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## **Nurse's knowledge toward oncology patients during chemotherapy management**

**Hasan H. Watheeq**

MSc Student, University of Kufa, Faculty of Nursing, Adult Nursing Department, Iraq

Corresponding author email: [hassinhaider300@gmail.com](mailto:hassinhaider300@gmail.com)

**Ibrahim A. Al-Ashour**

Assistant Professor, University of Kufa, Faculty of Nursing, Adult Nursing Department, Iraq

Email: <mailto:ibrahima.alashour@uokufa.edu.iq>

**Abstract**---Cancer is an international health problem with a growing occurrence. Chemotherapy is currently the standard of care for the majority of solid tumors and hematologic malignancies. Oncology nurses play a significant role in care delivery and patient education. Objective(s): This study aims at assessing the knowledge of nurses toward oncologic patients during chemotherapy management. In addition, to find out the relationship between nurses' knowledge and their demographic variables. Methodology: A descriptive cross-sectional quantitative study has been conducted for the period between the 1<sup>st</sup> of November 2021 and 1<sup>st</sup> of June 2022. A non-probability sampling technique (total purposive sampling method) is conducted on (47) nurses. A self-administrated questionnaire have been used for data collection in the current study, which has included two parts; the first part deals with the nurse's demographic information, and the second part includes the nurse's knowledge about the chemotherapy management. Results: The majority of nurses have a pass level of knowledge with a Significant association found between the knowledge of nurses and (level of education and training section). Conclusions: The study concluded that the nurses with higher education degrees are the ones who have the most essential knowledge of chemotherapy management. In addition, training courses have a positive effect on the knowledge level of nurses.

**Keywords**---knowledge, oncology patient, chemotherapy.

## Introduction

As a human, we are constituted of too many millions of cells. A few cells are specific to certain tissues, this group of cells amounts to about 70% of cancers. However, any cellular has the potential to go through malignant modifications and result in the development of a carcinoma <sup>(1)</sup>. Cancer is the world's second greatest cause of mortality, accounting for an estimated 9.6 million deaths, or one in every six, in 2018. Men are more likely to develop lung, prostate, colorectal, stomach, and liver cancers, whereas women are more likely to develop breast, colorectal, lung, cervical, and thyroid cancers <sup>(2)</sup>.

Cancer occurs when the body's normal regulation mechanism fails. Under normal circumstances, new cells form and replace old cells that have worn out or become damaged. Cancer develops when old cells do not die and instead proliferate uncontrollably, resulting in the formation of new, abnormal cells. These excess cells could form a mass of tissue known as a tumor <sup>(3,4,5)</sup>. Many cancer treatments and medications are already available, with many more being researched. Some therapies, such as surgery and radiation therapy, are "local," meaning they are intended to treat a specific tumor or region of the body. Because drug therapies (such as chemotherapy, immunotherapy, or targeted therapy) can influence the entire body, they are commonly referred to as "systemic" treatments <sup>(6)</sup>.

Oncology nurses play a significant role in care delivery and patient education on the need of recognizing and treating adverse reactions and the complexity of cancer therapy. Reduced risk through supportive care measures can enhance patient outcomes, quality of life, and cost for both the medical system and the patient <sup>(7)</sup>. Studies have demonstrated that nurses are involved in symptom evaluation, monitoring, and management during chemotherapy treatment, typically utilizing standardized check-lists in both adult and pediatric cancer patients <sup>(8,9,10)</sup>. Although practice requirements vary by province and territory, nurses who give chemotherapy must be specially trained on the protocols, administration, and potential side effects <sup>(11)</sup>. As a vital component of the multidisciplinary team, the nurse may carry out the agreed-upon strategy, assessing and adapting therapy as it advances. The nursing evaluation assesses the presence of toxicities and the necessity for management <sup>(12,13,14)</sup>.

