL, encompassing physical, emotional, functional, and social wellbeing. Specifically, symptom experience was operationalized as symptom severity and symptom interference; symptom management behaviors were defined as dynamic self-care strategies for chemotherapy-related symptoms; and outcomes were defined as QOL.[9,10]

WWOCA, undergoing chemotherapy—typically a platinum agent combined with a taxane (carboplatin plus paclitaxel)—frequently report multiple distressing adverse effects, including severe fatigue, peripheral neuropathy with numbness of the hands and feet, pain, nausea, vomiting, abdominal discomfort, altered body image, alopecia, anxiety, depression, decreased appetite, taste changes, and dry lips.[11] These symptoms adversely affect multiple QOL domains, causing limitations in daily functioning, reduced functional capacity, and restricted social participation. A previous study found that anemia, constipation, and weight loss were significantly associated with physical, functional, emotional, and social wellbeing.[12] Depression and anxiety were significantly correlated with overall QOL, all functional scales, and symptom burden in people with cancer receiving chemotherapy.[13] Notably, evidence shows a high prevalence of depression and anxiety among WW-OCA, underscoring the substantial psychological burden in this population.[13]

Symptom management behaviors are activities individuals undertake to promote health and well-being, such as engaging in physical exercise or managing daily activities while living with a chronic illness.[9] Symptom management begins with an individual's evaluation of their symptom experience based on personal perception. Management strategies may involve a single approach or multiple approaches, depending on the individual's symptom experience. These strategies encompass decisions about which actions are used to manage symptoms, when symptom management is initiated, where it occurs, why it is undertaken, how much management is required, who performs it, for whom it is performed, and how it is carried out.[9,10] Loss of appetite was the symptom that participants managed most effectively among people with gynecologic cancer receiving chemotherapy.[15] The most reported management strategies included attempting to consume as much food as possible and selecting a variety of foods, such as fruits, noodles, or milk.[15]

QOL is a multidimensional construct that reflects individuals' perceived well-being across the physical, social/family, emotional, and functional domains.[14] Clinical factors have been shown to significantly influence these domains.[15] In a longitudinal study of WW-OCA receiving first-line chemotherapy, lower physical and functional well-being scores—measured using the Functional Assessment of Cancer Therapy-Ovarian (FACT-O)—were associated with advanced- stage disease, elevated CA-125 levels, and the need for interval debulking surgery.[15] Additionally, symptom severity is a key determinant of QOL, with symptoms such as fatigue, anorexia, and insomnia demonstrating significant negative associations with overall well-being.[16,17]

Collectively, these findings highlight the associated nature of symptom experience, symptom management behaviors, and QOL among WW-OCA undergoing chemotherapy, addressing an important knowledge gap in understanding how these constructs interact in clinical practice. By delineating these associations, this study provides an empirical foundation to inform future research and the development of targeted supportive care strategies.

Aims and Hypotheses

This study pursued three aims regarding WW-OCA: 1) assess symptom experiences (occurrence, severity, and interference), symptom management effectiveness, and QOL, 2) examine the relationships between these three variables, and 3) determine which dimensions of symptom experience and symptom management effectiveness significantly predict QOL. We hypothesized that these factors are significantly correlated and that symptom experience and management behaviors serve as primary predictors of QOL.

Methods

Study Design: A cross-sectional study was used, and this report adheres to STROBE checklist guidelines.

Sample and Setting: The study was conducted at the short-stay unit of a university hospital in Bangkok, Thailand. These units provide outpatient oncology care, including chemotherapy administration and post-treatment observation to monitor adverse reactions before discharge.

Participants were purposively recruited from women diagnosed with primary or recurrent ovarian cancer who had received at least one cycle of intravenous paclitaxel plus carboplatin chemotherapy, with or without bevacizumab. Eligibility criteria included age ≥18 years; participants aged ≥ 60 years were screened for cognitive function using the Six-Item Cognitive Impairment Test (6CIT).[18,19] Scores of 0-7 indicated normal cognition. Additional criteria were the ability to communicate in Thai and the willingness to provide informed consent.

The required sample size was calculated using G*Power (v3.1.9.7), a medium effect size (r = 0.29),[20,21] α = 0.05, and power = 0.80; the estimated sample size was 91 participants. Allowing for 5% attrition, the target sample was increased to 96. All 96 participants completed the study.

Ethical Considerations: This research was approved by the Human Research Ethics Committee of the Faculty of Medicine Ramathibodi Hospital, Mahidol University, Thailand (Approval No. COA. MURA2023/710, 18 September 2023). Participants provided written informed consent and were assured that all responses would remain confidential and anonymous. Identification numbers were used to protect privacy. Participants retained the right to withdraw at any stage without any consequence for their medical care.

