

Oncology Nursing Staff Knowledge and Practice Behaviors Toward Chemotherapy Impact on Peripheral Neuropathy: A Study from North of Iraq

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ABSTRACT

Background: Chemotherapy-induced peripheral neuropathy (CIPN) is still one of the most significant and difficult symptoms that oncology nurses face when caring for patients undergoing neurotoxic chemotherapy. The purpose of this research was to assess the nurses' knowledge and practice behaviors toward chemotherapy impact on peripheral neuropathy, as well as find the correlation between nurse's knowledge, practice behaviors regarding CIPN with socio-demographical characteristics.

Methodology: A descriptive, non-probability (purposive sample) was conducted on nursing staff (194) working in four oncology centers in four governorates in the North of Iraq for the period from 15th January 2021 to 20th May 2021 To collect the data, an assessment questionnaire was created. The data were prepared, organized and entered into the computer file; Statistical Package for Social Science (SPSS) (23 version) At (P. value 0.05), was employed for data analysis. The descriptive data analysis (frequencies, percentages, X², and spearman's correlation) is included in the data.

Results: The results revealed that (31.4 percent) of the sample was between the ages of (25-29 years) and that (52.1 percent) of the sample was male. The nursing staff's knowledge and practice habits were both modest. No statistical significance was found between nurses' knowledge and demographic characteristics except for years of experience at $P \leq 0.05$ as well as for the practice, with the exception of marital status and cancer patient care training course, at $P \leq 0.05$.

Conclusion and Recommendation: Despite the nurses' moderate knowledge and practice behaviors, a substantial positive connection was discovered between knowledge and practice level of nursing staff regarding chemotherapy influence on peripheral neuropathy. Giving oncology nurses confidence as well as giving pamphlets that are easily accessible on how to assess and care for patients undergoing chemotherapy for peripheral neuropathy.

Keywords: Chemotherapy induced peripheral neuropathy, Multifactorial pathology, Chronic degenerative illness

INTRODUCTION

Cancer is seen as a serious public health issue in both developed and developing nations. It is viewed as a Multifactorial pathology and is categorized as a chronic degenerative illness that affects thousands of individuals each year¹. Cancer therapies that are now in use include surgery, radiation, and chemotherapy. New therapy strategies have been developed, such as targeted drugs that target only cancer cells. Chemotherapy is the use of chemical compounds to treat diseases that impact distinct phases of the cell cycle, either alone or in conjunction with other treatments. Systemically, the disease^{2,3}. Chemotherapy-induced peripheral neuropathy (CIPN) is a crippling side effect of neurotoxic chemotherapy medications. One-third of all chemotherapy patients are thought to acquire CIPN, with one-third progressing to irreversible neuropathy. Patients with mild to severe CIPN say their quality of life has deteriorated. Chronic discomfort and impairments in physical abilities to perform routine daily duties, which might be temporary or permanent. Furthermore, CIPN might result in a dosage decrease or even therapy discontinuation, which can have a negative influence on illness outcomes⁴. The prevalence of CIPN in cancer patients is estimated to be around 38%, depending on the length of exposure and the use of common chemotherapeutic drugs

such as platinum-based compounds, plant alkaloids, taxanes, and bortezomib⁵. Chemotherapy often kills both cancer and non-cancerous cells because both types of cells (cancer and non-cancerous cells) go through the same stages of the cell cycle. Aberrant cell proliferation occurs in neoplastic cells, allowing the tumor to proliferate. Some chemotherapeutic medications are meant to act particularly on the cell cycle division phase, reducing or stopping cell division and growth, but they may also kill cells that have already divided. As a result, the sooner these medications are taken, the better. It is now widely accepted that cancers that are rapidly growing are more susceptible to pharmaceutical activity, resulting in cell death due to the huge number of cells that are proliferating⁶. Chemo Peripheral Neurotoxicity (CIPN) is a prevalent, possibly fatal, and dose-limiting side effect of cancer therapy. Despite its clinical importance, which limits the use of various antineoplastic treatments and even the future development of novel anticancer drugs, several essential elements of CIPN remain unanswered, one of which is how to measure its prevalence and severity in the most effective and trustworthy manner⁷. The most prevalent symptom of CIPN is sensory impairment, however it can also affect motor abilities and the autonomic nervous system. Patients with CIPN may have tingling, numbness, cramping, and aching or burning sensation in their hands and feet, which can make ordinary actions like buttoning clothes, using

