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Developing and validating Nursing Care Standard for Patients Receiving Chemotherapy

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Abstract: *Nurses in different agencies and clinical settings have diverse roles in ensuring safe and competent cancer chemotherapy, such as Adapting and interpreting standards for the practice environment and care providers.*
Aim of the study*: to develop and validating nursing care standards for patient receiving chemotherapy at the clinical Oncology department.*
Setting: *Kasr El-Einy Center for Radiation Oncology and Nuclear Medicine (NEMROCK) at Cairo University Hospitals.*
The sample *composed of two groups, the first group 80 experts while the second group consists of 40 staff nurses.*
Data collection tools *were an opinionnaire developed by the researchers based on the relevant literatures and observation checklist.*
The results: *there is strong agreement of all expert groups regarding the importance of developing standard of care for patient receiving chemotherapy, there was no performance appraisal system. While, the nursing intervention items that related to administration of chemotherapy via peripheral access had well performed. The study concluded that the proposed standards are valid and applicable to use in Kasr El-Einy Center for Radiation Oncology and Nuclear Medicine (NEMROCK) at Cairo University Hospitals. The study recommended that The developed nursing care standards for patients receiving chemotherapy should be available and communicated in all oncology units. Nurses who provide chemotherapy should have specialized preparation through the availability of adequate educational opportunities for all nurses.*
Key words: *validity, applicability, standards, nursing care, chemotherapy administration*

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I. Introduction

Chemotherapy is the traditional anti-cancer therapy. Chemotherapy drugs circulate throughout the bloodstream and disperse to destroy cancerous cells in multiple locations. Due to its nature, chemotherapy is often used to treat cancers that have spread beyond their original point of development. (Vancouver, 2018).Also, cancer Chemotherapy refers to the wide range of therapeutic options used in the treatment of malignant diseases, including categories such as cytotoxic drugs, biologics, immunotherapies, targeted drug therapies, hormonal treatments, and high dose chemotherapy regimens supported with hematopoietic stem cell transplant (Canadian Association of Nurses in Oncology/Association Canadienne des Infirmieres en Oncologie (CANO/ACIO), 2010).This leads to an increasing demand on chemotherapy services. Therefore, it is imperative to ensure that standards of care are maintained despite the increasing pressures and that system and processes are in place to give nurses the tools to deliver high quality of oncology care (Langhorne etal., 2010)

Healthcare workers have boarded on enduring mission to provide the best possible care to patients diagnosed with different types of cancer. The contribution of the nurses has been acknowledged through the earlier times when the target was to reach quality care to the later ones where the focus was shifted to holding the high levels of care (Charalambousetal, 2009). Likewise, their influence extended to the up-to-date aim to promote and personalize care (Charalambousetal, 2014). Nursing's impact on the delivery of quality care was recognized in the literature (Nevidjonet.al., 2010)and one that was attributed to numerous reasons. These include the time the nurse spends with the patient (Sierko et.al. 2011), the close relationship developed among the patients and the nurses (Belcher, 2009) the high levels of trust illustrating this relationship (Dinc 2013) and the good communication (Uitterhoeve et.al. 2009)

Hence, the role of the chemotherapy nurse is much valued, and there is a wealth of knowledge within this group about side effects and their management.(Farrell and Lennan, 2013) Though, the development of further skills within this group to meet the demands of policy and service needs has been ad hoc. The United Kingdom Oncology Nursing Society (UKONS) has since offered guidance to support the practitioners and employers ensure individuals are fit for practice in regard to nurse-led chemotherapy services and to ensure patient care is not compromised.(Lennan et.al. 2014). To sum up, oncology nursing practice is evolving in response to regulation, quality initiatives, and changes in communication, which affects documentation, education, and standards of care. The future will likely hold changes for oncology nursing practice from personalized medicine, genomics, and the nursing shortage. Nurses want to know how to minimize medication errors, what happens if an error is made, and what impact that error will have on licensure. (Margaret ,2014)

Significance of the study: Oncology nurse plays vital role in the delivery of care, and patient education about the importance of identifying and managing adverse reaction and complexity of cancer treatment. Decrease the risk with supportive care measures can improve patient' outcomes, quality of life, and decrease the cost for both medical system and the patient (Zitella et.al. 2016). Nursing standard for the management could allow more patients to benefit from receiving chemotherapy at full dose on schedule, increase the quality of patient , reduce practice variation care and clinical outcomes, decreasing patient's readmission to hospital, or minimize the risk and its complications (Given and Sherwood, 2016). Hence there is urgent need to design nursing standard to supply oncology nurses with the chance to earn the necessary, evidence-based knowledge and skills for safe and effective, quality care provision.