Instruments: The study utilized four instruments: the Demographic and Clinical Characteristics Questionnaire, M.D. Anderson Symptom Inventory-Ovarian Cancer (MDASI-OC), Modified Self-Care Diary (SCD) Questionnaire, and Functional Assessment of Cancer Therapy-Ovarian Questionnaire (FACT-O). The internal consistency reliabilities of the MDASI-OC, SCD, and FACT-O in both the pilot and main study are presented in **Table 1**.

Table 1. Internal consistency reliability of study instruments in pilot and main study

Subscales	Number of items	Cronbach's alpha coefficient	
		Pilot study (n = 10)	Actual study (n = 96)
MDASI-OC			
- Core symptoms	13	0.89	0.78
- Ovarian cancer module	8	0.84	0.69
- Interference	6	0.94	0.84
- Core + Ovarian module	21	0.93	0.85
FACT-O	39	0.88	0.86
SCD	10	0.91	0.79

Note. MDASI-OC = M.D. Anderson Symptom Inventory-Ovarian Cancer, FACT-O = Functional Assessment of Cancer Therapy-Ovarian Questionnaire, SCD = Modified Self-Care Diary (SCD) Questionnaire

The Demographic and Clinical Characteristic Questionnaire: Developed by the primary investigator (PI) based on a comprehensive literature review. It comprises two sections: 1) Demographic data (age, marital status, education, occupation, income, housing, and illness duration), and 2) Clinical information obtained from medical records (diagnosis, cancer stage, chemotherapy regimen and cycles, and Eastern Cooperative Oncology Group (ECOG) performance status).

The M.D. Anderson Symptom Inventory-Ovarian Cancer (MDASI-OC): This was developed by Sailors

et al.,[22] and adapted from Cleeland et al.,[23] and used with permission from the University of Texas M.D. Anderson Cancer Center. The MDASI-OC is used to assess symptom experience, with three dimensions: symptom occurrence, symptom severity and symptom interference.

Symptom occurrence was operationalized as the presence or absence of each of the 21 symptoms (13 core symptoms, e.g., fatigue, nausea, numbness/tingling, drowsiness, disturbed sleep and eight ovarian cancer-specific symptoms, e.g., abdominal pain, bloating, urinary urgency, constipation) reported within the past 24 hours. The core symptom and interference items were translated into Thai and linguistically validated by the University of Texas M.D. Anderson Cancer Center.[25] The ovarian cancer-specific items were translated using a forward-backward translation process, with final approval by the same institution.

Symptom severity was measured using the same 21 symptoms, with participants rating symptom severity on a scale from 0 ("not present") to 10 ("as bad as you can imagine"). The total score ranges from 0 to 210, with higher scores indicating greater severity.[22]

Symptom interference was assessed using six standard interference items, which evaluate the extent to which symptoms interfere with key aspects of daily functioning: general activity, mood, work (including housework), relations with others, walking ability, and enjoyment of life. Each item is rated on a scale from 0 ("did not interfere") to 10 ("interfered completely"). The scores ranged from 0 to 60, with higher scores indicating higher interference. Mean scores for severity and interference were calculated separately by averaging their respective items.[22]

The Modified Self-Care Diary (SCD) Questionnaire: This Diary was originally developed by Nail et al.,[24] and assesses chemotherapy-related symptom-management behaviors across 15 symptoms. The Thai version, translated by Sumdaengrit,[25] expanded it to 21 symptoms based on a literature review. The Modified SCD was used with permission from Sumdaengrit.[25] For this study, the SCD was reduced to 10 symptoms commonly experienced by WW-OCA receiving chemotherapy: fatigue, nausea/vomiting, sleep disturbance, hair loss, mouth ulcers, numbness/tingling, pain, fever, shortness of breath, and mood change. Item reduction was undertaken to improve clinical relevance, minimize respondent burden, and align the instrument with ovarian cancer-specific symptom profiles. Participants reported whether each symptom was experienced and whether self-care strategies were used (e.g., shaving their hair in anticipation of chemotherapy-induced alopecia). When strategies were used, perceived effectiveness was rated on a 5-point Likert scale from 0 (no effect) to 4 (greatest effect). The number of self-care methods used ranged from 0 to 90, and the total effectiveness score ranged from 0 to 360. Mean effectiveness score ranged from 0 to 4. In this study, symptom management behavior was operationalized using the mean effectiveness score, with higher scores indicating greater perceived effectiveness of symptom management behaviors.

