ASSESSMENT OF REGISTERED NURSES' COMPETENCIES IN CHEMOTHERAPY CARE COMPETENCIES AND THEIR PREDICTORS IN A THAI TERTIARY HOSPITAL

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ABSTRACT

This descriptive correlational study examined the competencies of professional nurses in caring for adult and older adult cancer patients undergoing chemotherapy at a hospital in southern Thailand. The sample consisted of 100 professional nurses, with data collected between April and May 2024. The instruments included a demographic questionnaire and a competency questionnaire, with strong reliability (Cronbach's alpha = .97). Data were analyzed using descriptive statistics, Spearman's correlation, and the Mann-Whitney U test. The results showed that nurses' overall competencies in caring for adult and older adult cancer patients undergoing chemotherapy were at a high level (Mean = 2.73, SD = 0.52). The three highest-rated competencies were ethics and patient rights (Mean = 3.24, SD = 0.53), patient preparation before, during, and after chemotherapy (Mean = 2.77, SD = 0.62), and communication, teaching, and providing information (Mean = 2.71, SD = 0.66). Furthermore, both experience in chemotherapy care and participation in cancer-related training were significantly associated with higher competency levels (r = 0.37, p < .001; Z = 4.209, p < .001). These findings highlight key areas for professional development and may guide future efforts to strengthen oncology nursing competencies.

BACKGROUND

Cancer remains a critical global public health concern. In 2024, it was estimated that approximately 2,001,140 new cancer cases and 611,720 cancer-related deaths would occur worldwide (Siegel, Giaquinto, & Jemal, 2024). In Thailand, cancer incidence data between 2020 and 2023 demonstrated fluctuating trends, reflecting ongoing challenges in cancer prevention and control (National Cancer Institute, Department of Medical Services, Ministry of Public Health, Thailand, 2021; 2022; 2024). In 2022, the five most prevalent cancers among Thai males were colorectal cancer, liver and bile duct cancer, lung cancer, and prostate cancer. Among females, the leading cancer types were breast cancer, ovarian cancer, colorectal cancer, lung cancer, and uterine cancer, respectively. At Vachira Phuket Hospital, a tertiary care center located in southern Thailand, the number of cancer cases has shown a steady increase in recent years. In 2021, the hospital reported 958 cancer cases, which rose to 1,120 in 2022, and 1,269 in 2023 (Vachira Phuket Hospital, 2024). This upward trend is attributed to the increasing life expectancy of the population, as well as advancements in cancer detection technologies that facilitate earlier and more accurate diagnoses.

Aimed at prolonging survival and improving patients' quality of life, chemotherapy remains a cornerstone in cancer treatment. However, the adverse effects associated with chemotherapy—many of which vary depending on the specific regimen—can pose significant threats to patients' holistic well-being. Chen et al. (2021) investigated symptom clusters among patients with leukemia and identified four primary clusters: (1) psychological symptoms; (2) pain-fatigue-sleep disturbances; (3) dry mouth and constipation; and (4) nutrition-related impairments. Similarly, a study conducted by Shafiq et al. (2022) involving 345 patients with advanced cancer in Singapore found that psychological

symptoms were both common and severe. In contrast, physical symptoms varied in intensity from mild to severe, while the level of psychological distress ranged from mild to advanced stages.

Therefore, in providing care for patients undergoing chemotherapy, it is essential for professional nurses to demonstrate a high level of knowledge, appropriate attitudes, and proficient clinical skills. These competencies are critical for effectively promoting the quality of life among cancer patients. Nursing competencies serve as key factors in enhancing the capacity of professional nurses to deliver comprehensive and evidence-based oncology care. As emphasized by Drury et al. (2023), continuous professional development is imperative, encompassing advancements in knowledge, engagement with research and policy, and ongoing training in clinical practice to ensure the delivery of high-quality nursing in oncology settings.

The Oncology Nursing Society (2025) delineated the competencies for Generalist Oncology Nurses which include: 1) scientific information; 2) understanding cancer as a disease; 3) assessment and decision-making; 4) treatment modalities; 5) care management; 6) patient and caregiver support; and 7) professional practice.

The Thailand Nursing and Midwifery Council (2018) has outlined eight core competency domains for registered nurses to ensure the delivery of high-quality care. These competencies serve as a national standard and include: (1) ethics, code of conduct, and the law; (2) core nursing and midwifery practices; (3) professional characteristics; (4) leadership, management, and quality improvement; (5) academic and research competencies; (6) communication and relationship; (7) information technology; and (8) social competencies. Together, these domains collectively provide a framework for the professional development and performance evaluation of registered nurses across various healthcare settings.

