NURSES' KNOWLEDGE AND ADHERENCE TO CLINICAL PRACTICE GUIDELINE TO PREVENT EXTRAVASATION OF CHEMOTHERAPY IN ERBIL CITY

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ABSTRACT

Background

Knowledge is the cornerstone of providing safe nursing care. However, to do so, they require access to the most recent clinical information and guidance.

Objectives

This study aimed to determine the nurses' knowledge and adherence to clinical practice guidelines to prevent chemotherapy-related extravasation

Materials and Methods

Descriptive cross-sectional design was used, 70 oncology nurses who administer chemotherapeutic drugs were selected in both Rizgary Teaching Hospital and Nanakaly Hospital for blood disease in Erbil City, from June 2022 to May 2023, data was collected through a structured interview questionnaire consisting of demographic data of nurses, knowledge about extravasation of chemotherapy, adherence to clinical practical guideline and barrier adherence to clinical practical guideline, data analyzed by using mean, standard deviation, frequency, percentage, Chi-square and binary logistic regression were used to find out the result of the study, and, a p-value less than 0.05 is considered significant.

Results

Concerning the overall level of knowledge of oncology nurses 55.7% had inadequate knowledge, 61.4% of them had low adherence to clinical practice guidelines, and the factors associated with low adherence to clinical practice guidelines was lower level of education (P-value=0.007, OR= 0.63), inadequate knowledge, (P-value= 0.041, OR=6.48), and high perceived barrier (P-value=0.004, OR= 9.87), the most commonly reported barriers was lack of continuing education to update nursing information and poor applicability of clinical practice guideline in real-world practice.

Conclusion

The clinical practice guideline adherence rate of nurses concerning chemotherapy administration was low because most oncology nurses had inadequate knowledge and high perceived barriers consequently the study highlighted the significance of continuing education to maintain oncology nursing staff with the updated evidence-based guidelines.

Keywords: *Oncology nurse, Knowledge, Clinical practice guideline, Chemotherapy-related-extravasation* .

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INTRODUCTION

Cancer is one of the most deadly and life-threatening diseases that may strike anybody, anywhere in the world. More than 14 million individuals have been diagnosed with cancer, which is expected to rise by at least 70% over the next ten years [1]. Cancer incidence is expected to climb further in the next decades. Chemotherapy administration is the primary and most commonly utilized therapeutic approach. Every day healthcare professionals provide almost one million chemotherapy injections across the world [2]. Because there is no centralized registry of chemotherapy extravasation occurrences and there is significant underreporting of chemotherapy extravasation incidents, the exact incidence of chemotherapy extravasation varies greatly from case to case.

Chemotherapy extravasation still occurs at a rate ranging from 0.1% to 6% when administered by peripheral intravenous access, even though centre-based guidelines and policies aim to reduce its risk. When evidence is available, institution-based guidelines should be based on it; nevertheless, when these guidelines do exist [3], they are usually vague and non-specific. Chemotherapy can have a significant impact, but it also has the potential to cause a variety of adverse effects, some of which may influence the treatment plan, prognosis, and the patient's response to the treatment [4]. Extravasation is the unintentional administration of intravenous vesicant solution chemotherapy into tissues other than the vascular route [5].

Extravasation treatment includes non-pharmacological measures such as elevating the affected extremity and applying cold or warm compression, as well as medication measures such as antidotes, local anti-inflammatory drugs in inflammation, and pain management [6]. Non-pharmacological treatment involves opening or withdrawing the catheter from the affected extremity. Extravasation leads patients to spend extra time in the hospital, conduct unnecessary diagnostic procedures, receive unnecessary therapy, feel stress, and jeopardize their lives. The increased use of chemotherapy as a cancer treatment has increased the health dangers encountered by nurses who handle and administer chemotherapy. As a result, medical practitioners in charge of managing intravenous applications must be aware of the medications that might induce tissue harm and take the required measures [7].

To limit the possibility of suffering further bad effects from the treatment, every effort must be taken to reduce the number of complications that emerge during chemotherapy administration. This study includes clinical information on chemotherapy extravasation and addresses preventative and treatment measures.