The Functional Assessment of Cancer Therapy-Ovarian Questionnaire (FACT-O): The Thai version of FACT-O (version 4) was used with permission from the FACIT system (https://facit.org) and developed by Cella et al.[14] FACT-O assesses QOL over the past 7 days across five domains: physical well-being, social/family well-being, emotional well-being, functional well-being, and ovarian cancer subscale (e.g., Swelling in the stomach). This questionnaire consists of 39 items (22 positively worded and 17 negatively worded), rated on a 5-point Likert scale from 0 ("not at all") to 4 ("very much"). The total score ranges from 0 to 152, with higher scores indicating a better QOL. As the FACT-O has no established clinical cut-off scores, interpretation was based on the percentage of the maximum score (≥ 50% indicating moderate-good QOL).

Data Collection: Data were collected between March and September 2024. After institutional

ethics approval, eligible WW-OCA were identified by clinic staff and approached by the PI. After obtaining informed consent, eligible participants completed the questionnaires in a private setting. The PI assisted participants with low literacy or vision impairment by reading items aloud. Completion time averaged 30-40 minutes.

Data Analysis: Data were analyzed using SPSS for Windows version 21.0. Descriptive statistics summarized demographic and clinical characteristics and symptom profiles. Normality was assessed using the Kolmogorov-Smirnov test. Because the data were not normally distributed, Spearman's rank-order correlation (rho) was used to examine associations among symptom severity, symptom management behaviors, and QOL. Hierarchical multiple regression analysis was conducted to identify predictors of QOL. Statistical significance was set at $p < 0.05$. Missing data were minimal, affecting less than 10% of the dataset.

Results

The participants ranged in age from 28 to 90 years. The most common age group was 45-59 years. Most participants were married, had a bachelor's degree, and reported a monthly family income of > 45,000 Baht (> 1,400 USD). The majority were diagnosed with ovarian cancer, with most cases at stage III or stage IV. Most participants had ECOG = 0. Chemotherapy exposure: 1-3 cycles and 4-6 cycles; 69.8% received paclitaxel + carboplatin, and 30.2% received the same regimen plus bevacizumab **(Table 2).**

Table 2. Demographic and medical characteristics of the participants (N = 96)

Characteristics	n	%
Age (years) (min-max = 90-28 years, mean = 58.08, SD = 11.65)		
Marital status		
Single	32	33.3
Married	53	55.2
Widowed	7	7.3
Divorced	4	4.2
Education level		
Primary school	18	18.7
Secondary school	10	10.4
Diploma	12	12.5
Bachelor's degree	40	41.7
Master's degree or higher	16	16.7
Occupation		
Unemployed	37	38.5
Shopkeeper/vendor	11	11.5
Government officer	33	34.4
State enterprise employees	5	5.2
Other (self-employed)	10	10.4
Family income (Baht/month)		
< 15,000 (< 470 USD)	5	5.2
30,000-15,000 (470 USD-940 USD)	23	24.0
45,000-30,001 (941 USD-1,400 USD)	13	13.5
> 45,000 (> 1,400 USD)	55	57.3

Table 2. Demographic and medical characteristics of the participants (N = 96) (Cont.)

Characteristics	n	%
Accommodation		
Detached house/Semi-detached house	61	63.6
Townhouse/townhome	13	13.5
Condominium	8	8.3
Other (commercial building, tenement house)	14	14.6
Diagnosis		
Ovarian cancer	88	91.7
Fallopian tube cancer	3	3.1
Recurrent ovarian cancer	5	5.2
Staging		
I	10	10.4
II	11	11.4
III	42	43.8
IV	33	34.4
Duration of illness (months)		
0-3	21	21.9
4-6	31	32.3
7-12	25	26.0
> 12	19	19.8
Number of cycles		
1-3	39	40.6
6-4	31	32.3
> 6	26	27.1
Type of chemotherapy		
Paclitaxel + carboplatin	67	69.8
Paclitaxel + carboplatin + bevacizumab	29	30.2
ECOG performance status score		
0	94	98.0
1	1	1.0
2	1	1.0

Note. ECOG = Eastern Cooperative Oncology Group

Symptom experience

Participants reported a mean of 11.44 symptoms (range 2-21) within the past 24 hours. The most frequently reported symptoms (occurrence) were numbness/tingling, fatigue, loss of appetite, drowsiness, and sleep disturbance. For symptom interference, participants experienced a mean of 3.77 affected domains of daily functioning (range = 0-6). The most commonly affected areas were general activities, enjoyment of life, and the ability to work.