Aim of the study: To develop nursing care standards for patients receiving chemotherapy at the selected setting through:

1. Designing nursing care standards based on reviewing related literature.
2. Examining the proposed standards, validity based on the experts' point of view.
3. Determining the applicability of the proposed standards based on actual observation of its usage by nurses.

II. Material and Methods

Design: The qualitative design was used for tool development, to fulfill the aim of the study.

Setting: The study was conducted at Kasr El-Einy Center of Radiation Oncology and Nuclear Medicine (NEMROCK) at Cairo University Hospitals. It is a comprehensive cancer department offering care for patients with cancer. . It accepts about 3000 new cancer cases in addition to 15,000 follow up patients per year, within outpatient clinics and an inpatient ward of 103 beds both for free and private sections.

Study Duration: January till September (2017).

Sample size: 80, experts and 40 nurse staff.

Subjects: Two groups of subjects were included in the study, namely experts and staff nurses.

1. Experts: This group served as experts to assess the face and content validity of the developed tool. They consisted of three categories:

a) Nursing service members representing nursing administrators include 30 experts; 11 supervisors and 19 head nurse, nine were from NEMROCK center and Al Manial Specialized Hospital at Cairo University Hospitals and the other ten were from National Cancer Institute. They have ascertained the content validity of the proposed standards.

b) Nursing faculty members. Their total number was 30 experts; they consist of 12 from administration and 18 from medical – surgical nursing departments. They affiliated as 12 from Faculty of Nursing at Ain Shams University, and 18 from Cairo University. They have also ascertained the content validity of the proposed standards.

c) Physicians' members representing clinical oncologists from Faculty of Medicine at Cairo University, and the National Cancer Institute. The number of this group was 20 experts. They were included in the study for eliciting their opinions about the proposed standards. They consisted of two professors, two assistantprofessors and 16 lecturers.

2. Staff nurses**:** All nurses who have been working in the study setting at the time of the study were included. They were 40 nurses for in-patient setting.

Inclusion criteria:

1. Either sex
2. Experience ≥ 1 year

Exclusion criteria:

3. Experience less than one year

Procedure methodology

An official permission was obtained from the dean of faculty of nursing, Damanhour University as well as from the hospital administrator of Kasr El-Einy Center of Radiation Oncology and Nuclear Medicine (NEMROCK) at Cairo University Hospitals. There are two tools were used in the different phases of the study.

I. The opinionnaire sheets: It was developed to assess the validity of the criteria through experts' opinions. This sheet contained three parts:

- Demographic data, workplace, specialty, position
- Structure items for chemotherapy unit (structure standards).
- Nursing procedure of administration of chemotherapy and nursing management of its most common side effects (process standards).

Corresponding to their responses for content validity, it was either agree or disagree.

The tool was developed and constructed by the researchers based on relevant literature and from the review of international standards of chemotherapy administration, Chemotherapy and biotherapy guidelines and recommendations for practice and safe handling of hazardous drugs both by the Oncology Nursing Society ONS (2014), Guidelines on preventing medication errors with anti-neoplastic agents by American Society of Hospital Pharmacists ASHP (2006), Canadian Association of Nurses in Oncology (CANO, 2012) and American Society of Clinical Oncology, (2014).

III. Observation checklist

The observation checklist is based on the proposed standards. It is concerned with structure and process standards of nursing in chemotherapy units. It included structure items that should be presented in the chemotherapy units and performed items that should be carried out by the nurses in the chemotherapy administration units.

