

# Nurse's Practice Toward Oncology Patients During Chemotherapy Management

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## Abstract

Oncology nurses face high levels of stress since they interact with patients and families for a long period, a considerable proportion of patients die, and oncology practice needs nurses to keep up-to-date knowledge and skills in a continuously changing environment.

**Objective(s):** This study aims at assessing the practice of nurses toward oncologic patients during chemotherapy management and to find out the relationship between nurses' practice and their demographic variables.

**Methodology:** A descriptive cross-sectional quantitative study has been conducted for the period 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. Nurses' practice observational checklist regarding chemotherapy administration has been used for data collection in the current study.

**Results:** The majority of nurses have a fair level of practice with significant association found between the practice and the (level of education and years of experience).

**Conclusions:** The study concluded that the nurses with higher education degrees are the ones who have the best practice in chemotherapy management. In addition, the nurses with the most years of experience are the ones who have the best practice level regarding chemotherapy management.

**Keywords:** Practice, Oncology Patient, Chemotherapy.

## Introduction:

Cancer is a broad word that refers to a range of diseases that may influence any portion of the body. Malignant tumors and neoplasms are other words used (1). Female breast, Lung, bowel, and prostate cancer are the four most frequent malignancies globally. These four tumors account for more than four out of every 10 cancers diagnosed globally (2).

oncology nurses face high levels of stress since they interact with patients and families for a long

period, a considerable proportion of patients die, and oncology practice needs nurses to keep up-to-date knowledge and skills in a continuously changing environment (3).

Oncology nurses will reach established levels of safety in nursing practice by utilizing nursing skills. This includes mastering the complexity of cancer treatment, negotiating interdisciplinary teamwork, and incorporating safety standards into practice, among a slew of other duties necessary to provide evidence-based oncology

nursing care. (4). Additionally, Oncology nurses are not only accountable for supplying patients with the essential care during treatment; they also help to monitor physical and psychological symptoms and issues, as well as give emotional support and assistance (5,6,7,8).

An effective, skilled oncology-nursing staff can provide care across the cancer continuum – from prevention, early detection, and different therapeutic modalities to survivorship care and, ultimately, end-of-life care thereby contributing to both a minimization in cancer burden and an enhancement in patient outcomes (9).

According to research, Lower mortality rates, fewer prescription errors, and good outcomes have all been connected to registered nurses (RNs) with bachelor's and graduate degree levels (10,11,12).

### 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 data have been collected from February 13, 2022, to March 9, 2022. The data was gathered utilizing the constructed observational checklist instrument. The researcher acquired the objective's data by using direct observation as a data collecting method. Nurses have been observed while working in oncology wards with the researcher observing each nurse three times. Nurses' practice observational checklist regarding chemotherapy administration was constructed for the study. It was constructed by the researcher based on a comprehensive review and recent literature regarding chemotherapy administration (Elhanahy & Abdelgadir, 2019; Lister et al., 2019; Oncology Nursing Society (ONS), 2018). To assess the nurses' practice regarding chemotherapy administration. It comprised 13 steps covering the following: pre-chemotherapy administration steps (9), and chemotherapy administration steps (4).

### Results:

**Table (1): The Distribution of Socio-Demographic Characteristics for Participants (N=47)**

Demographic	Responses	F	%
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
	<b>Mean± Std. Deviation</b>	<b>25.15±1.96</b>	
Years of experience	<= 1	19	40.4
	2 - 5	25	53.2

	6+	3	6.4
	<b>Mean± Std. Deviation</b>		<b>2.81±1.71</b>

**F: frequency**

A total of 47 nurses have been included in this study, their demographic data are presented in table (1) reveal that nearly two-thirds of the study sample is female (66%) and that their academic qualification is a bachelor's (57.4%), this table

asserts that majority of nursing staff are previously got training courses. In addition, their ages 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 Practice toward Oncology Patients during Chemotherapy Management.**