Overall, mean symptom severity (mean = 1.95) and mean symptom interference (mean = 2.15) were both rated as mild. Item-level analyses of symptom severity and symptom interference are presented in **Tables 3 and 4.**

Table 3. Symptom occurrence and severity of women with ovarian cancer receiving chemotherapy (N = 96)

Symptoms	Symptom occurrence		Symptom severity		95% CI	
	n	%	Mean	SD	Lower	Upper
1-21 Symptoms (Min-Max = 2-21, Mean = 11.44, SD = 3.93)						
21 Symptoms						
1. Numbness/tingling	95	99.0	4.98[1]	2.53		
2. Fatigue(tiredness)	75	78.1	3.01[3]	2.39		
3. Anorexia	72	75.0	3.10[2]	2.67		
4. Drowsiness	72	75.0	2.73[6]	2.39		
5. Sleep disturbance	69	71.9	2.90[4]	2.61		
6. Leg cramps/leg muscle pain	67	69.8	2.82[5]	2.65		
7. Constipation	65	67.7	2.49	2.22		
8. Back pain	61	63.5	2.11	2.16		
9. Distress (upset)	56	58.3	1.80	2.04		
10. Problem with remembering things	49	51.0	1.43	1.78		
11. Nausea	48	50.0	1.70	2.11		
12. Dry mouth	48	50.0	1.25	1.68		
13. Pain	45	46.9	1.82	2.51		
14. Bloating	45	46.9	1.54	2.01		
15. Sad	44	45.8	1.28	1.85		
16. Problem with paying attention	40	41.7	1.35	1.98		
17. Urinary urgency	39	40.6	1.33	2.05		
18. Pain in abdomen	34	35.4	1.16	1.87		
19. Shortness of breath	28	29.2	0.73	1.40		
20. Vomiting	23	24.0	0.80	1.73		
21. Pain or burning with urination	23	24.0	0.63	1.33		
Overall symptoms (21 symptoms)			1.95	1.06	1.7	2.2

Table 4. Symptom interference of women with ovarian cancer (N = 96)

Symptoms	Symptom occurrence		Symptom interference		95% CI	
	n	%	Mean	SD	Lower	Upper
Number of interferences (range 0-6) Mean = 3.77, SD = 1.87						
Interference domains						
1. General activity	72	75.0	2.42[4]	2.23		
2. Enjoyment of life	69	71.9	2.56[1]	2.57		
3. Work	64	66.7	2.52[2]	2.60		
4. Walking	63	65.6	2.45[3]	2.59		
5. Mood	54	43.8	1.75[5]	2.00		
6. Relationship with others	40	41.7	1.19[6]	1.84		
Overall symptom interference			2.15	1.72	1.8	2.5
Overall symptom experience (severity, interference)			1.99	1.11	1.8	2.2

Note. 1-6 = Rank

Symptom management behaviors and effectiveness

All participants reported engaging in symptom management behaviors. The mean overall effectiveness score across the 10 symptoms was 2.58, indicating moderate perceived effectiveness. Effectiveness varied by symptoms and strategies. For hair loss, strategies such as wearing wigs/headscarves and shaving hair were rated highly effective, with shaving hair reported as the most effective behavior. For numbness/tingling, commonly used strategies (e.g., vitamin B supplementation, massage) were found to be relatively ineffective; placing hands or feet on a pillow was rated the most effective among these behaviors. For fatigue/tiredness, strategies such as going to bed early and taking naps were moderately effective, while taking daily multivitamins was rated the most effective. For sleep disturbance, strategies such as reading, watching television, and resting were moderately effective, while taking sleeping pills was rated the most effective (**Table 5**).

Table 5. Symptom management behavior and effectiveness

Symptom management behavior* (Top 5 symptoms)	n	%	Effectiveness		95% CI	
			Mean	SD	Lower	Upper
1. Hair loss (n = 96)						
1.1 Wore a wig, headscarf, or hat	96	100.00	3.17	0.66		
1.2 Shaved hair	87	90.63	**3.23**	0.56		
1.3 Changed to use pH-balanced shampoo (e.g. baby shampoo)	76	79.16	2.93	0.66		
1.4 Reduced brushing of hair	8	8.33	1.88	1.12		
1.5 Used soft hairbrush	6	6.25	2.17	1.47		
Overall effectiveness of hair loss management			3.18	0.62		
Overall hair loss management behavior	96	100.00	3.09	0.63	2.97	3.22
2. Numbness/tingling (N = 95)						
2.1 Took vitamin B	94	98.95	1.00	0.80		
2.2 Rub or massage the fingertips and toes	84	88.42	1.10	0.67		
2.3 Got more exercise	21	22.11	1.14	0.57		
2.4 Wore socks to prevent foot injuries	19	20.00	1.16	0.50		
2.5 Avoided too hot or too cold weather	9	9.47	1.67	0.86		
2.6 Placed hands or toes on pillow	7	7.37	1.86	1.06		
2.7 Wore gloves to prevent hand injuries	4	4.21	1.50	1.00		
Overall effectiveness of numbness/tingling management			1.08	0.68		
Overall numbness/tingling management behavior	95	100.00	1.04	0.69	0.91	1.19
3. Fatigue/tiredness (N = 86)						
3.1 Went to bed earlier than usual	79	91.86	2.85	0.48		
3.2 Took naps	79	91.86	2.87	0.43		
3.3 Watched TV or listened to music	77	89.53	2.84	0.48		
3.4 Stopped working/doing an activity	74	86.05	2.88	0.46		
3.5 Drank a large amount of nutritious liquid	72	83.72	2.88	0.55		
3.6 Took multivitamins daily	63	73.26	**2.89**	0.40		
3.7 Prayed or meditated	44	51.16	2.77	0.52		
3.8 Got more exercise	24	27.91	2.58	0.71		
3.9 Got up later than usual	22	25.58	2.86	0.56		
3.10 Told myself not to worry	17	19.77	2.47	0.80		
3.11 Listened to Dhamma	14	16.28	2.71	0.72		