## Methodology

A descriptive cross-sectional quantitative study has been conducted in Al-Najaf City/Al-Najaf Al-Ashraf Health Directorate / Middle Euphrates Cancer Center. A non-probability sampling technique (total purposive sampling method) is conducted on (47) nurses. The participant's data has been collected via the one-to-one contact that lasts from January 29, 2022, to February 10, 2022. The data is collected via the distribution of a constructed questionnaire (Arabic version) to study elements. The nurse's consent was verbally obtained after the object of participation has been clarified. A self-administrated questionnaire has been constructed for the study. It includes two parts. These parts are displayed as follows: Part I: Demographic Characteristics, This part consists of (5) items, which include: (age, gender, level of education, years of experience, and previous

training). Part II: Nurses' knowledge assessment questionnaire regarding the chemotherapy management. It is concerned with the assessment of the nurses' level of knowledge. It was constructed by the researcher based on reviewing scientific-related literature (Green, 2019; Midlands & Advisory, 2017; Neuss et al., 2017). the tool consists of 30 questions, in the form of multiple-choice questions (MCQs). The 30 questions are divided into 5 categories that assess the Knowledge of nurses regarding the nature of the work of chemotherapy (3 questions), side effects and complications of chemotherapy (7 questions), nursing care for patients receiving chemotherapy (8 questions), safe handling of Chemotherapy (9 questions) and dealing with chemotherapy emergencies during chemotherapy administration(3).

## Results

Table (1): The Distribution of Socio-Demographic Characteristic for Participants

Demographic	Responses	Frequency	%
Gender	Male	16	34.0
	Female	31	66.0
Level of Education	school nursing	10	21.3
	institute	10	21.3
	bachelors	27	57.4
Training Section	Yes	38	80.9
	No	9	19.1
Age Group	<= 22	2	4.3
	23 - 25	28	59.6
	26 - 28	14	29.8
	29+	3	6.4
	Mean± Std. Deviation	25.15±1.96	
Years of experience	<= 1	19	40.4
	2 - 5	25	53.2
	6+	3	6.4
	Mean± Std. Deviation	2.81±1.71	

A total of 47 nurses have been included in this study, their demographic data are presented in table (1). This table reveals that nearly two-thirds of the study sample are female (66%) and that their academic qualification is a bachelor's (57.4%), this table shows that the majority of nursing staff are previously got training courses. In addition, their ages have ranged from 23-25 (59.6%). Moreover, more than half (53.2%) of nurses have 2-5 years of experience.

Table (2): The Evaluation of Nurse's Knowledge toward oncology patients during chemotherapy management

items	response	F	%	MS	SD	R.S	Ass.
A major disadvantage of chemotherapy is that it:	False	7	14.9	1.8	0.36	92.5	Pas s
	True	40	85.1				
Nausea and vomiting are common	False	2	4.3	1.9	0.20	97.8	Pas

effects of radiation and chemotherapy, when should a nurse administer antiemetic?	True	45	95.7	6		7	s
A client complains about pain at the insertion site of an implanted venous port device during infusion of medication. Which is the most likely an explanation for this problem?	False	18	38.3	1.6	0.49	80.8	Pas s
	True	29	61.7	2			
Which assessment finding suggests the client has developed stomatitis (inflammation of the mouth)?	False	26	55.3	1.4	0.50	72.3	Fail
	True	21	44.7	5			
The nurse is caring for a patient receiving intravesical bladder chemotherapy. Which adverse effect should the nurse monitor?	False	4	8.5	1.9	0.28	95.7	Pas s
	True	43	91.5	1			
Which of the following statements are correct about using combination chemotherapy?	False	33	70.2	1.3	0.46	64.8	Fail
	True	14	29.8	0			
A client is receiving chemotherapy that has the potential to cause pulmonary Toxicity. Which of the following symptoms indicates a toxic response to the Chemotherapy?	False	7	14.9	1.8	0.36	92.5	Pas s
	True	40	85.1	5			
Chemotherapy problem, leakage of chemotherapy is:	False	16	34.0	1.6	0.48	82.9	Pas s
	True	31	66.0	6			
The nurse shows the client who is receiving chemotherapy and the family how to manage possible nausea and vomiting at home. The nurse should cover the information in relation to:	False	13	27.7	1.7	0.45	86.1	Pas s
	True	34	72.3	2			
The nurse observes white patches and ulcerations in a client's oral cavity. the client tells the nurse that the sores developed	False	15	31.9	1.6	0.47	84.0	Pas s
	True	32	68.1	8			