Practice Items	Response	F	%	MS	SD	R.S	Ass.
Revise physician's chemotherapy order.	Some Time	2	4.3	2.96	0.204	98.58	Good
	Always	45	95.7				
Receive appropriately labeled drugs in a clean and drying syringe or bags of intravenous fluids	Never	4	8.5	2.45	0.653	81.56	Good
	Some Time	18	38.3				
	Always	25	53.2				
Verify prepared medications with physician's order.	Never	7	14.9	2.21	0.690	73.76	Fair
	Some Time	23	48.9				
	Always	17	36.2				
Confirmation of right(patient, drug, time, route, dose, rate)	Never	5	10.6	2.40	0.681	80.14	Good
	Some Time	18	38.3				
	Always	24	51.1				
Wash hands	Never	35	74.5	1.28	0.498	42.55	Poor
	Some Time	11	23.4				
	Always	1	2.1				
Apply personal protective equipment: Gloves	Never	12	25.5	2.09	0.775	69.50	Fair
	Some Time	19	40.4				
	Always	16	34.0				
Apply personal protective equipment: Face Mask	Never	23	48.9	1.55	0.583	51.77	Poor
	Some Time	22	46.8				
	Always	2	4.3				
Apply personal protective equipment: Gown	Never	30	63.8	1.40	0.577	46.81	Poor
	Some Time	15	31.9				
	Always	2	4.3				
Apply personal protective equipment: Goggles	Never	37	78.7	1.21	0.414	40.43	Poor
	Some Time	10	21.3				

Check the patency of the vein for blood return and then flush using 0.9% sodium chloride	<b>Never</b>	4	8.5	2.32	0.629	77.30	Fair
	<b>Some Time</b>	24	51.1				
	<b>Always</b>	19	40.4				
Administer drugs in the correct order: anti-emetics, then vesicant cytotoxic drugs, then all others.	<b>Never</b>	6	12.8	2.28	0.682	75.89	Fair
	<b>Some Time</b>	22	46.8				
	<b>Always</b>	19	40.4				
Ensure the correct administration rate.	<b>Never</b>	4	8.5	2.32	0.629	77.30	Fair
	<b>Some Time</b>	24	51.1				
	<b>Always</b>	19	40.4				
Documentation of chemotherapy administration.	<b>Never</b>	14	29.8	2.06	0.818	68.79	Fair
	<b>Some Time</b>	16	34.0				
	<b>Always</b>	17	36.2				

**Poor** (mean of scores 1-1.66), **fair** (mean of scores 1.67-2.32), **Good** (mean of scores 2.33 and more), **RS:** relative sufficiency, **MS:** mean of scores, **SD:** standard deviation, **F:** Frequency

Table (2) indicates that the nursing practices toward Oncology Patients during Chemotherapy Management are good in items (1, 2, and 4) while

poor in items (5, 7, 8, and 9) and fair in the remaining items.

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

Overall Nurses' practice	Levels	F	%	MS	SD
	<b>Poor</b>	3	6.4%	<b>2.04</b>	0.26
	<b>Fair</b>	38	80.9%		
	<b>Good</b>	6	12.8%		

**Poor** (mean of scores 1-1.66), **Fair** (mean of scores 1.67-2.32), **Good** (mean of scores 2.33 and more), **MS:** mean of scores, **SD:** standard deviation, **F:** Frequency

Table (3), this table points out that the overall Evaluation of nurses' practice toward Oncology

Patients during Chemotherapy Management is fair (80.9%).

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

Response		Statistics	Overall Practice				x <sup>2</sup>	P-Value
			Poor	Fair	Good	Total		
Gender	Male	Frequency	2	14	0	16	4.651	0.09 NS
		Percent	12.5%	87.5%	0.0%	100.0%		
	Female	Frequency	1	24	6	31		
		Percent	3.2%	77.4%	19.4%	100.0%		
Total			3	38	6	47		

**NS:** not significant at  $p > 0.05$ , **x<sup>2</sup>:** The chi-square

Table (4) shows the Relationship between the Overall Nurse's Practice and Gender. The highest

fair level of practice was male (87.5%). However, these results are statistically not significant.

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

Response		Statistics	Overall Practice				x²	P-Value
			Poor	Fair	Good	Total		
Level of Education	School Nursing	Frequency	0	6	4	10	9.285	0.05 S
		Percent	0.0%	60.0%	40.0%	100.0%		
	Institute	Frequency	1	9	0	10		
		Percent	10.0%	90.0%	0.0%	100.0%		
	Bachelors	Frequency	2	23	2	27		
		Percent	7.4%	85.2%	7.4%	100.0%		
Total			3	38	6	47		

**S: significant at  $p \leq 0.05$ , x<sup>2</sup>: The chi-square**

Table (5) shows the relationship between The Overall Nurse's Practice and their Level of education. In which the vast majority of a fair

level of practice was at Institute (90%). However, the results are statistically significant.