Table 5. Symptom management behavior and effectiveness (Cont.)

Symptom management behavior* (Top 5 symptoms)	n	%	Effectiveness		95% CI	
			Mean	SD	Lower	Upper
3.12 Got fresh air	11	12.79	2.27	0.78		
3.13 Kept busy to get my mind off	11	12.79	2.55	0.82		
Overall effectiveness of /tiredness management			2.86	0.47		
Overall fatigue/tiredness management behavior	86	89.58	2.79	0.43	2.70	2.88
4. Difficulty sleeping (n = 72)						
4.1 Read, watched TV, or listened to music	58	80.56	2.66	0.57		
4.2 Tried not to think about it	47	65.28	2.53	0.68		
4.3 Rested in bed	44	61.11	2.61	0.57		
4.4 Took sleeping pills	43	59.72	**3.07**	0.63		
4.5 Prayed or meditated	25	34.72	2.56	0.65		
4.6 Get some exercise (during daytime)	21	29.17	2.81	0.60		
Overall effectiveness of difficulty sleeping management			2.64	0.54		
Overall difficulty sleeping management behavior	72	75.00	2.69	0.51	2.57	2.81
5. Nausea/Vomiting (n = 66)						
5.1 Took antiemetic as the doctor's prescription	63	95.45	3.11	0.51		
5.2 Ate sour food/fruit	58	87.88	2.78	0.46		
5.3 Ate hot food more than cold food	27	40.91	2.37	0.68		
5.4 Took a deep breath or used an inhaler	27	40.91	2.33	0.73		
5.5 Avoided look or smell of food	23	34.85	2.30	0.76		
5.6 Rested in a peaceful place after a meal	20	30.30	2.30	0.86		
5.7 Took a nap while feeling nauseous	16	24.24	2.63	0.61		
5.8 Avoided sweet, fatty, and spicy food	15	22.73	2.47	0.51		
5.9 Took a small amount but more frequently	12	18.18	2.17	0.71		
5.10 Drank clear liquid (e.g. soft drink, apple juice)	12	18.18	2.17	0.71		
5.11 Kept busy to get my mind off	8	12.12	1.75	1.03		
5.12 Cleaned mouth and teeth more than usual	6	9.09	1.50	0.83		
5.13 Eat more slowly than usual	5	7.58	1.60	0.54		
Overall effectiveness of nausea/vomiting management			2.77	0.49		
Overall nausea/vomiting management behavior	86	100.00	2.71	0.49	2.59	2.83
Overall symptom management behavior and effectiveness	96	100.00	2.58	0.35	2.50	2.65

Note. Most frequently used symptom management behaviors are *italicized*; most effective symptom management are **bolded**. *A patient could choose more than one method.

Quality of life

The mean overall QOL score was 108.75 out of a possible 152, indicating a generally good level of QOL (71.6% of the maximum score). Scores ranged from 52 to 136, with a higher score indicating better QOL. Among the domains, the highest mean score was observed in the ovarian cancer subscale, while the lowest was in the functional well-being domain. The remaining domain scores were: physical well-being, social/family well-being, and emotional well-being. All domains scored above 50% of the total possible score (**Table 6**).

Table 6. Quality of life in women with ovarian cancer receiving chemotherapy (n = 96)

Quality of life	Possible range	Actual range	Mean (SD)	% of Maximum score	95% CI	
					Lower	Upper
The overall QOL	0-152	136-52	(15.91) 108.75	71.6%	105.5	112.0
The subscale QOL						
Physical well-being	0-28	28-4	(5.08) 20.77	74.2%	19.7	21.8
Social/Family well-being	28-0	28-9	(3.82) 21.77	77.8%	21.0	22.6
Emotional well-being	0-24	24-2	(4.66) 18.34	76.4%	17.4	19.3
Functional well-being	28-0	28-7	(4.74) 17.86	63.8%	16.9	18.9
Ovarian cancer subscale	44-0	36-12	(4.41) 27.39	62.3%	26.5	28.3

Note. CI = confidence interval; QOL = Quality of Life

Correlation and prediction of QOL

All three dimensions of symptom experience (occurrence, severity and interference) were negatively associated with total QOL, with interference showing the strongest association (r = -0.52). However, the association between self-management effectiveness and QOL was not significant (**Table 7**). In the hierarchical regression model, only symptom interference predicted QOL, and all variables together explained 28.6% of the variance in QOL (**Table 8**).