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a pen, opening a jar or container, or standing, walking, or mounting stairs difficult⁸. CIPN is caused by a combination of factors including cycle dosage, cumulative dose, treatment strategy, duration of infusion, administration of other chemotherapeutics, Comorbidities and pre-existing peripheral neuropathy. The majority of people's neuropathy cures in 46 months, but it's often permanent in those (about 60%) who still have symptoms after 6 months. Despite the positive results of multiple studies, there is still no consensus on how to avoid CIPN⁹. Controlling pain, minimizing the progression of this side effect, and ensuring patient safety are all part of the treatment for CIPN. One of the many challenges that a cancer patient faces is CIPN, which is one of the least understood but most life-altering. It has the potential to have a big influence on patients' quality of life, especially if they are already struggling with a host of other concerns as a result of their cancer diagnosis. The pain and dysfunction produced by CIPN can affect a patient's life in a variety of ways, ranging from "basic" activities like buttoning a shirt or opening a jar to discomfort that affects practically every daily activity and interferes with sleep. Understanding the presenting symptoms, risk factors, and evidence-based management of CIPN is crucial for nurses¹⁰⁻¹². Nurses in hospitals are particularly vulnerable when preparing and administering CDs. As a result, there is a strong need to educate nurses with knowledge regarding potential toxins and protective measures⁷. According to the researcher's understanding, there is a lack of research in our nation investigating nurses' knowledge and practice habits linked to CIPN, therefore this study intended to: To examine oncology nurses' knowledge, practice habits, and socio-demographic factors related chemotherapy-induced peripheral neuropathy and determine the relationship between oncology nurses' knowledge and practice habits about chemotherapy-induced peripheral neuropathy.

MATERIALS AND METHOD

In order to fulfil the current study's aims, a descriptive study was conducted from 14th December 2020 to 20th September 2021. The research was carried out in four oncology facilities in four governorates in northern Iraq: Kirkuk, Mosul, Erbil, and Sulaymaniyah. A non-probability (purposive sample) of 94 nurses was divided across four oncology facilities in four governorates, as follows: Kirkuk (64), Mosul (70), Erbil (17), and Sulaymaniyah (43) nurses. The researcher created the study instrument (questionnaire) to collect data. The first section dealt with socio-demographic characteristics such as age, gender, marital status, level of education, years of experience as a nurse, years of experience in cancer centers, oncology patients care training course, and chemotherapy training course. The second section consisted of six multiple-choice questions and ten (dichotomous, Yes or No) questions designed to test the sample's knowledge of the impact of chemotherapy on peripheral neuropathy. A correct response received a score of 2, while an incorrect answer received a score of 1. The final section includes three sub-items to assess practice behaviors toward CIPN impact on peripheral neuropathy, which include eleven questions (to check how frequently the nurse does each of the following in her practice, five questions for (how frequently the nurse collects the following patient's information, and eighteen questions (when the nurse assesses the ongoing CIPN (how frequently the nurse assesses the following patient's information) (sensation, vibration, muscle tone, reflexes, temperature). A four-point Likert scale was employed, with (4) representing always, (3) representing frequently, (2) representing rarely, and (1) representing never. The validity of the questionnaire was evaluated by experts in the area, and certain items were adjusted based on their comments and suggestions; all expert opinions were taken into account, the data collection process was performed from period from 15th January 2021 to 20th May 2021. The data has been processed, structured, and entered into a computer file; for data analysis, the

Statistical Package for Social Science (SPSS) (23 version) is employed at (P. value 0.05). Data analysis that covers frequency, percentages, X2 and Spearman's correlation.

RESULTS

According to the findings, 31.4 percent of the research group were between the ages of 25 and 29, with 52.1 percent of them being male. In terms of marital status, 64.4 percent of the sample was married.