**Table (6): The Relationship between The Overall Nurses Practice and their training section.**

Response		Statistics	Overall Practice				x <sup>2</sup>	P-Value
			Poor	Fair	Good	Total		
Training Section	Yes	Frequency	2	30	6	38	1.900	0.386 NS
		Percent	5.3%	78.9%	15.8%	100.0%		
	No	Frequency	1	8	0	9		
		Percent	11.1%	88.9%	0.0%	100.0%		
Total			3	38	6	47		

**NS: not significant at  $p > 0.05$ , x<sup>2</sup>: The chi-square**

Table (6) shows the relationship between The Overall Nurses Practice and their training section. Which (88.9%) of nurses that have not had any

training courses are at a fair level of practice. However, these results are statistically not significant.

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

Response		Statistics	Overall Practice				x <sup>2</sup>	P-Value
			Poor	Fair	Good	Total		
Age	<= 22	Frequency	0	2	0	2	2.297	<b>0.890 NS</b>
		Percent	0.0%	100.0%	0.0%	100.0%		
	23 - 25	Frequency	2	23	3	28		

		Percent	7.1%	82.1%	10.7%	100.0%		
	26 - 28	Frequency	1	10	3	14		
		Percent	7.1%	71.4%	21.4%	100.0%		
	29+	Frequency	0	3	0	3		
		Percent	0.0%	100.0%	0.0%	100.0%		
Total			3	38	6	47		

NS: not significant at  $p > 0.05$ ,  $\chi^2$ : The chi-square

Table (4.14) shows the relationship between The Overall Nurse's Practice and their Age. In which more than half of nurses were in the (23 – 25) age

category and at a fair level of practice. However, these results are statistically not significant.

**Table (7): The Relationship between The Overall Nurse's Practice and their Years of experiences.**

Response		Statistics	Overall Practice				x <sup>2</sup>	P-Value
			Poor	Fair	Good	Total		
Years of experiences	<= 1	Frequency	1	18	0	19	9.723	0.04 S
		Percent	5.3%	94.7%	0.0%	100.0%		
	2 - 5	Frequency	1	18	6	25		
		Percent	4.0%	72.0%	24.0%	100.0%		
	6+	Frequency	1	2	0	3		
		Percent	33.3%	66.7%	0.0%	100.0%		
Total			3	38	6	47		

S: significant at  $p \leq 0.05$ ,  $\chi^2$ : The chi-square

Table (7) shows the relationship between The Overall Nurse's Practice and their Years of experience. In which, more than half of nurses' years of experience were ranging between (2-5) years, also (72%) of them at a fair level of practice. However, these results are statistically 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%) (16,17,18,19).

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 concolor with a study carried out in Jordan, that finds out that the vast majority of nurses were bachelor (91.9%) (20).

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 (21). 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 (22,23,24).

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 confirmed by Choudhary that aimed to “explore the knowledge and attitude of staff nurses regarding the care of the patient undergoing chemotherapy treatment”. He noticed in his research that more than half (62%) of the study participants were between the ages of (21-25) years old (25).

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 tallies 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 (Hosen et al., 2019). 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 (21).

In the current findings of the study, the majority (80.9%) of nurses have fair level of practice toward oncology patients during chemotherapy management with an overall mean (2.04). These results are in line with the cross-sectional study design conducted in Erbil- Iraq that entitled “Safe Handling Knowledge and Practices of Chemotherapy among Oncology Nurses in Erbil City” they reveled in their study that more than half of nurses (63%) had fair practices of safe handling of chemotherapy (26). Additionally, in another descriptive study conducted in Egypt aimed to “evaluate the nurse’s practice (safety measures) during chemotherapy preparation and administration and to identify potential risk factors that may predispose nurses to chemotherapy hazards”. This study revealed poor safety protective measures among nurses handling cytotoxic drugs (27). Furthermore, in Egypt, a descriptive exploratory research design was conducted in 2018 to Assess nurses’ performance regarding chemotherapy administration in the clinic. They mentioned in their research that the majority (83.3%) of studied nurses had an unsatisfactory level of practice regarding chemotherapy administration (22). In addition, a previous descriptive research design

was utilized by Mohamed and Sharaf to “assess nurses’ knowledge and evaluate their practices regarding the safe handling of cytotoxic drugs”, They mentioned in their study that the majority of nurses had poor practices related to safe handling of cytotoxic drugs (29,30,31).

