

Quality of Nursing Care Provided to Children Undergoing Chemotherapy

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Abstract

Background: The care of children with cancer is very specialized, and in order to deliver high-quality care, nurses must be educated, skilled, and committed to standard guidelines. **Aim:** To assess the quality of nursing care provided to children undergoing chemotherapy. **Design:** A descriptive design was used for this study. **Setting:** The study was conducted at the Oncology Institution in Sohag City. **Sample:** A convenient sample of all available nurses (40 nurses) who are working with children undergoing chemotherapy at the Oncology Institution in Sohag City. **Tools:** Two tools were used for data collection. **Tool (I):** A personal data sheet. **Tool (II):** Observational checklist. **Results:** There was a highly statistical significant positive correlation between the studied nurses assessment of the patient before administration, providing patient/caregiver education, pre-administration considerations, chemotherapy/biotherapy administration, post administration of chemotherapy/biotherapy care and quality of nursing care. **Conclusion:** On the light of the current study results, 75% of the studied nurses had incompetent level of quality of nursing care provided to children undergoing chemotherapy, while 25% of them had competent level of quality of nursing care provided to children undergoing chemotherapy. **Recommendations:** Develop training courses regarding chemotherapy administration among pediatric nurses.

Key words: Chemotherapy, Children, Nursing, Quality of care

Introduction

Cancer continues to be one of the leading causes of disease-related mortality in children and young adults (AYAs). However, improvements in supportive care and treatment advancements for side effects of cancer therapy have resulted in an estimated 80% survival rate. (Keller et al., (2024)

Childhood cancer (CC) prevention is a difficult task, thus preventing the worst effects of CC requires an early and correct diagnosis followed by appropriate treatment. In high-income nations, children with cancer had a cure rate of over 80%, but in low- and middle-income nations, it was only 20% (World Health Organization, (2020). Chemotherapy is one of the cancer treatment techniques that has been established; it is mainly used to treat metastatic cancer that is resistant to radiation or surgery. While chemotherapy is the most successful way to end cancer, it involves many challenges. For example, anti-cancer drugs can cause DNA damage that needs to be repaired more often, and cancer cells have evolved to become resistant to drugs (Kim et al., (2021).

Chemotherapy is a well-known and successful treatment for several cancers, however its ability to eradicate all cancer cells has not shown to be as high as expected. The exact cause of this malfunction has not yet been determined (Behranvand et al., (2022).

Commonly used chemotherapeutic drugs fall into multiple types based on their mode of action, which include antimetabolites, alkylating agents, mitotic spindle inhibitors, topoisomerase inhibitors, and others. More than 90% of cancer patients who receive new targeted medicines or conventional chemotherapeutics die from multidrug resistance (MDR) (Bukowski et al., (2020).

Significance of the Study

Although cancer is still one of the leading causes of mortality for children, the prognosis has significantly improved due to recent developments in supportive care and chemotherapy usage. Children with cancer are becoming more and more in need of intensive care management. Nevertheless, there are still insufficient studies illustrating their results in the literature, particularly in poor nations (Ali et al., (2016).

Based on a baseline evaluation of pediatric oncology care in Egypt, the 5-year survival rate for childhood cancer was predicted to be 40%. Egypt has age-standardized cancer incidence rates of 166.6 per 100,000 people. In Egypt, there are numerous obstacles to receiving the best possible care for children with cancer, and a lack of funding keeps survival rates from rising (Soliman et al., (2021).

The number of children having cancer in Sohag City in 2022 was 437 children according to the Oncology Institution in Sohag City. (Electronic medical

record of Oncology Institution, Sohag City, (2022-2023)

In contrast to adult malignancies, childhood cancers are typically fatal without prompt detection and treatment, and there are no evidence-based population screening programs or lifestyle risk-reduction techniques that have been shown to improve outcomes (Force et al., (2019).

Aim of the current study

To assess the quality of nursing care provided to children undergoing chemotherapy.

Research Questions

1. What is the quality of nursing care provided to children undergoing chemotherapy?
2. Is a relation between personal data and quality of nursing care provided to children undergoing chemotherapy?