Table 7. The relationships among symptom experience (occurrence, severity, interference), symptom management effectiveness, and quality of life (n = 96)

Variables	1.1	1.2	1.3	2	3
1. Symptom experience (item 1-27)					
1.1 Symptom occurrences	1.00				
1.2 Symptom severity	0.69*	1.00			
1.3 Symptom interference	0.72*	0.61*	1.00		
2. Symptom management effectiveness	-0.05	0.05	-0.01	1.00	
3. Overall quality of life	-0.51*	-0.43*	-0.52*	0.17	1.00

Note. *Correlation is significant at the 0.01 level (2-tailed).

Table 8. Hierarchical multivariate regression analysis predicting quality of life from symptom occurrence, severity, interference, and symptom management effectiveness (n = 96)

Variables	B	SE	β	t	p-value
Model 1					
Constant	126.892	4.597	-	27.605	< 0.001
Symptom occurrence	-0.816	0.434	-0.272	-1.879	0.063
Symptom severity	-0.034	2.069	-0.002	-0.017	0.987
Symptom interference	-2.638	1.229	-0.286	-2.147	0.034
$R = 0.517$, $R^2 = 0.267$, Adjusted $R^2 = 0.243$, R^2 change = 0.267, $F_{(3,92)} = 11.168$, $p < 0.001$					
Model 2					
Constant	109.791	11.817	-	9.291	<0.001
Symptom occurrence	-0.770	0.432	-0.256	-1.782	0.078
Symptom severity	-0.048	2.052	-0.003	-0.023	0.982
Symptom interference	-2.627	1.219	-0.285	-2.155	0.034
Symptom management effectiveness	6.354	4.051	0.140	1.569	0.120
$R = 0.535$, $R^2 = 0.286$, Adjusted $R^2 = 0.255$, R^2 change = 0.019, $F_{(1,91)} = 2.460$, $p = 0.120$					

Note. B = unstandardized coefficient, SE = standard error, β = standardized coefficient

Discussion

This study examined symptom experiences, symptom management behaviors, and QOL among WW-OCA undergoing chemotherapy in Thailand, and explored the relationships among these variables and their predictive effects on QOL.

Results demonstrated that the most commonly reported patterns of symptom occurrence and severity were similar, including numbness or tingling, fatigue, loss of appetite, drowsiness, and sleep disturbances. Numbness or tingling was the most prevalent symptom, consistent with the neurotoxic effects of commonly used chemotherapy agents such as paclitaxel and carboplatin that cause peripheral nerve damage. These symptoms may substantially affect patients' experiences of illness and overall well-being.[26] Previous studies also reported persistent fatigue and peripheral neuropathy during the early period following chemotherapy, with sleep disturbances emerging later in the treatment cycle.[27] Symptom severity, particularly fatigue, has also been shown to increase across chemotherapy cycles and is associated with declining QOL.[28] Prior studies suggest that psychological interventions like acceptance and commitment therapy (ACT) effectively reduce the subjective severity of psychological distress (e.g., fatigue, anxiety, and sadness). However, their impact on functional interference from physical symptoms such as pain or sleep disturbance remains limited. For instance, internet-based ACT trials show that while mood and relationship interference improved, these changes were not statistically significant. This indicates that while psychological strategies successfully recalibrate emotional responses, reducing the physical interference of symptoms often requires more targeted physiological interventions or is simply driven by the natural recovery trajectory over time.[29]

All participants reported engaging in symptom management behaviors, with an overall perceived effectiveness rated as moderate. Hair loss management was the most frequently reported strategy, with behaviors such as shaving hair, wearing wigs or wearing head coverings rated highly effective. These findings are consistent with previous research among women with gynecologic cancers, in which hair loss, appetite loss, nausea, fatigue, and vomiting were common symptoms and self-care behaviors or coping often included the use of wigs, hats, and gentle hair care practices.[30]

The overall QOL in this study was good. Although previous studies have reported lower functional, social/family, and disease-specific QOL among women with advanced-stage ovarian cancer receiving chemotherapy.[12] Differences in disease stage, treatment phase, and supportive care resources may partially explain these variations. The high scores observed across all QOL dimensions, particularly in SWB, likely reflect the strong support systems inherent in Thai culture, which places a significant emphasis on family caregiving and collectivism.[31] Furthermore, high levels of emotional well-being (EWB) may be associated with the prevalence of religious coping mechanisms, particularly Buddhist principles, that promote acceptance and equanimity in the face of illness.[32]