during chemotherapy treatment even though the client performed oral care regularly, the nurse suspects that the complication can be attributed to :							
Verbal chemotherapy orders from the physician are:	False	31	66.0	1.3	0.48	67.0	Fail
	True	16	34.0	4		2	
The nurse monitors the patient's condition when receiving chemotherapy, particularly monitoring:	False	6	12.8	1.8	0.34	93.6	Pass
	True	41	87.2	7		2	
The role of the nurse when giving chemotherapy is seen in:	False	7	14.9	1.8	0.36	92.5	Pass
	True	40	85.1	5		5	
Which of the following statements about giving chemotherapy after surgery is correct?	False	34	72.3	1.2	0.45	63.8	Fail
	True	13	27.7	8		3	
The type of IV fluid used to clean the vein before and after the chemotherapy:	False	5	10.6	1.8	0.31	94.6	Pass
	True	42	89.4	9		8	
Signs of severe hypersensitivity to the chemotherapy:	False	19	40.4	1.6	0.50	79.7	Pass
	True	28	59.6	0		9	
The Chemotherapy extravasation symptoms are:	False	16	34.0	1.6	0.48	82.9	Pass
	True	31	66.0	6		8	
When caring for a client with a central venous line, which of the following nursing actions should be implemented in the plan of caring for the chemotherapy administration?	False	4	8.5	1.9	0.28	95.7	Pass
	True	43	91.5	1		4	
Before giving the chemotherapy to the patient:	False	20	42.6	1.5	0.50	78.7	Pass
	True	27	57.4	7		2	
Before the initiation of each chemotherapy administration makes sure of:	False	5	10.6	1.8	0.31	94.6	Pass
	True	42	89.4	9		8	
Preferred types of gloves when administering chemotherapy are:	False	9	19.1	1.8	0.40	90.4	Pass
	True	38	80.9	1		3	
Documentation of the chemotherapy after administration makes sure of the:	False	10	21.3	1.7	0.41	89.3	Pass
	True	37	78.7	9		6	
All "soft" chemotherapy wastes (contaminated	False	15	31.9	1.6	0.47	84.0	Pass
	True	32	68.1	8		4	

gloves, gowns, etc.) Should be placed in:							
Pre-chemotherapy administration nurse's action.	False	27	57.4	1.4	0.50	71.2	Fail
	True	20	42.6	3		8	
When selecting venous access for peripheral chemotherapy administration you should avoid all the following except:	False	21	44.7	1.5	0.50	77.6	Pass
	True	26	55.3	5		6	
When administering the chemotherapy via the implanted ports be sure of all the following except :	False	30	63.8	1.3	0.49	68.0	Fail
	True	17	36.2	6		9	
Nursing activities of initial managing of the chemotherapy extravasation?	False	17	36.2	1.6	0.49	81.9	Pass
	True	30	63.8	4		1	
For managing anaphylaxis during chemotherapy administration, what are the initial nursing actions that are taken?	False	17	36.2	1.6	0.49	81.9	Pass
	True	30	63.8	4		1	
When cleaning chemotherapeutic spills, the nurse should wear:	False	10	21.3	1.7	0.41	89.3	Pass
	True	37	78.7	9		6	
Nurses' actions when contaminated with drugs.	False	19	40.4	1.6	0.50	79.7	Pass
	True	28	59.6	0		9	

Fail (mean of scores >1.5)), Pass (mean of scores 1.5 and more), RS: relative sufficiency, MS: mean of scores, SD: standard deviation, F: Frequency

Table (2) states that the nursing staff's knowledge toward oncology patients during chemotherapy management, which is fail in items number (4, 6, 11, 14, 24 and 26), and their knowledge level are pass in all remaining items.