Subject & method

This study was conducted under four main designs as follows:

1. Technical design
2. Operational design
3. Administrative design
4. Statistical design
5. Technical design: The technical design includes research design ,setting, subject and tools for data collection

Technical design

Research design

A descriptive research design was utilized to conduct this study.

Setting

The study was conducted at the Oncology Institution in Sohag City. The chemotherapy administration room is at the 2nd floor in the hospital ,the working hours is from 8 am-1pm. The Oncology Institution is the largest hospital in Sohag which gives services to all children suffering from cancer.

Sample

A convenient sample of all available nurses (40 nurses) who are working with children receiving chemotherapy at the Oncology Institution in Sohag City.

Tools for data Collection

Two tools were used in this study in order to collect the required data:

Tool I: A personal data sheet:

It was developed by the researchers to assess the characteristics of the studied nurses such as age, years of experience· qualification, received training courses for chemotherapy, and work department.

Tool II: Observational checklist:

This tool adopted from (the Atlantic Provinces Pediatric Hematology Oncology Network {APPHON} Pediatric Chemotherapy/Biotherapy Administration Clinical Competency Checklist December 2015). It was used to assess the quality of nursing care provided to children undergoing chemotherapy. The checklist consists of (48) items including the following: Assessment of the patient before administration (4 items), Providing Patient/Caregiver Education (5 items), Pre-administration considerations (17 items, the third item contain 7 sub items), Chemotherapy/Biotherapy Administration (13 items, the fourth item contain 3 sub items), Post Administration of Chemotherapy/Biotherapy Care (9 items, the eighth item contain 2 sub items).

Scoring system:

Scoring system for the observational checklist

Regarding the observational checklist about chemotherapy, each item was scored "1 for competent practice "and 0" for incompetent practice The total score of nurses' practice was 48 classified as follows:

- A score less than 80% (< 38.4 grades) was considered incompetent.
- A score equal or more than 80% (≥38.4 grades) was considered competent.

Operational design

Preparatory phase :This phase involved developing the data collection tools based on a review of the pertinent literature by the researchers and preparing data collection instruments.

- 1- Official Permission to conduct the study was obtained from the responsible authorities' in Oncology Institution in Sohag City after an explanation of the aim and nature of the study.
- 2- Development of the tools after reviewing the related literature.

Pilot study

A pilot study was carried out in October, 2023 that was conducted on (10%) of the study sample (n=4). The purpose of the pilot study was to identify logistical problems regarding ease of access and format that could occur during the study and might adversely affect data quantity and quality and of total sample size to investigate and ensure the feasibility, objectivity, applicability, and clarity of the study tools, as well as to determine the time

required for filling the observational checklist. There was no modifications were done in the tools after the pilot study, so that the involved numbers of pilot sample (4) nurses were added to the study sample.

Validity

The tool used for the study was tested for its content validity by three experts in the pediatric nursing field to assess the clarity, feasibility and applicability of the tools.

Reliability

internal consistency of reliability of the tools was tested statistically using Cronbach's alpha and it was 0.893.

Ethical considerations

- The research proposal was approved by the Ethical Committee in the Faculty of Nursing at Sohag University.
- An official permission was obtained through an issued letter from the director of oncology Institution in Sohag City.
- A written consent form was taken from the nurses included in the study.
- The objective of the study was explained to the nurses at the beginning before starting the study.
- The researcher informed the nurses that the study was voluntary; they given a right to refuse to participate and had the right to withdraw from the study at any time without giving any reason.
- They assured that their information was confidential and was used for research purposes only.

Field work

Firstly, an official permission was taken from Sohag Oncology Institution director to conduct the study after explaining the aim and nature of study to them to obtain their cooperation. Then, data were collected from all nurses who administer pediatric chemotherapy at Sohag Oncology Institution. At initial interview; the researcher introduced herself to initiate line of communication in order to facilitate the implementation of the tools. And explained purpose of the study to nurses prior to observing their work. Then written consent was taken from nurses. And the nurses were asked to fill their personal data sheet, then each nurse was observed directly to fill observational checklist sheet by using (tool II) .The study was carried out during shifts that are available for nurses. Then data were collected by the researchers. The total number of available nurses was 40 nurses.