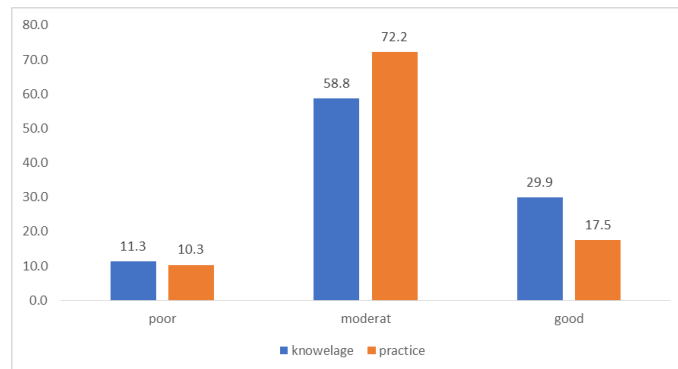


Figure 1: Level of Nursing staff knowledge and practice behaviours toward chemotherapy impact on peripheral neuropathy (N=194)

DISCUSSION

This study was initiated in response to the significant negative impact of CIPN on the daily lives of patients with diverse cancer diagnoses, as well as the lack of a standardized strategy among oncology nurses for dealing with patients who receive neurotoxic medications. This study could confirm that cancer nurses have CIPN knowledge, practice habits, and confidence gaps. These deficits have a negative influence on patient outcomes, physical function, and enjoyment of life in patients with CIPN if they are not corrected. Also, table 1 shows that a high percentage of residents are between the ages of 20 and 29, which is similar to the findings of (Younis et al., 2021; Ahmed et al., 2020) who found the same mean age^{13,14}. According to the demographic variables, the bulk of the participants in study^{15,16} were female. The research's findings are shown in table (1), which shows the socio-demographic characteristics of the entire study group. The statistics reveal a significant percentage of nurses between the ages of 30 and 34, accounting for 21.1 percent of the total. This finding was consistent with the findings of a study conducted by Qalawa and colleagues (2017), who investigated the relationship between oncology nurses' KAP regarding chemotherapy-induced peripheral neuropathy and discovered that 60% of nurses were between the ages of 30 and 42, and that 52.1 percent of the total sample was female. The interpretation of these findings is related to the admissions method in nursing colleges and institutions, where females account for 75% of the total. As a result, we discovered that women outnumbered males in terms of marital status, with a significant percentage of the sample being married and constituting (64.4 percent) (17) Also, according to the findings of a study conducted by Qalawa and colleagues (2017), who investigated the relationship between oncology nurses' practice behaviors, knowledge, and confidence regarding chemotherapy-induced peripheral neuropathy, 80.0 percent of them were females and married, and 44.8 percent of the sample graduated from a medical institute¹⁷. The findings of a research done by Al-Atiyya and Banifawaz (2018). In terms of educational attainment, the majority of respondents held a Bachelor's degree or above (91.9 percent). In terms of years of experience as nurses, 30.9 percent of nurses worked between (1-4) years as nurses, whereas 32.0 percent of nurses worked in an oncology unit between 1-4 years. This finding is consistent with the findings of a

Table 1: Association between level of knowledge and certain demographic data (N=194)