The designed observation checklist was divided into two parts:

Part I: This entailed demographic data of the nurses' subject, such as years of experience, education, age.

Part II: This part was the initial list of structure developed for assessing structure items of chemotherapy unit. It consists of (84) criteria as follows:

Organizational attributes	18	Items
Human and facilities resources	35	Items
Hazards protection	19	Items
Health record – keeping system	4	Items
Job description for all nursing staff	4	Items
Performance appraisal system for nursing staff	4	Items

Part III: This part was developed for the purpose of assessing the nursing care of patient receiving chemotherapy. It consists of (291) criteria under main heading that identify body system for patient receiving chemotherapy, as follows:

Nursing assessment	55	Item
Nursing diagnosis	3	Item
Nursing planning	3	Item
Nursing interventions:		Item
Pre administration of chemotherapy	7	Item
During administration of chemotherapy		Item
Post administration of chemotherapy	47	Item
Safety disposal of chemotherapeutic agents	34	Item
Nursing care of chemotherapy side effects	11	Item
Nursing evaluation	119	
	11	

Preparatory phase: It includes reviewing of literature, international standards, and different studies related to the role of nurses of chemotherapy administration. the theoretical knowledge ofvarious aspects of nurses' roles by reviewing books, articles, periodicals and magazines as well as opinions from nursing experts in order to develop the exact tools for data collection. Then, modifications were made to suit the level of nurses' practice, patient needs and available facilities in Kasr El-Einy Center of Radiation Oncology and Nuclear Medicine (NEMROCK) at Cairo University Hospitals.A pilot study was conducted aiming at evaluating the initial checklist clarity and relevance to the study objectives. It was conducted on a sample of ten juries, three physicians, four nursing faculty members, and three head nurses.These were not included in the main study sample. Necessary modifications were carried out based on the findings of the pilot study for more clarification

and simplicity and for developing the final form of tools. Field work included two methods to collect the data needed for the development of the proposed nursing care standards for patients receiving chemotherapy. Thesemethods were the validity of the constructed questionnaire and collecting the observation checklist for applicability.

Scoring system:

1. **Opinionnaire**: the possible response was "agree" or "disagree". The agree answer (satisfactory) = "1" and "zero" for "disagree" which consider unsatisfactory answer. The satisfactory response started from 80% and above, unsatisfactory was below 80%.
2. **Observation checklist**: it contains observation of structure and process:

- The structure score: the possible response was present and absent. The score of present (satisfactory) = "1" and absent score (unsatisfactory) = "0".
- The process score: the possible response was done or not done. The score of done (satisfactory) = "1" and not done (unsatisfactory) = "0". From 0 < 75% considered unsatisfactory. From 75% and more is considered satisfactory.

Validation*:* The constructed opinionnaire was used to validate the content of the developed standard and assessment sheet for structure items. The nursing care standard (process and structure) was introduced to the 80 juries. Then, the proposed standards was considered content valid. It indicated generally high Spearman coefficient and Crombach alpha coefficient of reliability that ranged between (0.702 and 0.893) and (0.832 and 0.999), respectively. Also the jury's agreement ranged between (90 -100%) upon all aspects of standards.

Observation for applicability: This technique was used in applying the observation checklist to collect data to test its applicability. It was done through assessment of the items of structures were collected by the researchers through checking the presence of the written policies and procedures manual in the study setting three times in each floor. The average duration of the observation was from two to three hours per shift. The observation took six months (January- Jun, 2017).

Standard development: It is based on the validity and applicability of the tool. The nursing care standard was developed. The researcher divided the proposed nursing care standards according to Donabedian's model which is composed of three parts: structure, process, and outcome standards. The structure standards entailed structure items that should be available in the chemotherapy unit and the process standards entailed nursing care standard (The nursing process was used as a framework to establish standard) that should be rendered for cancer patients who are receiving chemotherapy. The researcher divided the part of nursing intervention to pre-administration, administration, and post-administration of chemotherapeutic drugs. Then, the observation checklist was developed for assessing the applicability of the proposed standard.