Table (3): The Overall Evaluation of Nurse's Knowledge toward Oncology Patients during Chemotherapy Management

Overall Nurse's Knowledge	Statistics	F	%	MS	SD
	Fail	7	14.9%	1.67	0.15
	Pass	40	85.1%		

Fail (mean of scores >1.5)), Pass (mean of scores 1.5 and more), MS: mean of scores, SD: standard deviation, F: Frequency

Table (3) confirms that the overall Evaluation of Nurse's Knowledge toward Oncology Patients during Chemotherapy Management is a pass (85.1%).

Table (4): The Relationship between the Overall Nurse's Knowledge and their Gender

Response		Statistics	Overall Assessment			x <sup>2</sup>	P-Value
			Fail	Pass	Total		
Gender	Male	Frequency	3	13	16	0.285	0.594 NS
		percent	18.8%	81.3%	100%		
	Female	Frequency	4	27	31		
		percent	12.9%	87.1%	100%		
Total			7	40	47		

NS: not significant at P value > 0.05, x<sup>2</sup>: The chi-square

Table (4) presents the Relationship between the Overall Nurse's Knowledge and their Gender, in which the highest pass knowledge lies in females (87.1%), however, these results were statistically not significant.

Table (5): The Relationship between The Overall Nurse's Knowledge and their Level of education

Response		Statistics	Overall Assessment			x <sup>2</sup>	P-Value
			Fail	Pass	Total		
Level of education	School nursing	Frequency	4	6	10	7.845	0.02 S
		percent	40.0%	60.0%	100.0%		
	Institute	Frequency	2	8	10		
		percent	20.0%	80.0%	100.0%		
	Bachelors	Frequency	1	26	27		
		percent	3.7%	96.3%	100.0%		
Total			7	40	47		

S: Significant at P value ≤ 0.05, x<sup>2</sup>: The chi-square

Table (5) explains the relationship between the Overall Nurse's Knowledge and their Level of education, in which the highest pass knowledge was bachelor's (96.3%). however, the result was statistically significant.

Table (6): The Relationship between The Overall Nurses Knowledge and their Training section

Response		Statistics	Overall Assessment			x <sup>2</sup>	P-Value
			Fail	Pass	Total		
Training Section	Yes	Frequency	3	35	38	7.668	0.005 HS
		Percent	7.9%	92.1%	100.0%		
	No	Frequency	4	5	9		
		Percent	44.5%	55.5%	100.0%		
Total			7	40	47		

HS: high significant at P value ≤ 0.01, x<sup>2</sup>: The chi-square

Table (6) reveals the Relationship between the Overall Nurse's Knowledge and their Training section, in which the vast majority of nurses who have had training

courses were at a pass level of knowledge (92.1%). However, these results were statistically high significant.

Table (7): The Relationship between the Overall Nurse's Knowledge and their Age

Response		Statistics	Overall Assessment			x <sup>2</sup>	P-Value
			Fail	Pass	Total		
Age	<= 22	Frequency	0	2	2	1.073	0.783 NS
		Percent	0.0%	100.0%	100.0%		
	23 - 25	Frequency	5	23	28		
		Percent	17.9%	82.1%	100.0%		
	26 - 28	Frequency	2	12	14		
		Percent	14.3%	85.7%	100.0%		
	29+	Frequency	0	3	3		
		Percent	0.0%	100.0%	100.0%		
Total			7	40	47		

NS: not significant at P value > 0.05, x<sup>2</sup>: The chi-square

Table (7) shows the Relationship between the Overall Nurse's Knowledge and their Age. In which the majority of nurses who are at pass level of knowledge were in (23 – 25) age category.