Variables	Total	Poor knowledge N(%)	Moderate Knowledge N(%)	Good Knowledge N(%)	P
Age					
20-24 Y	35	5(14.3)	22(62.9)	8(22.9)	.239
25-29 Y	61	6(9.8)	31(50.8)	24(39.3)	
30-34 Y	41	3(7.3)	23(56.1)	15(36.6)	
35-39 Y	31	3(9.7)	20(64.5)	8(25.8)	
40 years and more	26	5(19.2)	18(69.2)	3(11.5)	
Gender					
Male	101	15(14.9)	59(58.4)	27(26.7)	.223
Female	93	7(7.5)	55(59.1)	31(33.3)	
Marital status					
Single	52	4(7.7)	30(57.7)	18(34.6)	.226
Married	125	14(11.2)	74(59.2)	37(29.6)	
Divorced	10	1(10.0)	6(60.0)	3(30.0)	
Widow	7	3(42.9)	4(57.1)	0(0.0)	
Educational levels					
Secondary nursing school graduate	44	4(9.1)	27(61.4)	13(29.5)	.806
medical institute graduate	87	9(10.3)	54(62.1)	24(27.6)	
College of nursing graduate	56	9(16.1)	29(51.8)	18(32.1)	
post graduate (MSC, PHD)	7	0(0.0)	4(57.1)	3(42.9)	
Years of Experience as Nurses					
less than 1 years	35	4(11.4)	24(68.6)	7(20.0)	.014
1-4 years	60	5(8.3)	36(60.0)	19(31.7)	
5-9 years	51	3(5.9)	24(47.1)	24(47.1)	
10 and above	48	10(20.8)	30(62.5)	8(16.7)	
Years of experience In Oncology center					
less than 1 years	60	5(8.3)	36(60.0)	19(31.7)	.308
1-4 years	62	8(12.9)	36(58.1)	18(29.0)	
5-9 years	46	3(6.5)	26(56.5)	17(37.0)	
10 and above	26	6(23.1)	16(61.5)	4(15.4)	
Oncology Patients care training Course					
No	96	13(13.5)	58(60.4)	25(26.0)	.419
Yes	98	9(9.2)	56(57.1)	33(33.7)	
Chemotherapy Training Course					
No	102	14(13.7)	60(58.8)	28(27.5)	.447
Yes	92	8(8.7)	54(58.7)	30(32.6)	

No statistical significance between nurses' knowledge and demographic characteristics except for Years of experience as nurses at $P \leq 0.05$ level, Table (1)

research done by Al-Atiyya and Banifawaz (2018), who discovered that nursing experience ranged from 1-26 years, with particular expertise in cancer nursing ranging from (2-17) years. In terms of Oncology Patients Care Training Course, 50.5 percent of the sample has training course, and 52.6 percent has Chemotherapy Training Course. Finally, the majority of the nurses were from Mosul hospitals and constitute (36.1 percent). The interpretation of this finding is connected to the number of years of nurses' experience at the oncology unit, where the majority of nurses engage in training courses¹⁸. Also, at the P0.05 level, the results reveal that there is no statistical significance between nurses' knowledge and demographic factors, with the exception of years of experience as nurses (1). According to the findings of the current study (Qalawa and others 2017), there are statistically significant relationships between oncology nurses' knowledge and demographic data such as years of experience, a positive correlation between nurses' knowledge and practice, a negative correlation between knowledge and confidence but it did not reach a significant level, and there were (18).

Also, at the P0.05 level, there is no statistical significance between nurses' practice and demographic factors, with the exception of marital status and Oncology Patients Care Training Course (2). Miltenburg and Boogerd's study found no statistically significant relationship between practice and socio demographic data except in the areas of evaluation of fine motor skills, documentation of CIPN assessment data, and CIPN assessment prior to each neurotoxic chemotherapy injection⁹. The outcome also demonstrates As with knowledge, there was a substantial positive connection between practice and knowledge. Increase nursing staff knowledge and practice level about chemotherapy's influence on peripheral neuropathy. According to the findings of the current study, there were no statistically significant relationships between oncology nurses' knowledge and practice behaviors and confidence, there was a positive correlation between nurses' knowledge and practice, and there was a negative correlation between knowledge and confidence but it did not reach a significant level (13). Figure 1 depicts Nursing staff knowledge and practice behaviors regarding chemotherapy's influence

Table 2: Association between level of Practice and certain demographic data (N=194)