To lower the chance of chemotherapy-related extravasation as a side effect, as well as detect and prevent its development, all oncology nurses must be knowledgeable about extravasation risk factors, treatment, and prevention techniques. The objective of this study is to determine nurses' knowledge and adherence to anticancer drug guidelines of extravasation of chemotherapy in Erbil City

METHODS

A descriptive cross-sectional study design was used to assess nurses' knowledge regarding the management of extravasation of chemotherapeutic drugs in oncology units at both Rizgary Teaching Hospital and Nanakaly Hospital for blood disease in Erbil City, from June 2022 to March 2023, before data collection, ethical approval was granted from the College of Nursing for the conducted of the study. A purposive sampling technique was used to recruit 70 nurses based on sample size estimation [8], the researchers explained the study purpose and the privacy of participants' information was confident. The participants who met the inclusion criteria included those working with cancer patients, and administering chemotherapy.

Data was collected through a structured interview questionnaire consisting of demographic data related to the participant's age, gender, educational level, years of experience, and training course and the second section is related to knowledge created by the authors to assess the oncology nurses' knowledge about extravasation of chemotherapy, signs and symptoms, risk factors, preventive measures and management.

Thirty-six -questions were developed for a correct response with one score and an incorrect response with zero scores. The questions were specific and related to chemotherapy extravasation. The questions related to knowledge included definition (6 items), signs and symptoms (6 items), risk factors (6 items), treatment (6 items), and prevention (6 items). The total score was 36 score, a score equal to and below half is considered inadequate, and a score of more than half was considered adequate [9]. Adherence to clinical practice guidelines was adapted from a previously validated survey tool from European Oncology Nursing Society extravasation guidelines [10], which was constructed to reflect the observable behaviours associated with best

practices to prevent extravasation of chemotherapy, all items on the observational schedule were "Yes" scored one was given for satisfactory performance, and "No" score zero was given for unsatisfactory performance.

High observation scores represented closer adherence to recommended best practice guidelines. The lower score represented low adherence to clinical practice guidelines. Another part of the questionnaire consisted of 8 items about barriers facing nurses for the safe administration of cytotoxic chemotherapy drugs, response options (Yes =1 score) and (No= 0 score) summing responses to all items formed a summary score; higher scores correspond to perceive more barriers [(11)].

A statistical package for social sciences (SPSS version 27) was used to analyse the study. Data were presented as descriptive statistics of frequency and percentage for categorical variables and Chi-square to find out the association between adherence to clinical practice guidelines and variables of the study, Binary logistic regression analysis was used to find and predict the factors influencing the adherence to anticancer drug clinical practice guidelines, P- value <0.05 was considered statistically significant.

RESULTS

Among the total of 75 nurses, 58.6% were male and 41.4% were female, the age ranging from 25 to 45 years, with a mean age of 31.76 (SD = 6.69). Regarding the professional category, it was observed that 81.4% of the participants graduated from the institute, 65.7 % of nurses reported less than 10 years of experience in oncology hospitals, and 61.4% reported hadn't previously participated in training courses.

Concerning the overall level of knowledge, 55.7% had inadequate knowledge, 61.4% of the nurses had low adherence to the clinical practice guideline and 67.1% of nurses perceived more barriers to applying clinical practice guidelines to prevent extravasation of chemotherapy. Moreover, it has been found that there was a significant association between nurse's low adherence to clinical practice guidelines and age groups less than 30 years (p=0.002), male gender (p=0.016), who graduated from the institute (p=0.012), experience less than 10 years (p=0.001), no participation in training course previously (p=0.005), inadequate knowledge (p=0.001), and high perceived barrier (p=0.001) as shown in Table 1.

Figure 1 shows that 84.6% of nurses had inadequate knowledge and 76.6% of nurses perceived high barriers which were significantly associated with low adherence to clinical practice guidelines.

Table 2. shows oncology nurses' knowledge regarding chemotherapy-related-extravasation, more than half the percentage had adequate knowledge regarding the definition, signs and symptoms, complications and prevention while more than half the percentage of their knowledge regarding risk factors and treatment was inadequate.

Table 3 shows that the highest percentage 81.4% of the participants were adherent to clinical practice guidelines in the item "stop and disconnect infusion" while 32.9 % percentage of the participants were low adherence to clinical practical guidelines in the item "elevate the limb with the extravasation site". generally, the results presented that 61.4% of nurses had low adherence to the clinical practice guideline while 38.6% had high adherence to the clinical practice guideline

Table 4. Revealed barriers facing nurses during the administration of chemotherapy, lack of continuing education to update nursing information was the most reported barrier by the nurses 72.9% and poor applicability of CPGS in real-world practice ranked as a second barrier 68.6%.