Statistical analysis The collected data were grouped, organized, categorized, analyzed and presented in tables. Descriptive statistics were applied: Frequency and percentage distribution for different demographic variables, such as age, years of experience, qualification and to test the agreement of the experts on the content items.

- Mean is the measure of tendency.
- Standard error is the measurements of the standard distance (deviation) between a sample and the population measure.
- T-Test is used for identifying differences between three means of observations.
- Spearman coefficient and cronbach alpha coefficient is used to test the internal consistency. Statistical significance was considered at p-value <0.05.
- Data analysis was achieved by using personal computer (p.c.), through statistical all package for the social sciences (SPSS version 16.0) program.

IV. Result

Table (1) demonstrates the characteristics of the jury subjects. It indicated that the nursing faculty and medical were lecturers, 73.3% and 80% respectively, while the majority of the nursing services (63.3%) were supervisors, and their highest percentage of specialty (66.7%) was for clinical oncology. However, the lowest one (16.67%) was for nursing administration and medical surgical. Almost half of the nursing service (53.3%) had 10 to 15 years of experience while the 23.3% of them had more than 15 years of experience. The majority of nursing faculty and medical had 10 to 15 years of experience (73.3 and 60%) respectively. Whereas all of the medical experts (100%) had clinical oncology, specialty the 66.7% of the nursing service had the same specialty.

The agreement of experts about items of unit structure related to organizational attribute is presented in table (2). It shows that most of them agreed about all of the items and their scores of agreement ranged between 83.3% and 100%. With no statistically significant differences could be revealed among the three experts groups.

Table (3) indicates the agreement of experts about items of unit structure related to record – keeping system. It indicates that almost all of them agreed upon all of the items with no statistically significant differences among the three experts groups.

The agreement of experts about items of unit structure related to performance appraisal is presented in table (4). It indicates that all of them agreed about all of the items. No statistically significant differences could be revealed among the three experts groups

Data in the table (5) point at the characteristics of the nurses' subject. It indicates that the majority of nurses (47%) had over 15 years of experience, while the minority (8%) had 5 years of experience. As obvious in the table all nurses had a diploma. Moreover more than three quarters of the subject were female, and again most of them (85%) were married and the rest (15%) were single.

Table (6) showed the implementation items of pre- chemotherapy administration activities of the proposed observation checklist of the performance of nurses as observed among study nurses. These items were done by about 50% with statistical difference that could be revealed among three observations of performance, except for two items performed by high percentage; "receive appropriate labeled drugs in clean, and drying syringe or bags of IV fluids" & "verify prepared medications with physician's order" (97.5% &72.5%), respectively with high positive statistically significant difference among three observations of performance. Nevertheless, the poor performance was for "wash hands" (17.5%) with negative statistically significant difference (t -8.22 & p 0.000)

Table (7)**.** It illustrated that the items of insertion of peripheral intravenous access performed by percentage ranged between (40% - 100%) except for item of "wrap sterile gauze around injection ports" which was done by 15 % only. On the contrary, items of implanted port were not performed at all (0.0%), While the items of "administer anti-emetics / pre-medications as ordered" and "attach bag of chemotherapeutic agent" performed by (72.5%) with highly statistical significant difference that could be revealed among three observations of performance.

Data in table (8) shows that the performance of nurses was very low which reflected on their percentage of all items did not more than 27.5%. There was no statistical difference that could be revealed among three observations of performance.

Table (9) illustrated the performance of nurses level of implementation itemsrelated to post-chemotherapy administration. Data showed that items of disconnect chemotherapy IV line performed as follow; wash hands were done by 22.5% of nurses only, meanwhile, they disconnect the drug and apply pressure at cannula site with sterile gauze for 3-4 min after removal (97.5 & 92.5), respectively, but monitor the patient for side effects of chemotherapy was done by 2.5%. The items of disposechemotherapeutic agents safely were most done by low rate not exceeding than 5%, except for store waste container out of patient's room all of nurses were performed (100%), while seal the waste container when it is 75% full was done by three quarters of nurses subjects and 65% use latex gloves and gown when handling body fluids.

Part I. Validation of the developed observation checklist for unit structure through the opinions of the experts groups.