Variables	Total	Poor practiced	Moderate practiced	Good practiced	P
Age					
20-24 Y	35	1(2.9)	24(68.6)	10(28.6)	.149
25-29 Y	61	9(14.8)	43(70.5)	9(14.8)	
30-34 Y	41	6(14.6)	32(78.0)	3(7.3)	
35-39Y	31	1(3.2)	24(77.4)	6(19.4)	
40 years and more	26	3(11.5)	17(65.4)	6(23.1)	
Gender					
Male	101	8(7.9)	79(78.2)	14(13.9)	.150
Female	93	12(12.9)	61(65.6)	20(21.5)	
Marital status					
Single	52	4(7.7)	40(76.9)	8(15.4)	.017
Married	125	11(8.8)	92(73.6)	22(17.6)	
Divorced	10	5(50.0)	4(40.0)	1(10.0)	
Widow	7	0(0.0)	4(57.1)	3(42.9)	
Educational levels					
Secondary nursing school	44	3(6.8)	28(63.6)	13(29.5)	.089
Medical institute graduate	87	6(6.9)	67(77.0)	14(16.1)	
College of nursing graduate	56	10(17.9)	39(69.6)	7(12.5)	
post graduate (MSC, PHD)	7	1(14.3)	6(85.7)	0(0.0)	
Years of Experience as a nurse					
less than 1years	35	2(5.7)	26(74.3)	7(20.0)	.296
1-4 years	60	5(8.3)	43(71.7)	12(20.0)	
5-9 years	51	10(19.6)	32(62.7)	9(17.6)	
10 and above	48	3(6.3)	39(81.3)	6(12.5)	
Years of experience In Oncology					
less than 1years	60	7(11.7)	45(75.0)	8(13.3)	.272
1-4 years	62	3(4.8)	46(74.2)	13(21.0)	
5-9 years	46	6(13.0)	29(63.0)	11(23.9)	
10 and above	26	4(15.4)	20(76.9)	2(7.7)	
Oncology Patients care training Course					
No	96	4(4.2)	75(78.1)	17(17.7)	.019
Yes	98	16(16.3)	65(66.3)	17(17.3)	
Chemotherapy training course					
No	102	10(9.8)	72(70.6)	20(19.6)	.713
Yes	92	10(10.9)	68(73.9)	14(15.2)	

No statistical significance between nurses practice and demographic characteristics except for Marital status and Oncology Patients care training Course at $P \leq 0.05$ level, Table (2)

Table 3: Correlation between level of knowledge and level of practice

P. Value	R	Level
0.025	0.83	Knowledge Practice

A strong positive correlation was found between knowledge and practice as with Increase the knowledge, level of practice nursing staff regarding chemotherapy impact on peripheral neuropathy Table (3)

on peripheral neuropathy were modest (N=194). According to Binner (2010), the majority of oncology nurses indicated limited knowledge and practice regarding chemotherapy influence on peripheral neuropathy, never or rarely teaching adaption techniques, whereas the majority regularly or frequently taught safety measures¹⁹. Based on their degree of confidence and frequency of practice, nurses were not confident in executing NP assessment abilities, according to the

findings of a 2017 study by Xue and colleagues. CIPN (Chemotherapy-induced peripheral Neuropathy) evaluation is essential for oncology nurses in charge of neurotoxic chemotherapy delivery, according to all respondents; nevertheless, 76.45% of nurses considered their CIPN assessment abilities were fair or poor. According to Xue and colleagues (2017), 80 percent of nurses said they received fair or inadequate cancer pain development and skills²⁰.

CONCLUSION

The majority of the nursing staff has a modest degree of knowledge and practice habits. Except for years of experience, there were no statistically significant relationships between oncology nurses' knowledge and demographic characteristics. Furthermore, there was no statistical significance between nurses' practice behaviors and demographic characteristics except for marital status and Oncology Patients Care Training Course in Oncology, but there was a strong positive correlation between knowledge, practice behaviors level among nursing staff regarding chemotherapy impact on peripheral neuropathy. Giving nurses the confidence to use neurological testing and follow up on patients receiving chemotherapy for peripheral neuropathy, as well as offering a scientific handbook that oncology nurses can easily access on how to reduce the effect of chemotherapy on peripheral neuropathy, is advised.