Statistical Analysis

The statistical package for social science (SPSS) program, version 27, was used to code, organize, computerize, tabulate, and analyze the data that were gathered. For categorical data, descriptive statistics were shown as frequencies and percentages; for quantitative data, the arithmetic mean (X) and standard deviation (SD) were used. The Chi Square test (X²), which is used for relation testing, was utilized to compare the qualitative variables.

Results

Table (1): Shows that, less than three quarters of the studied nurses 70% aged from 21 to less than 30 years old, less than two thirds of them 60% had less than 5 years of experience, less than three quarters of them 72% of them had nursing technician institute, all of them 100% hadn't received training courses for chemotherapy and most of them 80% worked at Pediatric department.

Table (2): Demonstrates that most of the studied nurses 97.5% & more than three quarters of them 77.5% were competent for " Ensures a recent history and physical examination has been completed by physician/NP prior to initiating therapy (as required by protocol and or change in status)" and " Completes current nursing patient assessment prior to administration and reports any new or concerning findings" respectively. While, more than half 57.5% of them were incompetent for " Confirms results of required blood work, tests, and imaging. Ensures physician(s) are aware of results".

Table (3): Reveals that all of the studied nurses 100% were competent for " Verifies consent for treatment", " Coordinates administration time with pharmacy", " Verify the following (independently double checked):Right patient/protocol/ cycle/day", " Expiry date of prepared agent", " Compatibility/IV set-up/ solution", " Provides interventions to ensure patient is physiologically ready (meeting pre-administration criteria)", " Is prepared for acute hypersensitivity reactions.", " Patient is pre medicated as required (i.e. anti-emetics, antihistamines)", " Assesses for central venous access device (CVAD) blood return and line/insertion site integrity or peripheral intravenous (PIV) site integrity", " Aware of procedure if accidental exposure occurs" and " Documents assessments and interventions".

Table (4): Illustrates that, all 100% & most of the studied nurses 97.5% were competent for " Reports pertinent information to oncoming registered nurse (RN's) about the therapy administration, tolerance and supportive care plan" and " Communicates relevant information with other health professionals involved in the care of this patient: completes

permanent documentation of agent administration and supportive care (labs, history and physical, nursing assessment)". While, all of the studied nurses 100% were incompetent for "Administer supportive/rescue medications and provide interventions to minimize side effects".

Figure (1): Reveals that, three quarters 75% of the studied nurses had incompetent level of quality of nursing care provided to children undergoing chemotherapy, while one quarter of them 25% had competent level of quality of nursing care provided to children undergoing chemotherapy.

Results

Table (1): Frequency distribution of the studied nurses personal data (n=40)

personal data	No	%
Age		
21- <30	28	70.0
30- <40	12	30.0
≥ 40	0	0.0
Mean ± SD	29.69±6.145	
Years of experience		
<5 years	24	60.0
5 - <10 years	11	27.5
≥10 years	5	12.5
Mean ± SD	23.54±2.549	
Qualification		
Nursing Diploma	5	12.5
Nursing Technician Institute	29	72.5
Bachelor of Nursing	6	15.0
Received training courses for chemotherapy		
Yes	0	0.0
No	40	100.0
Work department		
Emergency unit	0	0.0
Pediatric department	32	80.0
pediatric Intensive care unit	8	20.0

Table (2): Frequency distribution the studied nurses regarding Assessment of patient prior to administration chemotherapy (n=40)

Assessment of patient prior to administration	Competent		Incompetent	
	No	%	No	%
1) Ensures a recent history and physical examination has been completed by physician/NP prior to initiating therapy (as required by protocol and or change in status).	39	97.5	1	2.5
2) Completes current nursing patient assessment prior to administration and reports any new or concerning findings.	31	77.5	9	22.5
3) Confirms results of required blood work, tests, and imaging. Ensures physician(s) are aware of results.	17	42.5	23	57.5
4) Assesses past history of side effects including hypersensitivities and allergy profile, as well as their management.	30	75.0	10	25.0