Regarding the relationship between the overall nurse’s practice and their gender, the current study revealed that there is no statistically significant difference between the nurse’s practice toward oncology patients during chemotherapy management and their gender at a  $p\text{-value} > 0.05$ . These results are in line with the previous cross-sectional study conducted in Bangladesh to “evaluate the knowledge of nurses concerning handling chemotherapy agents and the current practice of cancer centers in different hospitals in Bangladesh”. They discovered in their study that there is no statistically significant connection between practice of nurses and their gender (32).

Regarding the relationship between the overall nurse’s practice and their level of education, results of the current study refers to that there is a statistical significant correlation between the practice of nurses toward oncology patients during chemotherapy management and their level of education at  $p\text{-value} = 0.05$ . That may be because the nurses those have higher education degree have more commitment to standard procedure manual. This study contradicts the findings of the study conducted in Ethiopia. To assess “knowledge and practices on the safe handling of cytotoxic drugs Among Oncology Nurses”. Those concluded in their study that was no statistical connection between “nurses’ Practices on the Safe Handling of Cytotoxic Drugs” and level of education (33).

Regarding the relationship between the overall nurse’s practice and their training section. The current study finds out that there was no statistical significant difference between the practice of nurses toward oncology patients during chemotherapy management and their training section at a  $p\text{-value} > 0.05$ . The interpretation of this is possibly because most of the courses held inside the oncology center were focused on increasing the theoretical aspect of the nurses and its lack of educational workshops with a practical



aspect, in addition to the lack of the role of monitoring the nursing duty within the health institution with the absence of nursing guideline booklet. This result is congruent with a previous study in Egypt by Mahdy, Rahman, and Seddek to assess the nurses' level of practice regarding chemotherapy administration, they mentioned in their study that there was no statistical connection between the practice level of nurses regarding chemotherapy administration and their training courses (Mahdy, Rahman, and Seddek, 2018). Along the same line, a descriptive cross-sectional study conducted in India to assess the practices regarding safe handling of chemotherapeutic drugs among nursing personnel, reported that there was no statistically significant relationship between the Practice score of nurses regarding safe handling of chemotherapeutic drugs with training courses at  $p\text{-value} = 0.08$  (34).

Regarding the relationship between the overall nurse's practice and their age. The study shows that there was no statistical association between the practice of nurses toward oncology patients during chemotherapy management and their age at a  $p\text{-value} > 0.05$ . Probably because the work depends on the commitment of the nurse to standard procedure steps and not on the nurse's age. This result is consistent with a study conducted in Iran, entitled "Knowledge, Attitude, and Performance of Oncology Nurses Handling Antineoplastic Drugs in Hospitals of Urmia University, Iran" to assess oncology nurses' knowledge, attitude, and performance, as well as to measure nurses' chemotherapy load and adverse effects. The study discovered that there was no statistical relationship between the performance of nurses in handling antineoplastic drugs and their age at a  $p\text{-value} = 0.80$  (35).

Regarding the relationship between the overall nurse's practice and their years of experience. Study results reveals that there was a statistically significant association between the practices of nurses toward oncology patient during chemotherapy management and their years of experience in the oncology center at a  $p\text{-value} = 0.04$ . That perhaps because nurses with more years of work are more experienced and more accustomed to the nature of the work entrusted to them. This study is congruent with a cross-

sectional study conducted in Iran, aiming at "evaluating the knowledge, attitude, and practice (KAP) of oncology nurses towards the safe handling of ANPDs". The result of study indicated that there was a significant correlation between work experience in oncology ward with practice scores (36).

### 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 fair level of practice
3. Nurses with higher education degrees are the ones who have the best practice in chemotherapy management.
4. The nurses with the most years of experience are the ones who have the best practice level regarding chemotherapy management

**Recommendations:** The study recommended the need to

1. 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.
2. 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.
3. Improving current strategies of monitoring and assessment of nurses' overall performance in the workplace to ensure greater levels of practice related with chemotherapy administration is strongly advised.