Table no1: Characteristics of expert subjects

Items	Experts groups					
	Nursing Service (n=30)		Nursing Faculty (n=30)		Physician (n=20)	
	NO	%	NO	%	NO	%
Job position						
Professor			5	16.7	0	0
Assistant professor			5	16.7	2	10
Lecturer			20	66.6	18	90
Supervisor	11	36.7				
Head nurse	19	63.3				
Job place						
Ain Shams University			12	40		
Cairo University	17	56.7	18	60	12	60
National Cancer Institute	13	43.3			8	40
Specialty						
Clinical oncology	30	100			20	100
Nursing administration			12	40		
Medical surgical			18	60		
Years of experience						
15	7	23.3	8	26.7	4	20
10 -15	16	53.3	22	73.3	12	60
5 – 10	7	23.3			4	20
5	-	-	-	-	-	-

Table no 2: Agreement of experts groups related to organizational attributes of the unit structure items

Proposed standards	Juries' Agreement						Z	P
	Nursing Service(n=30)		Nursing Faculty(n=30)		Physician (n=20)			
	F	%	F	%	F	%		
The oncology center shall have rules and regulations: ○ A written strategic plan of organization is available.	29	96.7	28	93.3	17	85	2.80	0.003
○ There is a chart of organization.	30	100	30	100	20	100	4.47	0.00
Written policies and procedures of nursing practice are clearly defined and available : ○ Admission and discharge of patients receiving chemotherapy.	30	10	30	100	20	100	4.47	0.00
Occupational health and safety.	26	86.7	30	100	20	100	2.80	0.00
○ Infection control	30	100	30	100	20	100	4.47	0.0
○ Preparation of chemotherapy	27	90	30	100	20	100	3.35	0.00
○ Receiving and administration of chemotherapy	30	100	30	100	20	10	4.47	0.00
○ Monitoring patient receiving chemotherapy	25	83.3	30	100	17	85	2.24	0.013 *
○ Management of chemotherapy side effects	30	100	30	100	20	100	4.47	0.00
○ Safe handling and disposing of chemotherapy	24	80	30	100	20	100	2.80	0.003
○ Patient education.	30	100	30	100	20	100	4.47	0.00
○ Staff orientation, education and certification	27	90	30	100	20	100	3.35	000

Table no3: Experts' agreement upon the record – keeping system of the unit structure.

Proposed standards	Experts' Agreement						Z	P
	Nursing Service (n=30)		Nursing Faculty (n=30)		Physician (n=20)			
	F	%	F	%	F	%		
The oncology center shall have a health record – keeping system.Patient data are accessible and retrievable.	27	90	27	90	20	100	2.80	0.013
▪ Health records are maintained and stored for sufficient length of time.	30	100	27	90	20	100	3.35	0.00
▪ Standardized guidelines for documentation are available	30	100	30	100	20	100	4.47	0.00
Health records are only accessed by nurses, physicians & designated others who have taken an oath of confidentiality.	30	100	30	100	20	100	4.47	000

P < 0.005

Table no 4: Experts' agreement upon the performance appraisal system items of the unit structure

Proposed standards	Experts' Agreement						Z	P
	Nursing Service (n=30)		Nursing Faculty (n=30)		Physician (n=20)			
	F	%	F	%	F	%		
The oncology center shall have performance appraisal system for nursing staff. ▪ It based on nursing personnel in the center.	30	100	30	100	20	100	4.47	0.00
▪ It is clearly defined.	30	100	30	100	20	100	4.47	0.00
▪ It is known to all nursing personnel.	30	100	30	100	20	100	4.47	0.00
▪ It is done at regular time and discussed with nursing personnel	30	100	30	100	20	100	4.47	0.00

P < 0.005

Part I1: Observation of the performance of nurses using the developed observation checklist.

Table no5: Characteristics of the nurses' subject.