A review of the literature indicates that various factors are associated with the competency levels of nurses providing care to patients with chronic illnesses. However, there remains a gap in the evidence specifically examining the factors influencing the competencies of registered nurses in caring for adult and older adult patients with cancer in the Thai context. Maskor et al. (2021) discovered a correlation between work experience and nursing abilities among cancer care nurses in Malaysia (r = 0.11, p < 0.047). Despite these findings, research specially focused on oncology nursing competencies in Thailand, particularly for adult and older populations, remains limited.

Evidence from international studies further supports the association between demographic and professional factors and oncology nursing competencies. A study conducted in Malaysia by Maskor et al. (2021) found a statistically significant but weak positive correlation between years of work experience and oncology nursing competencies *(*r = .11, p < .047*)*. Similarly, Al Qadire et al. (2023), who assessed registered nurses' knowledge and competencies in managing chemotherapy-induced neutropenia and related symptoms, reported moderate levels of competency. Iacorossi et al. (2020) found that nurses with more than 15 years of experience and over the age of 40 demonstrated significantly higher levels of competency in cancer nursing care. These findings underscore the influence of age and experience on the development of professional competencies in oncology nursing.

Vachira Phuket Hospital, a tertiary care center located in southern Thailand, has observed a continuous rise in the number of patients diagnosed with cancer (Vachira Phuket Hospital, 2024). In response to this trend, the hospital's administrative team, under the leadership of the hospital director, has implemented strategic initiatives to strengthen the knowledge and skills of nursing personnel in oncology care. These initiatives include allocating registered nurses to participate in specialized cancer nursing training programs that last from one to four months, as well as organizing regular cancer conferences to promote professional development and assess the competencies of nurses providing oncology care. In light of these effects, the present study aims to examine the competencies of registered nurses in caring for adult and older adult cancer patients undergoing chemotherapy. Additionally, the study seeks to explore the factors associated with oncology nursing competencies, including age, educational background, work experience, and participation in further oncology-related education.

Objectives
1) To describe the competency levels of registered nurses providing care to adult and older adult patients undergoing chemotherapy.
2) To examine the relationship between selected factors (such as age, educational level, and work experience and training) and the competency level of registered nurses providing care for adult and older cancer patients undergoing chemotherapy.

METHOD
Study design
Descriptive-correlational study
Population: registered nurses at Vachira Phuket Hospital caring for adult and older cancer patients undergoing chemotherapy.

Sample
The samples met the following inclusion criteria: 1) registered nurses at Vachira Phuket Hospital; 2) work at a ward where cancer patients are admitted; 3) a minimum of one year of experience; and 4) experience with at least one case involving the care for adult and older adult patients undergoing chemotherapy. In this study, the Taro Yamane formula (1967) was employed to calculate the minimum required sample size, as the research involved a clearly defined finite population. This formula is particularly suitable for estimating a representative sample size for descriptive studies where the total population is known. In addition, the study incorporated correlational analyses to examine the relationships among the variables. To ensure sufficient statistical power for these analyses, the sample size was assessed in accordance with established guidelines for correlation studies. According to Cohen's (1988) recommendations, a sample size of approximately 85-100 participants is adequate to detect a medium effect size (r = 0.30) with 80% power at a significance level of .05. The final sample size in the study exceeded this threshold, thereby ensuring the reliability of the correlational findings. Consequently, the Taro Yamane formula served as a practical and statistically validated approach for ascertaining the sample size. With a total population of 159 registered nurses and a 5% margin of error (*e* =0.05), the calculated sample size was 114 individuals.