### References:

1. Ministry of health – ksa. (2018, march 15). Cancerous diseases - cancer. <https://www.moh.gov.sa/en/healthawareness/educationalcontent/diseases/cancer/pages/cancer-2012-01-18-001.aspx>



2. Cancer research uk. (2018). Worldwide cancer statistics.  
<https://www.cancerresearchuk.org/health-professional/cancer-statistics/worldwide-cancer#heading-zero>
3. Raingruber, b., & wolf, t. (2015). Nurse perspectives regarding the meaningfulness of oncology nursing practice. *Clinical journal of oncology nursing*, 19(3), 292–296.  
<https://doi.org/10.1188/15.cjon.292-296>
4. Oncology nursing society. (2021). The importance of competencies for oncology nurses.  
<https://voice.ons.org/news-and-views/core-competencies-of-oncology-nurses>
5. Eicher, m. (2020). Oncology nurses at the forefront to empower cancer patients. *European society for medical oncology*.  
<https://www.esmo.org/oncology-news/oncology-nurses-at-the-forefront-to-empower-cancer-patients-during-the-pandemic>
6. Younis NM, Mahmoud M, Ahmed A, et al. University Students' Attitude Towards E-Learning. *Bahrain Medical Bulletin* 2021;43(2):460-2.
7. Muwfaq YN, Ahmed MM, Abdulsalam RR. Assessing Quality of Life in Palliative Care. *Bahrain Medical Bulletin* 2021;43(3):594-6.
8. Mahmood Mohammed Ahmed, Nasir Muwfaq Younis, Nawaf Mohammed Dhahir, Kareem Nasir Hussain. Acceptance of Covid-19 vaccine among nursing students of Mosul University, Iraq. *Rawal Medical Journal: Apr-Jun 2022. Vol. 47, No. 2*, pp:254\_258
9. Oti, n. O. O., de villiers, m., adejumo, p., okumu, r., maliti, b., elkateb, n., & hammad, n. (2021). Strengthening of oncology nursing education and training in africa in the year of the nurse and midwife: addressing the challenges to improve cancer control in africa. *Ecancermedicalscience*, 15, 1–15.  
<https://doi.org/10.3332/ecancer.2021.1209>
10. Rosseter, r. J. (2019). Fact sheet : creating a more highly qualified nursing workforce. American association of colleges of nursing nursing, 1–6.  
<http://www.aacn.nche.edu/media-relations/nursingworkforce.pdf>
11. Ahmed Salem Abbas , Nasir Muwfaq Younis. Efficacy of Pender's Health Promotion-based Model on Intervention for Enhancing University of Mosul Hypertensive Employees' Eating Behaviors: A randomized Controlled Trial. *Revis Bionatura* 2022;7(3) 35.
12. NASIR MUWFAQ YOUNIS, MAHMOUD MOHAMMED AHMED, NAWAF MOHAMMED DHAHIR. Knowledge and Attitude toward older adults among Nursing Students .2021. *P J M H S Vol. 15, NO. 3*, pp:683\_685.
13. Elhanahy, e., & abdelgadir, i. (2019). Developing and validating nursing care standard for patients receiving chemotherapy. *Iosr journal of nursing and health science (iosr-jnhs)*, 8(1), 68–79.  
<https://doi.org/10.9790/1959-0801066879>
14. Lister, s., dougherty, l., & mcnamara, l. (2019). *The royal marsden manual of cancer nursing procedures*. John wiley & sons.
15. Oncology nursing society (ons). (2018). Toolkit for safe handling of hazardous drugs for nurses in oncology. *Oncology nursing society (ons)*.
16. Kampitsi, a., papa, t., papadouri, a., papageorgiou, d., papara, v., & katsaragakis, s. (2012). 123 oncology nurses' knowledge and practices about safety handling and administration of chemotherapy agents—a hellenic oncology nursing society multicenter study. *European journal of oncology nursing*, 16, s44.
17. Naji AB, Ahmed MM, Younis NM. Adherence the Preventive Measure Against for COVID-19 among Teachers at University of Mosul. In *J Med Tox Leg Med* 2021;24(3&4). pp:273\_277.
18. Mahmoud Mohammed Ahmed, Nasir Muwfaq Younis and Ahmed Ali Hussein. Prevalence of Tobacco use among Health Care

Workers at Primary Health care Centers in Mosul City. *Pakistan Journal of Medical and Health Sciences*, 2021, 15(1), pp. 421–424

19.Nasir Muwfaq Younis,Mahmoud Mohammed Ahmed and Nawaf Mohammed Dhahir. Prevalence of Covoravirus among Healthcare Workers. *International Journal of Medical Toxicology&Legal Medicine*.Volume 24,Nos.1-2,jan-jaune 2021.pp:267-269.