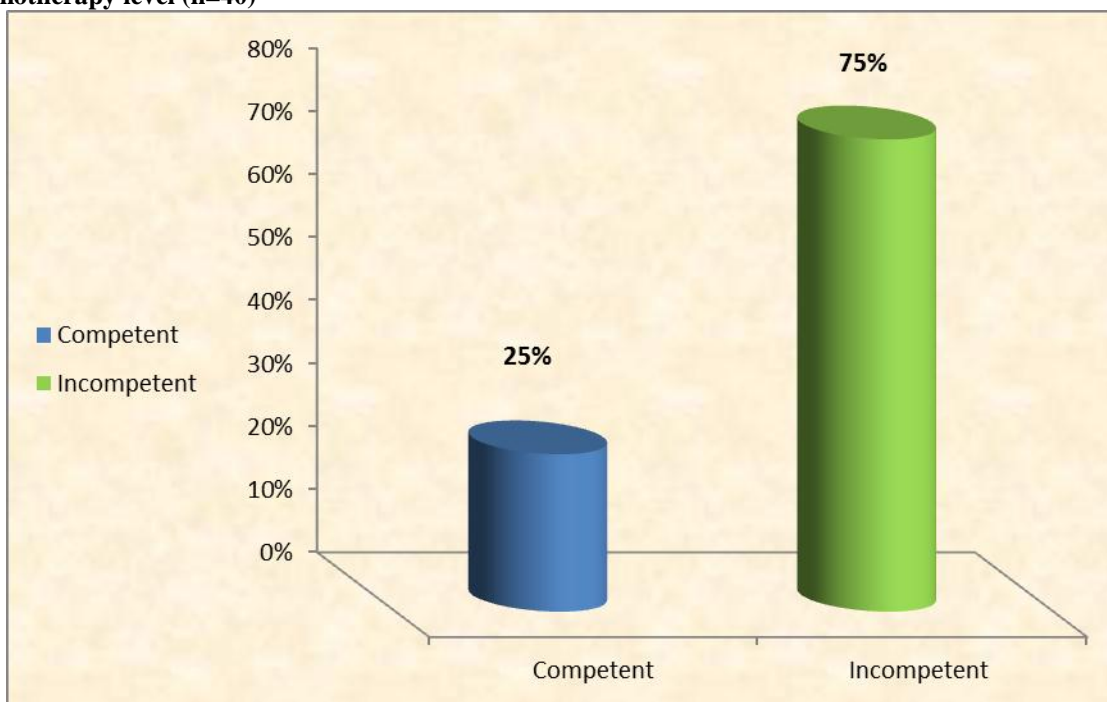
Table (3): Frequency distribution the studied nurses regarding considerations before chemotherapy administration (n=40)

Pre-administration considerations.	Competent		Incompetent	
	No	%	No	%
1) Verifies consent for treatment	40	100.0	0	0.0
2) Coordinates administration time with pharmacy.	40	100.0	0	0.0
3) Verify the following (independently double checked):	40	100.0	0	0.0
✓ Right patient/protocol/cycle/day	40	100.0	0	0.0
✓ Treatment roadmap with physician order set	22	55.0	18	45.0
✓ Investigations/test complete and reviewed by physician	23	57.5	17	42.5
✓ Current height/weight/(body surface area) BSA	33	82.5	7	17.5
✓ Right drug /dose /route /volume and rate	15	37.5	25	62.5
✓ Expiry date of prepared agent	40	100.0	0	0.0
✓ Compatibility/IV set-up/ solution	40	100.0	0	0.0
4) Provides interventions to ensure patient is physiologically ready (meeting pre-administration criteria).	40	100.0	0	0.0
5) Is prepared for acute hypersensitivity reactions.	40	100.0	0	0.0
6) Patient is pre medicated as required (i.e. anti-emetics, antihistamines).	40	100.0	0	0.0
7) Assesse for central venous access device (CVAD) blood return and line/insertion site integrity or peripheral intravenous (PIV) site integrity.	40	100.0	0	0.0
8) Alert to extravasation prevention and management.	7	17.5	33	82.5
9) Aware of procedure if chemotherapy spill occurs and location of chemo spill kit.	37	92.5	3	7.5
10) Aware of procedure if accidental exposure occurs.	40	100.0	0	0.0
11) Documents assessments and interventions.	40	100.0	0	0.0