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REFERENCES

- Herr GE, Kolankiewicz ACB, Berlezi EM, et al. Assessment of knowledge about oncological disease and health care practices. *Rev Bras Cancerol* 2013;59(1):33-41.
- Brazil. Ministry of Health; José Alencar Gomes da Silva National Cancer Institute. Nursing actions for cancer control: a proposal for teaching-service integration. Rio de Janeiro: INCA; 2008. Treatment bases 2008;369-556.
- Argyriou A, Kyritsis AP, Makatsoris S, et al. Chemotherapy-induced peripheral neuropathy in adults: a comprehensive update of the literature. *Cancer Manag Res* 2014;6:135-47.
- Schloss J. A pilot clinical trial assessing the efficacy and safety of supplementation with a B complex vitamin to reduce the incidence of chemotherapy induced peripheral neuropathy in patients diagnosed with a malignancy, published doctorate thesis, School of Medicine, The University of Queensland 2016;404.
- Kerckhove N, Collin A, Condé S, et al. Long-Term Effects, Pathophysiological Mechanisms, and Risk Factors of Chemotherapy-Induced Peripheral Neuropathies: A Comprehensive Literature Review. *Front Pharmacol* 2017; 8:86.
- Mohallem AGC, Rodrigues AB. *Monoclonal disease*. 2nd edition. São Paulo: Manole 2007.
- Cavaletti G1, Frigeni B, Lanzani F, et al. Chemotherapy-Induced Peripheral Neurotoxicity assessment: a critical revision of the currently available tools. *Eur J Cancer* 2010;46(3):479-94.
- Beijers AJ, Jongen JL, Vreugdenhil G. Chemotherapy-induced neurotoxicity: the value of neuroprotective strategies. *Neth J Med* 2012;70(1):18-25.
- Miltenburg NC, Boogerd W. Chemotherapy-induced neuropathy: A comprehensive survey. *Cancer Treat Rev* 2014;40(7):872-82.
- Maloney KW. *Nursing Management of Chemotherapy-Induced Peripheral Neuropathy*. University of Pennsylvania School of Nursing 2012;5.
- Martelli-Reid LS, Baker CA, Smith YC, et al. Postoperative Adjuvant Chemotherapy in Completely Resected Non-Small Cell Lung Cancer: Guidance for Nurses , A Quality Initiative of the Program in Evidence-based Care (PEBC), Cancer Care Ontario (CCO) Developed by the Lung Cancer Disease Site Group. 2007;7.
- Krstev S, Peruničić B, Vidakovic A. Work practice and some adverse health effects in nurses handling antineoplastic drugs. *Med Lav* 2003;94(5):432-39.
- Younis NM, Mahmoud M, Ahmed A, et al. University Students' Attitude Towards E-Learning. *Bahrain Med Bull* 2021;43(2):460-2.
- Ahmed MM, Younis NM, Hussein AA. Violence towards nurses staff at teaching hospitals in Mosul City. *Indian J. Forensic Med. Toxicol* 2020;14(3):2598-603.
- Muwfaq YN, Ahmed MM, Abdulsalam RR. Assessing Quality of Life in Palliative Care. *Bahrain Med. Bull* 2021;43(3):594-96.
- Younis NM, Ahmed MM, Hussein AA. Nurses' knowledge, attitude and practice towards preparedness of disaster management in emergency of mosul teaching hospitals. *Medico-Legal Update* 2020;20(3):775-79.
- Qalawa SH, Sobeh DE, Hafez FE. The Relationship between Oncology Nurses' Practice behaviors, Knowledge and Confidence regarding Chemotherapy Induced Peripheral Neuropathy. *Port Said Sci Nurs* 2017;4(1):1-17.
- Al-Atiyyat N, Banifawaz A. Oncology nurses' knowledge, practice, and confidence toward chemotherapy-induced peripheral neuropathy in Jordan. *Saudi Med J* 2018;39(11):1158-163.
- Xue Y, Schulman-Green D, Czaplinski C, et al. Pain attitudes and knowledge among RNs, pharmacists, and physicians on an inpatient oncology service. *Clin J Oncol Nurs* 2017;11(5):687-95.
- Binner M, Ross D, Browner I. Chemotherapy-induced peripheral neuropathy: assessment of oncology nurses' knowledge and practice. *Oncol Nurs Forum* 2016;38(4):448-54.