Finally, the results showed that 67.1% of the participants identified crowdedness of patients in the drug administration room. A logistic regression model was constructed to determine the association between selected predictor variables and low adherence to clinical practice guidelines as shown in Table 5.

Variables chosen in the model were based on the bivariate analysis. Age (year) less than 30, male, who graduated from the institute, total hospital experience less than 10 years, not participated in the training course, inadequate knowledge, and high perceived barrier were put into the model. Model fit was measured by the likelihood ratio statistic ($\chi 2$= 5.12, p=0.024) and the Hosmer and Leme show test ($\chi 2$= 10.90, p=0.143), the variability observed in the target variable is explained by the regression mode was R2 = 45.7%.

The following variables were associated with low adherence to clinical practice guidelines: lower level of education (P-value=0.007, OR= 0.63), inadequate knowledge, (P-value= 0.041, OR=6.48), and high perceived barrier (P-value=0.004, OR=9.48) respectively.

Table 1. Association between adherence to guidelines and variables of the study.

Variables		Adherence to guideline Low N(%)	High N(%)	Total N(%)	P-value
Age group/ (year)	<30	22(84.6)	4(15.4)	26(37.1)	0.002
	≥30	21(47.7)	23(52.3)	44(62.9)	
Gender	Male	30(73.2)	11(26.8)	41(58.6)	0.016
	Female	13(44.8)	16(55.2)	29(41.4)	
Academic qualification	Diploma	39(68.4)	18(31.6)	57(81.4)	0.012
	Bachelor	4(30.8)	9(69.2)	13(18.6)	
Year of experience	<10	28(90.3)	3(9.7)	31(44.3)	0.001
	>10	15(38.5)	24(61.5)	39(55.7)	
Training courses	No	32(74.4)	11(25.6)	43(61.4)	0.005
	Yes	11(40.7)	16(59.3)	27(38.6)	
Overall knowledge	Inadequate	33 (84.6)	6(15.4)	39(55.7)	0.001
	Adequate	10(32.3)	21(67.7)	31(44.3)	
Perceived barrier	Low	7(30.4)	16(69.6)	23(32.9)	0.001
	High	36(76.6)	11(23.4)	47(67.1)	

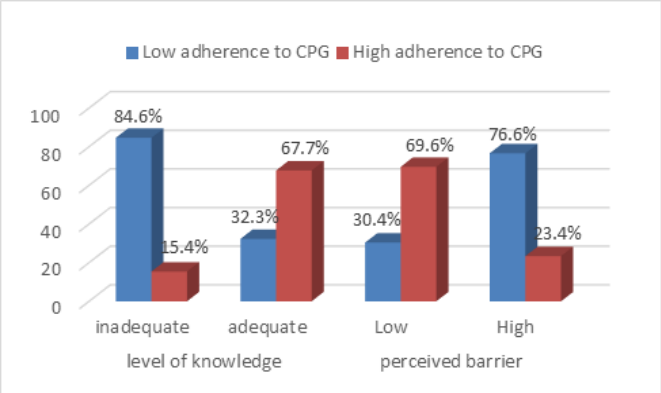

Figure 1. Percentage of adherence to clinical practice guideline (CPG) with nurse's knowledge and perceived Barriers.

Table 2. Nurses' Knowledge of chemotherapy-related extravasation.

Domains of knowledge	Mean	SD	Inadequate knowledge N(%)	Adequate knowledge N(%)
Definition	3.85	1.89	27(38.6)	43(61.4)
Signs and symptoms	3.08	1.86	28(40.0)	42(60.0)
Risk factors	2.91	2.22	37(52.9)	33(47.1)
Complications	3.10	1.48	30(42.9)	40(57.1)
Treatment	2.77	1.73	46(65.7)	24(34.3)
Prevention	3.01	1.82	25(35.7)	45(64.3)

Table 3. Nurse's Adherence to clinical practical guideline.

Items	N (%)
-Stop and disconnect infusion	57(81.4)
-Avoid manual pressure over the extravasated area	26(37.1)
-Aspirate as much extravasated solution with a 10 ml syringe	24(34.3)
-Remove the cannula and mark the affected area	31(44.3)
-Given hyaluronidase in one hour	27(38.6)
-Cover with a sterile gauze dressing	34(48.6)
-Elevate the limb with the extravasation site	23(32.9)
-Administer pain relief (systemic/topical)	29(41.4)

Table 4. Barriers to adherence to clinical practical guideline.