Table (4): Frequency distribution of the studied nurses regarding Post administration of chemotherapy/biotherapy care (n=40)

Post Administration of Chemotherapy/Biotherapy Care	Competent		Incompetent	
	No	%	No	%
1) Demonstrates ongoing assessment for post and delayed side effects/reactions.	14	35.0	26	65.0
2) Reports pertinent findings to physician and other team members in a timely manner.	5	12.5	35	87.5
3) Administer supportive/rescue medications and provide interventions to minimize side effects.	0	0.0	40	100.0
4) Provides ongoing education of patients/families of likely and potential side effects/prevention and management.	14	35.0	26	65.0
5) Ensures patient/family is aware of future treatment/symptom management plan.	14	35.0	26	65.0
6) Ensures family is aware of future follow-up and treatment plans.	20	50.0	20	50.0
7) Reports pertinent information to oncoming registered nurse (RN's) about the therapy administration, tolerance and supportive care plan.	40	100.0	0	0.0
8) Communicates relevant information with other health professionals involved in the care of this patient:				
a) completes permanent documentation of agent administration and supportive care (labs, history and physical, nursing assessment)	39	97.5	1	2.5
b) faxes/files required documentation to shared care partners	37	92.5	3	7.5

Figure (1): Distribution of the total studied nurses' quality of nursing care provided to children undergoing chemotherapy level (n=40)



Discussion

Chemotherapeutic agents are highly active biological agents capable of completely eliminating cancer cells. Their main method of action is to obstruct essential cell division processes. (Huot et al., 2024)

Assuring the safety of the chemotherapy administration process for all patients and their families, providing the patient and family with the necessary support, and assisting them in managing the side effects of this type of treatment are among the main responsibilities of nurses. (Silva-Rodrigues et al., 2019)

Regarding ensuring recent history and physical examination by physician prior to chemotherapy, the current study indicated that the vast majority of the studied nurses were competent for "Ensures a recent history and physical examination has been completed by physician/NP prior to initiating therapy (as required by protocol and or change in status). According to the researcher, this related to the presence of electronic system which enable the nurses to revise the doctor order prior to administering the chemotherapy.

This result is in the same line with (Winn et al., 2024) who found that RNs review patients' charts and history prior to the medical doctor (MD) initiating premedication and chemotherapy.

Regarding nursing patient assessment, The result of the present study displayed that more than three quarters of the studied nurses were competent in "Completing current nursing patient assessment prior to

administration and reporting any new or concerning findings". From the researcher point of view, this from the hospital policy and the presence of close continuous observation from the nursing administrator, head nurse and quality team and the continuous revision of their documentation.

This result is in the same line with (Dieperink et al., 2023) who stated that a face-to-face consultation with a nurse in the clinic the day before treatment was the standard of care for pre-chemotherapy assessment prior to chemotherapy intervention for all patients.

Regarding confirmation of results of blood work, the current study displayed that more than half of nurses were incompetent in "Confirming results of required blood work, tests, and imaging. ensuring physician(s) are aware of results". This result contradicts with (Winn et al., 2024) who observed that RNs reviewing patient's laboratory results and accurately identifying key values that would warrant reporting and interventions. According to the researcher, this may be due to not realizing the importance of blood or imaging results as they didn't receive training courses.

It also agreed with (Gul, 2021) who reported that Blood test must be conducted before an approval is given for the treatment of a patient.

Regarding Assessing past history of side effects including hypersensitivities and allergy profile, as well as their management, the present study displayed that three quarters of studied nurses were

competent in "Assessing past history of side effects including hypersensitivities and allergy profile, as well as their management". **From the researcher point of view**, this may be related to their experience in chemotherapy administration.

This finding is in conformity with **(Dagi and Daniels, (2024))** who portrayed that nurses need to have sophisticated abilities in gathering patient histories since patients are sometimes afraid to disclose the severity of their side effects for fear of having their chemotherapy discontinued.

Regarding taking informed consent, the current study revealed that all nurses were competent in "Verifying consent for treatment". **According to the researcher**, this is due to the fact that taking informed consent is part of the hospital policy.