Instrumentation
This study utilized a two-part instrument: Part 1: Demographic Data Form. This section consisted of 10 (ten) items related to age, gender, marital status, religion, education level, place of work, position, years of work

experience, experience in caring for oncology patients undergoing chemotherapy, and participation in continuing education related to chemotherapy nursing care for cancer patients. Part 2: Competency Assessment Form for Oncology Patients Undergoing Chemotherapy. This instrument was originally developed by Juangpanich, Karomprat, Sripan, and Chaiyawong (2015) based on the 90-item chemotherapy nursing framework created by Santisumranwilai and Ratchukul (2010). For the purpose of the current study, 40 items were selected from the original instrument. The selection process focused on retaining the core competencies essential for the safe and effective care of oncology patients undergoing chemotherapy while aiming to reduce item redundancy and minimize respondent burden. The reliability of the instrument was assessed in the study, yielding a Cronbach' alpha of 0.85. The selected items represented key domains of practice and were determined as the most relevant for assessing nursing clinical competencies within the context of the study. These items encompassed seven core competencies: (1) knowledge of chemotherapy and drug administration; (2) risk and complication management; (3) patient preparation before, during, and after chemotherapy; (4) knowledge of cancer and its impact; (5) communication, teaching, and information provision; (6) ethics and patient rights; and (7) research and knowledge development. The instrument used a 4-point Likert scales, with scores ranging from *1* to *4* points in which a score of 4 points reflects the highest level of competency, a score of 3 points indicates a high level of competency, a score of 2 points reflects a moderate level of competency, and a score of 1 point reflects a low level of competency. Total scores range from 40 to 160. Competency levels are interpreted based on the mean score using a four-level criterion (Tato, 2022). To summarize the criteria for competency level: mean scores of 3.25 to 4.00 reflect the highest competency level, while mean scores of 2.50 to 3.24 reflect a high competency level; mean scores of 1.75 to 2.49 reflect a moderate competency level; and mean scores of 1.00 to 1.74 reflect a low competency level. Reliability testing of the instrument was conducted on a sample of 20 similar cases, yielding a Cronbach's alpha coefficient of 0.97, indicating excellent internal consistency.

Data collection

The study received ethical approval from the Ethics Committee of Vachira Phuket Hospital. The principal investigator (PI) initially met with the head nurse and the ward heads involved in the study to obtain permission for data collection. Subsequently, the PI met with the participants to explain the purpose of the study, their responsibilities in completing the questionnaire, and their rights as participants. Questionnaires and informed consent forms were then distributed. After providing consent, the participants completed the questionnaires and returned them to the PI. Out of the total sample, 100 completed questionnaires were received. A total of 100 completed questionnaires were received from the sample. The response rate decreased by 12.28%, mainly due to participant unavailability, including maternity leave (n = 3), training attendance (n = 4), and absence during data collection (n = 7). Although the planned sample consisted of 114 nurses, only 100 were able participate due to unavoidable absences such as maternity leave, sick leave, and training. However, the sample retained adequate power to support the analysis.

Data analysis

1. Demographic data were analyzed using descriptive statistics, including percentages, means, standard deviations, medians, and interquartile ranges (IQR).

2. The level of nursing competency in caring for adult and older adult cancer patients undergoing chemotherapy was analyzed using the mean and standard deviation.

3. The correlations between age, work experience, experience in caring for adult and older cancer patients undergoing chemotherapy, all of which exhibited a non-normal distribution, were analyzed using Spearman's rank correlation coefficient. Additionally, the impact of training experience on competency levels was analyzed using the Mann-Whitney U test.

Ethical considerations

The study was approved by the Human Research Ethics Committee of Vachira Phuket Hospital (Document No. VPH REC 006/2024), with the approval period extending from March 20, 2024, to March 19, 2025. Ethical concerns were addressed by establishing rapport with the participants and clearly explaining the study's objectives, procedures, potential benefits, and associated risks. Participation was entirely voluntary, and no coercion or persuasion was employed to encourage involvement. Participants retained the right to withdraw from the study at any time without penalty. All data were kept confidential and securely stored. The results are presented in full without omission. All collected data will be destroyed within three years following the publication of the study.

RESULT

1. Demographic Data: Among the 100 participants, ages ranged from 23 to 55 years (Mean = 33.90, SD = 7.71). The majority were female (98%) and single (74%), with most identifying as Buddhist (77%). Nearly all participants held bachelor's degrees (99%) and were employed as staff nurses (94%). The median duration of work experience was 8 years (IQR = 11), while the median experience in caring for adult and older adult patients undergoing chemotherapy was 6 years (IQR = 6). Regarding work units, 48% were assigned to a surgical ward, 25% to a general medical ward, 16% to a respiratory critical care unit, 8% to a gynecological ward, and 3% to a chemotherapy clinic (see Table 1).