Regarding relationships among variables, all three dimensions of symptom experience—occurrence, severity, and interference—were significantly and negatively associated with overall QOL and with the domains of physical, emotional, and functional well-being. Among these dimensions, symptom interference demonstrated the strongest association with QOL, and was the only dimension that could predict QOL, indicating that the extent to which symptoms disrupt daily functioning may be more critical to patients' well-being than the mere presence or intensity of symptoms. This finding suggests that functional limitations resulting from symptoms play a central role in shaping perceived QOL. Previous research has similarly shown that symptoms such as fatigue, numbness, and nausea were the most troublesome in people with cancer.[33] It is not just the presence of a symptom that degrades QOL, but the extent to which that symptom prevents the individual

from engaging in meaningful social activities. For instance, treatment-induced numbness can transform simple daily tasks into significant hurdles, leading to social isolation and a subsequent decline in overall well-being.[26] These findings are consistent with previous studies showing that symptom interference was significantly and negatively correlated with physical, emotional, and functional QOL. Greater symptom interference limited patients' capacity to perform routine activities among people with cancer.[28,34,35] Severe symptoms can impair daily functioning,[33] increasing psychological distress, and ultimately reducing overall QOL.[4,36,37]

These results support the UCSF symptom management theory, which emphasizes that symptom experience—particularly its impact on daily functioning—plays a central role in determining health outcomes.[9,10] Among the subdimensions of symptom experience, interference appears to be the most clinically meaningful indicator of patient well-being, as it directly reflects functional impairment and the ability to engage in daily life.

In contrast, symptom management effectiveness was not significantly associated with symptom occurrence, severity, interference or overall QOL and did not significantly predict QOL. Although participants actively attempt to manage their symptoms, these strategies may not have been sufficiently effective to reduce clinical symptom severity, particularly for complex conditions such as chemotherapy-induced peripheral neuropathy (CIPN), for which effective treatment remains limited.[38] These findings are consistent with previous research reporting no significant relationship between symptom-management behavior and QOL among individuals with cancer.[21] While some innovative physical interventions, such as the use of frozen rubber gloves, have shown promise in significantly reducing peripheral neuropathy during the critical transition between cycles 3 and 4 of paclitaxel treatment, such specialized interventions were not a standard component of the general self-care behaviors measured in this cohort.[39] According to the UCSF symptom management theory,[9,10] self-management behaviors may facilitate coping and adaptation rather than directly reduce physiological symptom severity. The positive association between symptom management behaviors and social/family well-being further suggests that these behaviors may serve as psychosocial coping mechanisms, strengthening interpersonal support even when physical symptoms persist.

Limitations

This study has several limitations. First, the study was conducted at a single university hospital, which may limit the generalizability of the findings to other settings. Second, the modified Self-Care Diary included changes to the original instrument's items and structure, which may affect comparability with previous studies and require further validation. Third, the cross-sectional design limits the ability to establish causal relationships among symptom experience, symptom management behaviors, and QOL. Longitudinal studies are needed to better understand how these variables interact over the course of treatment. Finally, symptom management behaviors were self-reported and may be subject to recall or social desirability bias.

Conclusion and Implications for Nursing Practice

This study demonstrates that WW-OCA patients receiving chemotherapy experience multiple concurrent symptoms, with numbness/tingling, fatigue, and appetite loss being most prominent. Symptom occurrences, severity, and interference were significantly associated with poorer overall QOL, with interference being the strongest predictor. Although most participants engaged in symptom management behaviors, their perceived effectiveness varied, particularly for neuropathic symptoms. Overall, symptom experience appeared to have a stronger influence on QOL than self-management behaviors alone.

These findings highlight the importance of systematic, theory-informed symptom assessment and early nursing interventions targeting high-impact symptoms during chemotherapy. Integrating structured symptom monitoring, evidence-based non-pharmacologic strategies, and coordinated supportive care into routine oncology nursing practice may help reduce symptom burden and improve patient well-being. The findings also provide empirical support for the UCSF symptom management theory by demonstrating the relationships among symptom experience, symptom management behaviors, and QOL outcomes in women with ovarian cancer.

Implications extend to nursing education and research. Nursing education should emphasize theory-based symptom assessment and evidence-informed symptom management strategies. Future research should employ longitudinal and interventional designs to clarify causal pathways among symptom experience, management behaviors, and outcomes, and include diverse healthcare settings to enhance the generalizability of findings and strengthen theory-guided supportive cancer care. Furthermore, understanding the bio-behavioral phenotypes of people with cancer can be tailored to address the synergistic effects of co-occurring symptoms, thereby optimizing outcomes in symptom management theory.