Moreover, this result is in the same line with **(Alahmad et al., (2020))** who stated that nurses understand the significance of their role and the unique bonds they form with the children, making them an essential part of the medical care team. Any parent may sign the consent form, which is both required and valid.

Regarding Coordination of administration time with pharmacy, the current study showed that all nurses were competent in "Coordinating administration time with pharmacy". **From the researcher point of view**, this is related to the fact that chemotherapy preparation taking place in the pharmacy and this require coordination between the two parts.

This agreed with **(Gul, (2021))** who reported that the drug preparation order is sent to the pharmacy after the oncologist evaluation.

Regarding Right patient/protocol/cycle/day, the present study showed that all nurses were competent in "Verifying Right patient/protocol/cycle/day". **from the perspective of the researcher**, this is an essential and important point and making a mistake in such point lead to punishment.

This result is in the same line with **(Coyne et al., (2019))** who found that the nurse is responsible for ensuring the protocol and prescription is reviewed.

Regarding reviewing Treatment roadmap with physician order set, the current study revealed that more than half of the studied nurses were competent in "Verifying treatment roadmap with physician order set". **From the researcher point of view**, this may be related to avoiding any mistakes in medication administration.

This agreed with **(Caltieri, (2024))** who reported that making sure that the handwritten chemotherapy order pages are accurate and complete is the responsibility of the nurse.

Regarding measurement of BSA, the current study showed that more than three quarter of the studied

nurses were competent in "Verifying Current height/weight/(body surface area)". **From the researcher point of view**, determining BSA is required to determine the dose

This is in the same line with **(Workalemahu et al., (2020))** who documented that Variables such as height, weight, and age hold greater impact in pediatric chemotherapy dose.

Regarding Right drug /dose /route /volume /rate, the current study cleared that all nurses were competent in "independently double checking right patient/protocol/cycle/day". **From the researcher point of view**, this is relating to realizing the importance of such step in the safe and proper handling of the drug.

This study is consistent with **(Shafee et al., (2023))** who stated that the nurse should take the following precautions to avoid medication errors before administering chemotherapy: Conduct a separate and impartial review of the initial orders with a second registered nurse (RN) who is certified in chemotherapy. Verify the treatment plan, chemotherapeutic agent, dosage, flow rate calculations, and administration route twice.

Regarding ensuring patient is physiologically ready (meeting pre-administration criteria), the current study revealed that all nurses were competent in "Providing interventions to ensure patient is physiologically ready (meeting pre-administration criteria)". **From the researcher point of view**, this may be related to avoiding any complications that may result from the session and help the child be able to complete his/her session.

This finding is in congruence with **(Ho et al., (2020))** who reported that the psychological health of a person can frequently suffer while physical problems are present. Changes in body image brought on by weight increase or loss, hair loss, changes in skin texture, changes in nails, fatigue risk, stoma care, and loss of limbs might complicate issues related to psychological anguish.

Regarding providing medication as (i.e. anti-emetics, antihistamines), the current study revealed that all nurses were competent in "pre-medicating the patient as required (i.e. anti-emetics, antihistamines)". **According to the researcher**, this is a doctor order and they know by experience that there were complications may appear during or after the session such as vomiting.

This finding agreed with **(Gul, (2021))** who reported that Pre-medication is administered to prepare patients against the side effects of chemotherapy drugs.

Regarding Assessment for central venous access device (CVAD) blood return and line/insertion site integrity or peripheral intravenous (PIV) site integrity, the current study revealed that all nurses

were competent in " Assessing for central venous access device (CVAD) blood return and line/insertion site integrity or peripheral intravenous (PIV) site integrity". **From the researcher point of view**, this is due to avoiding any errors or complications that may hinder the session.

This agreed with (MARZOUK et al., (2021) who stated that central venous access management and maintenance now fall under the purview of pediatric oncology nursing practice. This includes determining which VAD is the best fit for each patient, training staff, family, and patient on how to use VADs, and recognizing potential issues before they become serious ones.

Regarding extravasation prevention and management, the current study showed that more than three quarters of studied nurses were incompetent in being " Alert to extravasation prevention and management". **From the researcher point of view**, this may be attributed to a lack of understanding about the dangers of cytotoxic medications and the protective actions that is able to limit the danger of these treatments.