Table (8): The Relationship between the Overall Nurse's Knowledge and their years of experience

Response		Statistics	Overall Assessment			x <sup>2</sup>	P-Value
			Fail	Pass	Total		
Years of experience	<= 1	Frequency	4	15	19	2.311	0.314 NS
		Percent	21.1%	78.9%	100.0%		
	2 - 5	Frequency	2	23	25		
		Percent	8.0%	92.0%	100.0%		
	6<=	Frequency	1	2	3		
		Percent	33.3%	66.7%	100.0%		
Total			7	40	47		

NS: not significant at P value > 0.05, x<sup>2</sup>: The chi-square

Table (8) illustrates the Relationship between the Overall Nurse's Knowledge and their years of experience. In which the highest pass level of knowledge was at 2-5 years of experiences (92%). However, these results were statistically not significant.



## Discussion

In the current study, there is a preponderance of females when it comes to gender, where females are more than half (66%). This outcome is consistent with the results of the study that is carried out in Greece, the study mentioned that the vast majority of nurses were female (93.5%)<sup>(18,19,20,21)</sup>. In terms of participant's level of education in the current study, more than half of nurses were bachelors (57.4%), the interpretation of this may be due to the increase in nursing colleges, as the past few years have witnessed an increase in private colleges and universities, from which a large number of nurses graduate annually. This finding is in concord with a study carried out in Jordan, that finds out that the vast majority of nurses were bachelor (91.9%)<sup>(22)</sup>.

Regarding the training section, in this study, the majority of nurses have been reported that they previously got training section (80.9 %) the current findings are in line with a descriptive type of study carried out in Turkey, those were found that nearly two-thirds ( 66.7%) of nurses got prior training on safety chemotherapy administration<sup>(23)</sup>. Moreover, in another study in Cairo- Egypt reported that the vast majority (92.7%) of nurses working in oncology wards had previously got training courses<sup>(24,25,26)</sup>.

Our findings indicate that a high percentage of both participants in the age categories (23-25) years old (59.6%). Perhaps because the older age groups are not willing to work in places that may be considered dangerous in terms of radiation and chemotherapeutic exposure. This finding corresponds to that by Choudhary that aimed to "explore the knowledge and attitude of staff nurses regarding the care of the patient undergoing chemotherapy treatment". He has noticed in his research that more than half (62%) of the study participants were between the ages of (21-25) years old<sup>(27)</sup>.

Regarding the years of experience, in the current study there are more than half (53.6%) of nurses have 2-5 years of services. This study is in agreement with a previous cross-sectional study that mentioned less than two-thirds (65.5%) of nurses those working in oncology units have less than five years of experience<sup>(28)</sup>. Furthermore, in 2016 one of the descriptive studies that concluded in turkey found that less than half (47.3%) of oncology nurses have 1-5 years of experience<sup>(23)</sup>.

In the current findings of the study, the majority of nurses have pass level of knowledge (85.1%) towards oncology patients during chemotherapy management with an overall mean (1.67). The study results are in agreement with what is done in Egypt, Entitled "Oncology Nurses' Knowledge and Practices regarding Safe Administration of Intravenous Chemotherapy" They stated in their research that the knowledge level of more than half (60%) of the studied nurses regarding safe administration of intravenous chemotherapy was good<sup>(29,30)</sup>. While a cross-sectional study conducted in Iran, aimed at "evaluating the knowledge, attitude, and practice (KAP) of oncology nurses towards the safe handling of ANPDs as well as determining the educational needs for the promotion of safe behaviors". they reported in their study adequate knowledge, attitude and practice scores<sup>(31)</sup>. Furthermore, In 2017, a cross-sectional descriptive study among oncology nurses

was conducted in Nigeria, entitled “ Knowledge of chemotherapy and occupational safety measures among nurses in oncology units” this study showed a good knowledge of chemotherapy among nurses <sup>(32)</sup> .