Table 1. Demographic Characteristics of Participants (n = 100)

Demographic Data	n	%
Age (years) Min-Max =23-55 Mean =33.90, SD =7.71		
Gender		
Male	2	2%
Female	98	98%
Marital Status		
Single	74	74%
Married	21	21%
Divorce, Separated	5	5%
Religion		
Buddhist	77	77%
Islamic	23	23%
Education Level		
Bachelor's Degree	99	99%
Master's Degree	1	1%
Place of Work		
General Medical Unit	25	25%
Surgical Unit	48	48%
Critical Respiratory Care Unit	16	16%
Gynecology Unit	8	8%
Chemotherapy Center	3	3%
Position		
Registered Nurse	94	94%
Registered Nurse (sub-head)	5	5%
Registered Nurse (professional level)	1	1%

Demographic Data	n	%
Work Experience (years) Mdn(IQR) = 8.00 (11)		
Experience in caring for adult and older adult cancer patients undergoing chemotherapy (years) Mdn (IQR) = 6.00(6).		
Training Course(s) in Nursing Care for Cancer Patients Undergoing Chemotherapy		
Yes	14	14%
No	86	86%

Competency	M	SD	Level
Knowledge about Cancer and Its Impact	2.51	0.63	High
Communication, Teaching, and Providing Information	2.71	0.66	High
Ethics and Patient Rights	3.24	0.53	High
Knowledge and Research Development	2.68	0.63	High
Total	**2.73**	**0.52**	**High**

2. The overall competency scores across the seven main domains were high, with a mean of 2.73 and a standard deviation (SD) of 0.52. The competencies with the highest mean scores were as follows: 1) ethics and patient rights (M = 3.24, SD = 0.53); 2) patient preparation before, during, and after chemotherapy administration (M = 2.77, SD = 0.62); 3) communication, teaching, and providing information (M = 2.71, SD = 0.66); 4) knowledge and research development (M = 2.68, SD = 0.63); 5) risk and complication management (M= 2.64, SD = 0.57); 6) knowledge of chemotherapy and drug administration (M = 2.58, SD = 0.71); and 7) knowledge about cancer and its impact (M = 2.51, SD = 0.63) (see Table 2).

Table 2. Mean (M), Standard Deviation (SD), and Levels of Competency in Caring for Cancer Patients Undergoing Chemotherapy (n = 100)

Competency	M	SD	Level
Knowledge about Chemotherapy and Drug Administration	2.58	0.71	High
Risk and Complication Management	2.64	0.57	High
Patient Preparation Before, During, and After Chemotherapy Administration	2.77	0.62	High

3. Concerning the correlations between related factors and competency in caring for adult and older adult cancer patients undergoing chemotherapy, the results indicated that experience in caring for cancer patients undergoing chemotherapy was moderately and positively correlated with overall nursing competency (r_s = .037, p < .001), as shown in Table 3. Furthermore, as presented in Table 4, nurses who had attended a relevant training course demonstrated significantly higher competency scores compared to those who had not (Z = 4.209, p < .001).

Table 3. Correlations between Age, Work Experience, Experience in Caring for Cancer Patients Undergoing Chemotherapy with Analysis by Spearman's Rank Correlation Coefficient: r_s) (n =100)

Independent Variables	r_s	p
Age	.12	.23
Work Experience	.13	.20
Experience in Caring for Cancer Patients Undergoing Chemotherapy	.37	.000***

*** p <.001

Table 4. Comparison of Nursing Competencies in caring for Cancer Patients Undergoing Chemotherapy between Registered Nurses with and without Training Courses in Nursing Care for Chemotherapy Cancer with Analysis by Mann-Whitney U Test) (n = 100)

Training	n	Nursing Competency in Caring for Cancer Patients Undergoing Chemotherapy		Hodges-Lehmann Median Difference	95%CI	U	Z	P
		Mdn *(IQR)*	Mean Rank					
Yes	14	3.43 (0.54)	80.75	-0.70	-0.950, -.450	1025.5	4.209	.000***
No	86	2.66 (0.65)	45.58					