Author Contributions

Conceptualization, Method and design: S.U., P.P., B.S.
Data collection, Drafting the manuscript: S.U.
Data analysis and interpretation: S.U., P.P., B.S.
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Revising the manuscript: S.U., P.P.
Final approval of the manuscript: S.U., P.P., B.S.

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การทำนายคุณภาพชีวิตจากประสบการณ์อาการและพฤติกรรมการจัดการอาการในผู้หญิงที่เป็นมะเร็งรังไข่ที่ได้รับยาเคมีบำบัด : การศึกษาแบบภาคตัดขวาง

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บทคัดย่อ: ผู้หญิงที่เป็นมะเร็งรังไข่และได้รับเคมีบำบัดมักเผชิญกับอาการรบกวนหลายอาการพร้อมกัน ซึ่งส่งผลเสียต่อคุณภาพชีวิต อย่างไรก็ตาม หลักฐานเชิงประจักษ์เกี่ยวกับประสบการณ์อาการและพฤติกรรมการจัดการอาการ รวมถึงอิทธิพลของสิ่งเหล่านี้ต่อคุณภาพชีวิตในผู้ป่วยกลุ่มนี้ยังคงมีจำกัดในประเทศไทย การศึกษาแบบภาคตัดขวางนี้ มีวัตถุประสงค์เพื่อศึกษาประสบการณ์อาการ พฤติกรรมการจัดการอาการ และคุณภาพชีวิต และทำนายคุณภาพชีวิตจากประสบการณ์อาการและพฤติกรรมการจัดการอาการในผู้หญิงที่เป็นมะเร็งรังไข่ที่ได้รับเคมีบำบัด กลุ่มตัวอย่างเป็นผู้หญิงที่เป็นมะเร็งรังไข่ได้รับยาเคมีบำบัดที่โรงพยาบาลมหาวิทยาลัยในประเทศไทยจำนวน 96 คน คัดเลือกด้วยวิธีเฉพาะเจาะจง เครื่องมือที่ใช้ในการวิจัย ได้แก่ แบบประเมินอาการ M.D. Anderson Symptom Inventory–Ovarian Cancer แบบสอบถามพฤติกรรมการจัดการอาการ และแบบประเมินคุณภาพชีวิต Functional Assessment of Cancer Therapy–Ovarian วิเคราะห์ข้อมูลโดยสถิติบรรยาย สหสัมพันธ์แบบสเปียร์แมน และการวิเคราะห์ถดถอยเชิงลำดับขั้น

กลุ่มตัวอย่างมีประสบการณ์อาการหลายอาการพร้อมกัน โดยอาการชา/รู้สึกเสียวซ่า และเหนื่อยล้าพบได้บ่อยที่สุด ระดับความรุนแรงของอาการและการรบกวนจากอาการโดยรวมอยู่ในระดับเล็กน้อย อย่างไรก็ตาม อาการทางระบบประสาทส่วนปลายและเหนื่อยล้าเป็นอาการที่มีความรุนแรงมากที่สุด ประสิทธิภาพของการจัดการอาการอยู่ในระดับปานกลาง โดยการจัดการอาการผมร่วงและคลื่นไส้มีประสิทธิภาพสูงสุด ในขณะที่อาการปลายประสาทอักเสบยังคงจัดการได้ไม่ดี คุณภาพชีวิตโดยรวมอยู่ในระดับดี ความรุนแรงของอาการ (การเกิดอาการ ความรุนแรงของอาการ และการรบกวนจากอาการ) มีความสัมพันธ์อย่างมีนัยสำคัญทางสถิติกับคุณภาพชีวิตโดยรวม อย่างไรก็ตาม ประสิทธิภาพของการจัดการอาการไม่มีความสัมพันธ์กับคุณภาพชีวิต เมื่อพิจารณาร่วมกันประสบการณ์อาการและประสิทธิภาพของการจัดการอาการสามารถอธิบายความแปรปรวนของคุณภาพชีวิตได้ร้อยละ 28.6 มีเพียงการรบกวนจากอาการเท่านั้นที่เป็นตัวทำนายเชิงลบที่มีนัยสำคัญต่อคุณภาพชีวิต ผลการศึกษานี้เน้นย้ำถึงความจำเป็นที่พยาบาลจะต้องทำการประเมินอาการอย่างเป็นประจำและครอบคลุม และดำเนินการพยาบาลที่เฉพาะเจาะจง โดยเฉพาะการลดการรบกวนจากอาการปลายประสาทอักเสบและอาการเหนื่อยล้าเพื่อส่งเสริมคุณภาพชีวิตของผู้หญิงที่เป็นมะเร็งรังไข่ที่ได้รับเคมีบำบัด

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