Items	N (%)
-Inadequate nurse staffing to an increased number of patients	41(58.6)
-Crowdedness of patients in the drug administration room	47(67.1)
-Time constraints	39(55.7)
- lack of facilities	37(52.9)
-Poor motivations	40(57.1)
-The hospital routine is easy and not disabling	43(57.3)
-Poor applicability of CPG in real-world practice	48(68.6)
-Lack of continuing education to update nursing information	51(72.9)

Table 5. Factors associated with low adherence to clinical practice guideline.

Variables		P-value	OR	95% CI	
				Lower	Upper
Age/Year	<30 ≥30	0.831	0.80 Ref.	0.10	6.06
Gender	Male Female	0.118	7.03 Ref.	0.61	41.0
Education	Diploma Bachler	0.007	0.63 Ref.	2.15	73.6
Experience	<10/years ≥ 10/ years	0.099	0.14 Ref.	0.01	1.44
Training course	No Yes	0.357	0.49 Ref.	0.11	2.21
Knowledge	Adequate Inadequate	0.041	Ref. 6.48	1.36	71.7
Perceived Barrier	High Low	0.004	9.87 Ref.	1.07	39.1

DISCUSSION

The oncology nurse's role includes assessing chemotherapy administration, reducing the likelihood of issues, and eliminating them. The patient's well-being should be prioritized in all parts of nursing practice. The nurses must have an adequate level of knowledge and practice in line with the most recent evidence-based standards [12]. The study found that more than half per cent of the participants were male, with ages ranging from 25 to 45 years old and a mean age of 31.76 years (standard deviation = 6.69 years) and it was observed that almost one-fifth of the participants graduated from college, it disagrees with the study mentioned that most of the participants were educated to at least a bachelor's degree level, other study shows all nurses were female their age 20-25 years old [13, 14].

In this study concerning years of experience in oncology hospitals, more than half of nurses reported more than 10 years, as agreed by a study in Baghdad, most of the study sample has 10 years of experience [15]. Moreover, in this study, 61.4 % of nurses did not participate in training on chemotherapy treatment, which agrees with the study showed nearly three-fifths of the oncology nurses had no participation in training courses [11], while disagrees with the study that showed 78% of nurses have participated in training [16].

In this study, nurses had adequate knowledge regarding definitions, signs, symptoms, complications and prevention, while inadequate knowledge regarding risk factors and treatment, this finding is comparable with a cross-sectional study conducted on 21 nurses in extravasation of antineoplastic chemotherapeutic drugs in Brazil revealed that the nurses had sufficient knowledge about risk factors, prevention, identification of signs and symptoms of occurrence of extravasation by chemotherapeutic drugs, overall knowledge was inadequate knowledge [17]. A descriptive research conducted in Turkey by Kosgeroglu et al. who revealed that nurses' understanding of chemotherapy delivery was insufficient [18].

Another research, conducted at Baghdad's Amal National Hospital, discovered that 51.1% of nurses had strong expertise, while 48.9% had low understanding. According to the findings of this survey, 55.7% of nurses had insufficient experience [19]. In this study, 61.4% of nurses had low adherence to the clinical practice guideline, while a study done in Korea showed the guideline adherence rate was >70% (20). Moreover, in this study, 67.1% of nurses perceived more barriers to applying clinical practice guidelines to prevent chemotherapy extravasation. Oncology nurses must continue their education to safely deliver chemotherapy while avoiding side effects such as extravasation [21, 22].

In the current study, findings reported that the highest percentage (72.9%) of the nurses had a lack of continuing education to update nursing information which was supported by research published by Khan et al showed that cancer nurses have limited knowledge and competence [23]. In this study, there was a significant association between nurses' knowledge regarding the extravasation of chemotherapy and adherence to clinical practice guidelines to prevent extravasation. Alarmingly nurses play an important role during chemotherapy administration, patient safety is the ultimate goal and part of daily nursing practices. To have a safe environment and practice safely, nurses must have an adequate level of knowledge and practice within recent evidence-based guidelines [24].

In conclusion , the guideline adherence rate of nurses concerning chemotherapy administration was low; more than half of them had inadequate knowledge and the most of nurses perceived more barriers to applying clinical practice guidelines to prevent extravasation of chemotherapy. Continued education, workshops and training courses should be conducted for oncology nurses to increase their knowledge and reinforce their competencies.

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