*** p <.001

DISCUSSION

1. The competency of registered nurses in caring for adult and older adult cancer patients undergoing chemotherapy was found to be high. This outcome may be attributed to the substantial clinical experience of the participants, who had a median of 8 years (IQR = 11) in general nursing practice and 6 years (IQR = 6) specifically caring for patients undergoing chemotherapy. Similarly, the study by Iacorossi et al. (2020) found that nurses with many years of experience demonstrated a high level of nursing competency. This method asserts that hands-on experience and field exposure improve skill development. The study found no significant correlation between overall employment experience or age and skill levels. This paradox suggests that the cultivation of competency is more profoundly influenced by the quality and pertinence of clinical experience—such as specialized oncology exposure or ongoing professional development— than by the mere accumulation of years or age alone. Formal education, mentorship, or engagement in reflective practice may be more crucial in developing specific competencies than simply accumulating years of experience. When

examining the competency sub-dimensions, the highest-ranked domain was ethics and patient rights (M = 3.24, SD = 0.53). This can be attributed to by the fact that most participants had been instilled with ethical and moral principles during their undergraduate education and continued to uphold these values throughout professional practice. Ethical conduct and respect for patient rights are foundational components of nursing care. This finding aligns with a previous study by Juangpanich, Karomprat, Sripan, and Chaiyawong (2015), which also reported that registered nurses demonstrated the highest competency in the area of ethics and patient rights. High competency was also observed in the domains of patient preparation before, during, and after chemotherapy administration (M = 2.77, SD = 0.62), as well as in communication, teaching, and provision (M = 2.71, SD = 0.66). These competencies are crucial for ensuing patient safety and providing holistic care during the complex chemotherapy process. However, the domain of cancer knowledge and its impact received the lowest median score (M = 2.51, SD = 0.63).

This finding may be attributed to the limited formal training in oncology nursing among the participants, as only 14% reported having attended a specialized training course in cancer care. The inadequate scores in the cancer knowledge category may indicate deficiencies in the current training or educational preparation for oncology nurses. The lack of training is recognized as a contributing factor, and this conclusion underscores the necessity of rigorously evaluating the sufficiency of the existing curriculum and continuous professional development initiatives. This raises the question of whether curriculum revision is essential to improve core oncology knowledge or if current training programs necessitate a more thorough evaluation to confirm their efficacy in boosting nursing competencies. Solera-Gómez et al. (2022) examined the educational requirements in oncology nursing and identified four essential abilities for every oncology nurse: communication, coping, self-direction of learning, and technical health proficiency. This gap in knowledge may hinder nurses' ability to comprehensively address the needs of cancer patients. Tuominen, Leino-Kilpi, and Meretoja (2020) emphasized that patients with colon cancer undergoing chemotherapy require ongoing, systematic support from nurses. This support should include information about disease progression, treatment side effects, self-care strategies, emotional support, and the enhancement of hope.

2. The study found that the competency of nurses in caring for adult and older adult cancer patients undergoing chemotherapy at Vachira Phuket Hospital was significantly associated with work experience and participation in oncology-related training. Specifically, nursing experience demonstrated a moderate positive correlation with competency (r_s = .366, p < .001). This finding highlights the importance of clinical exposure in developing nursing skills and confidence in managing complex cancer situations. In addition, participation in training programs was strongly associated with higher competency levels. Ongoing professional development through structured training courses equips nurses with essential knowledge and updates clinical practices, enabling nurses to deliver more effective and comprehensive care. This is consistent with a study by Sato, Hayashi, Nakayama, and Okimura (2022), which found that knowledge and continuous training positively influenced nurses' ability to assess cancer cachexia in patients undergoing chemotherapy. Similarly, Al Qadire et al. (2023) reported that nurses with knowledge related to neutropenia management in chemotherapy patients demonstrated moderate levels of competency. These findings underscore the critical role of both experience and continued education in enhancing the quality of nursing care provided to cancer patients.

Research limitations
The limitation of this study was the relatively small sample size. Several registered nurses were unable to participate due to their involvement in concurrent training courses related to childbirth care. Additionally, participants were recruited from a single setting, which may restrict the generalizability of the findings to the broader population of oncology nurses.

CONCLUSION AND RECOMMENDATION
The competency of professional nurses in providing oncology care for adult and older adult patients plays a critical role in enhancing patients' quality of life. It is essential for nurses to continually cultivate and develop their nursing competencies, particularly in the context of chemotherapy care. Efforts should be made to strengthen knowledge related to

chemotherapy treatment, as this remains an area still presents opportunities for improvement. To support this improvement, nursing administrators should promote and facilitate ongoing professional education and training opportunities. Continuous learning is vital for maintaining high standards of care and ensuring that nurses remain updated on current best practices. Future research should focus on the development and evaluation of structured competency enhancement programs for oncology nurses. Additionally, further studies should explore other potential factors that influence nursing competency, such as institutional support, workload, and interdisciplinary collaboration.

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