Regarding the relationship between nurse’s knowledge and gender. This study reveals that there is no statistical relationship between nurses’ knowledge about chemotherapy management and their gender at a p-value > 0.05. It may be due to the ease of obtaining information about chemotherapy management from various sources. The current study’s findings are similar to a descriptive study conducted in Egypt, the study reported that there was no association found between knowledge and selected demographic variables such as gender <sup>(30)</sup> .

Regarding the relationship between nurses’ knowledge and level of education. The study discover that there was a significant association between the knowledge of nurses about chemotherapy management and level of education (p=0.02). Nurses with bachelor's have the best knowledge compared to other groups, the explanation for this result may be because nurses with bachelor's degree have a higher awareness through their studies of chemotherapy. One of the previous studies found that there was a significant association between nurses’ knowledge of chemotherapy and level of education <sup>(32)</sup> . Furthermore, Habiba, Eldin, and Ibrahim stated in their study that nurses with bachelor degree received the higher mean percent score in their knowledge as compared to other qualification with a significant difference (P=0.001) <sup>(33)</sup> .

Regarding the relationship between nurse’s knowledge and training section. This study revealed that there was a highly significant association between the knowledge of nurses about chemotherapy management and the training section at a p-value =0.005. Nurses who are involved in nursing education courses have the strongest knowledge probably due to the continuing nursing education courses having a positive effect from a scientific point of view for nurses by relying on sober scientific sources. Results of the current study are in correspondence with the study finding done by khan, khawaja, and ali in Pakistan, their study findings indicates that there was a statistically significant association between the knowledge of nurses and the training section (p-value < 0.001) <sup>(34)</sup> . Along the same line, one of the a cross-sectional descriptive study, aimed to investigate oncology nurses' knowledge about handling and administering hazardous drugs, reported that nurses who received previous training scored higher in the knowledge than those who did not (p= 0.046) (Habiba, Eldin, and Ibrahim, 2018). furthermore, in Ethiopia a study finds out that nurses who received training were more likely to have good knowledge about chemotherapy than those not (p= 0.001) <sup>(35)</sup> .

Regarding the relationship between nurse’s knowledge and age. This study discovered that there is no statistically significant difference between the knowledge of nurses about chemotherapy management and their age at a p-value > 0.05. This result goes along with the one of the previous studies that found no statistically significant correlation between knowledge of nurses and their ages <sup>(36)</sup> . Also, in a cross-sectional study in Jordan carried out by al qadire and alkhalailah, they mentioned in their study that there is no connection between nurses’ knowledge and age <sup>(37)</sup> . An additional study aimed to “evaluate the

knowledge, attitude, and performance of oncology nurses”, they find out in their study that there is no statistically significant relationship between the knowledge of nurses and their age <sup>(38)</sup> .

Regarding the relationship between nurses' knowledge and their years of experience. The current study shows that there was no statistically significant association between the knowledge of nurses about chemotherapy management and their years of experience at a p-value > 0.05. This may be because of the ease of obtaining information from various sources and the availability of educational courses within the oncology center. This result is along with that the study carried out in Baghdad, the study mentioned that there was no statistical significance connection between knowledge of nurses and years of experience in the oncology unit <sup>(39)</sup> . In addition, in a previous cross-sectional study was carried out to assess “knowledge and practices of safe handling of CDs in selected tertiary teaching hospitals in Ethiopia”, find out that there was no significant association between knowledge of nurses and years of experience <sup>(40)</sup> .

### **Conclusions**

1. Almost two-thirds of the nurses at the Oncology Center were female with a bachelor's degree.
2. The majority of nurses have a passing level of knowledge.
3. Nurses with higher education degrees are the ones who have the most essential knowledge of chemotherapy management.
4. Training courses have a positive effect on the knowledge level of nurses

### **Recommendations**

1. Before and in-service training courses in oncology settings must be created to enhance nurses' practice related to chemotherapy management in order to increase knowledge and chemotherapy management practices and prevent the adverse effects of these medications among nurses.
2. Provision of standards or guide book and procedure manuals on chemotherapy management at oncology units is mandatory to guide nurses in dealing with cytotoxic drugs.

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