20.Sharour, l. A. (2020). Oncology nurses' knowledge about exploring chemotherapy related-extravasation care: a cross-sectional study. *Clinical epidemiology and global health*, 8(3), 780–784.

21.Kapucu, s., özkaraman, a. O., uysal, n., bagcivan, g., şeref, f. C., & elöz, a. (2017). Knowledge level on administration of chemotherapy through peripheral and central venous catheter among oncology nurses. *Asia-pacific journal of oncology nursing*, 4(1), 61–68. <https://doi.org/https://doi.org/10.4103/2347-5625.199081>

22.Mousa mohamed, a., attia, a., farouk, o.-e., & moustafa, e. (2021). Effect of nursing guideline on nurses' knowledge and practices regarding chemotherapy for women with reproductive cancer. *Egyptian journal of health care*, 12(3), 956–967.

23. Muwfaq Younis N , Efficacy of Health Beliefs Model-Based Intervention in Changing Substance Use Beliefs among Mosul University Students: A Randomized Controlled Trial. *Revis Bionatura* 2022;7(2) 35. <http://dx.doi.org/10.21931/RB/2022.07.02.35>

24. Shatha Abdul Rahman H. Al-Ghurairi, Nasir Muwfaq Younis , Mahmoud Mohammed Ahmed.Prevalence of weight gain among students of Mosul University, Iraq during quarantine 2020. *Rawal Medical Journal*: 2022. Vol. 47, No. 3.

25.Choudhary, v. (2016). Assessment of the knowledge and attitudes of staff nurses on nursing care of cancer patients undergoing chemotherapy at selected cancer hospitals of punjab. *Nursing & care open access journal*, 1. <https://doi.org/10.15406/ncoaj.2016.01.00009>

26.Esmail, d. H., qadir, c. S., mahmood, e. K., osman, g. A., & omar, y. B. (2016). Safe handling knowledge and practices of chemotherapy among oncology nurses in erbil city. *Kufa journal for nursing sciences*, 6(1).

27.Waheida, s. M., abd-elgaffar, s. I., & atia, g. A. (2015). Evaluation of handling practices of oncology nurses during chemotherapy preparation and administration in menoufia oncology hospital. *International journal of novel research in healthcare and nursing*, 2(3), 107–119.

28.Mahdy, n. Elsayed, rahman, a. A. E. R. A. El, & ahmed, g. M. S. (2018). Nurses' performance regarding chemotherapy administration in the clinic nglaa. *Egyptian journal of health care*, 9(4), 129–140.

29.Mohamed, m. A. F., & sharaf, a. Y. (2019). Tool two : safe handling of cytotoxic drugs : nurses ' performance observational checklist. *Iosr journal of nursing and health science (iosr-jnhs)*, 8(2), 89–100.

30.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.

31.Nasir Muwfaq Younis ,Mahmoud Mohammed Ahmed, and Ahmed Ali Hussein.Nurses' knowledge, attitude and practice towards preparedness of disaster management in emergency of mosul teaching hospitals. *Medico-Legal Update*, 2020, 20(3), pp. 775–779.

32.Hosen, m. S., hasan, m., saiful islam, m., raseduzzaman, m. M., tanvirul islam, m., & tazbiul islam, m. (2019). Evaluation of knowledge and practice of handling chemotherapy agents by nurses: a multi-centre studies in bangladesh. *Int j community med public heal*, 6, 4175–4180.

33.Asefa, s., aga, f., dinegde, n. G., & demie, t. G. (2021). Knowledge and practices on the safe handling of cytotoxic drugs among oncology nurses working at tertiary teaching hospitals in addis ababa, ethiopia. *Drug, healthcare and patient safety*, 13, 71.

- 34.Sarita, d., preksha, s., & shaminder, k. (2019). A study to assess the practices regarding safe handling of chemo drugs among nursing personnel. *International journal of current research*, 11, 6821–6827. <https://doi.org/10.24941/ijcr.36359.09.2019>
- 35.Orujlu, s., habibzadeh, h., sakhvidi, m. J. Z., & hajaghazadeh, m. (2016). Knowledge, attitude, and performance of oncology nurses handling antineoplastic drugs in hospitals of urmia university, iran. *International journal of occupational hygiene*, 8(1), 14–21.
- 36.Alehashem, m., & baniasadi, s. (2018). Safe handling of anti-neoplastic drugs in the university hospitals: a descriptive survey study among oncology nurses. *Int j cancer manag*, 11(2), e6482.