This finding is not supported by (Sharour, (2020) who reported that all oncology nurses, as bedside care providers, should be aware of the risk factors, managements, and preventive strategies associated with chemotherapy-related extravasation in order to avoid, identify, and minimize its occurrence. Additionally, it is advised that oncology nurses get ongoing education about the most recent evidence-based guidelines for the administration of chemotherapy.

Similarly, this result is in the same line with (Atya Abd Elfatah et al., (2022) who reported that in order to prevent and treat the problems of chemotherapy extravasation, nurses who administer chemotherapy agents should be aware of the early indicators of this phenomenon.

Regarding chemotherapy spill occurrence and location of chemo spill kit, the current study revealed that majority of studied nurses were competent in being " Aware of procedure if chemotherapy spill occurs and location of chemo spill kit". **From the perspective of the researcher**, this may be related to the fact that the clinical pharmacists provide the nurses with instructions regarding the toxicity and dangers of such substances and how to deal with chemotherapy spill.

This finding is inconsistent with (Webb et al., (2024) who found that only 50% of the hospitals he surveyed had spill kits available at the location of chemotherapy preparation; no hospitals had spill kits available during chemotherapy receiving, storage, transport, or administration.

Regarding post administration side effects, the current study displayed that less than two thirds of studied nurses were incompetent in " Demonstrating ongoing assessment for post and delayed side effects/reactions". **Regarding the researcher**, this may be related to the large number of Children who receiving chemotherapy every day which increased the work overload of the staff.

This result contradicts with (Dieperink et al., (2023) who stated that one of the most important responsibilities of cancer nurses is monitoring side effects; with traditional in-person oncology care, this involves evaluating "patients" physical and mental health prior to the start of the next chemotherapy cycle.

Regarding ensuring family is aware of future follow-up and treatment plans, the current study revealed that half of studied nurses were competent in " Ensuring family is aware of future follow-up and treatment plans". **Regarding the researcher**, this may be attributed to the fact that every patient has a treatment protocol which means that every patient receives his/her session at specific times and they know the importance of informing the family of coming at the determined time.

This result is similar to the results of (Gul, (2021) who reported that the head nurse is responsible for determining the patient appointment times.

Regarding Reports pertinent information to oncoming registered nurse, the current study revealed that all nurses were competent in " Reporting pertinent information to oncoming registered nurse (RN's) about the therapy administration, tolerance and supportive care plan". **From the researcher point of view**, this may be because they want to guaranteed the continuity of patient care and to continue where he/she stopped.

This result is consistent with (Belderson and Billett, (2017) who reported that it is the responsibility of the nurse to maintain open and accessible communication with the oncoming nurse regarding adherence of medication.

Regarding Communication of relevant information with other health professionals involved in the care of this patient, the current study revealed that vast majority of studied nurses were competent in " Communicating relevant information with other health professionals involved in the care of this patient". This result is in the same line with (Coyne et al., (2019) who reported that effective communication between health professionals can prevent most medication errors.

The result of the current study clarified that there was no significant relation between the total studied nurses quality of nursing care provided to children

undergoing chemotherapy level and their personal data at ($P > 0.05$).

This result is in the same line with (Shafee et al., (2023) who studied "Effect of An Educational Program regarding Double Check for Safe Chemotherapy Administration on Nurses' Performance, Beliefs and Attitude". And found that there was no significant relation between nurses' knowledge and beliefs and attitude with their age, education, and experiences.

Conclusion

On the light of the current study results, it can be concluded that three quarters (75%) of the studied nurses had incompetent level of quality of nursing care provided to children undergoing chemotherapy, while one quarter (25%) of them had competent level of quality of nursing care provided to children undergoing chemotherapy.

Recommendations

Based on the result of the current study , the following recommendations are suggested:-

1. Develop training courses regarding chemotherapy administration among pediatric nurses.
2. Booklet about chemotherapy should be found as a teaching aid in the unit.
3. Regular in-service training programs specialized in pediatric chemotherapy administration are required to increase the knowledge and competency of nurses.
4. Replication of the current study with a large sample of nurses who administer pediatric chemotherapy in different settings is required for generalizing the results.

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