Characteristics	Nurses' Subject (n=40)	
	F	%
Years of experience: ≥ 15	19	47

10 -15	9	22
5 – 10	9	22
≤ 5	3	8
Educational level: Technical Institute	0	0
Diploma with specialty	0	0
Diploma	40	100
Gender: Male Female	9 31	22.5 77.5
Marital status Married Widow Single	 34 0 6	 85 0 15

Table no 6: Implementation items of pre- chemotherapy administration activities of the proposed observation checklist of the performance of nurses as observed among study nurses.

Proposed standards	Done (n = 40)		X	SD	T – test	P
	F	%				
Nursing implementation: 1. Nursing activities: pre- chemotherapy administration: ▪ Revise physician's chemotherapy order.	17	42.5	0.43	0.44	-1.09	0.28
▪ Receive appropriate labeled drugs in clean and drying syringe or bags of intravenous fluids.	39	97.5	0.99	0.05	59.0	.000*
▪ Verify prepared medications with physician's order.	29	72.5	0.72	0.37	3.74	.001*
▪ Wash hands.	7	17.5	0.18	0.25	-8.22	.000
Handling the chemotherapeutic agents safely: Apply personal protective equipment.	0	0	0.00	.000[a]	-	-
▪ Change gloves every hour or immediately if they are contaminated, torn, or punctured when administering chemotherapy.	17	42.5	0.43	0.44	-1.09	0.28
▪ Prohibit eating, drinking, food storage and cosmetic application.	21	52.5	0.53	0.43	0.37	0.72

P < 0.005

Table no 7: Nursing implementation items of chemotherapy administration activities of the proposed observation checklist of the performance of nurses as observed among studynurses.

Proposed standards	Done (n = 40)		X	SD	T – test	**P**
	F	%				
Nursing activities of chemotherapy administration: I. Administration of chemotherapy via peripheral access: ▪ Organize materials; (needle box, syringe, intravenous materials &fluids).	36	90	.892	.276	8.97	.000
▪ Select appropriate needle size as possible.	40	100	1.00	.00[a]	-	-
▪ Explain procedure for the patient.	34	85	.858	.319	7.01	.000
▪ Instruct patient to remove all jewelry near access site.	28	40	.708	.408	3.23	.003*
▪ Determine the appropriate site for insertion of venous access avoid: ▪ Limbs with recent vein punctures.	39	97.5	.992	.053	59.0	.000
▪ Limbs with axillary's node dissections.	39	97.5	.992	.053	59.0	.000
▪ Lower limbs.	37	92.5	.925	.207	13.0	.000
▪ Anti-cubital fossa.	29	72.5	.733	.322	4.58	.000
▪ Ecchymosed or sclerosis areas.	37	92.5	.933	.135	20.3	.000
▪ Bony prominences and joints.	26	65	.658	.388	2.58	.014
▪ Utilize an appropriate sterile technique for access.	23	57.5	.592	.443	1.31	.199
▪ Establish blood return and patency.	31	77.5	.767	.348	4.85	.000
▪ Secure needle with tape by ensure visualization of the site.	38	95	.950	.221	12.9	.000
▪ Wrap sterile gauze around injection ports.	6	15	.150	.261	-8.5	.000
▪ Flush needle with sterile NS to clear the line.	15	37.5	.375	.408	-1.9	.060
▪ Ensure patients' comfort.	18	45	.467	.419	-.50	.618
II. Administration of chemotherapy via Implanted ports: ▪ Assess line placement.	0	0	.000	.00[a]	-	-
▪ Choose a non-coring, 90 degree needle	0	0	.000	.00[a]	-	-

appropriate to patient.						
▪ Clean the patient skin with alcohol.	0	0	.000	.00[a]	-	-
▪ Ensuring proper placement of the needle in the reservoir.	0	0	.000	.00[a]	-	-
▪ Establish blood return and patency for venous ports.	0	0	.000	.00[a]	-	-
▪ Inspect the needle insertion site for dislodgment, leakage or edema.	0	0	.000	.00[a]	-	-
▪ Apply a transparent dressing to stabilize the needle.	0	0	.000	.00[a]	-	-
▪ Administer anti-emetics / pre-medications as ordered	29	72.5	.725	.439	3.24	.002*
▪ Attach bag of chemotherapeutic agent.	29	72.5	.725	.439	3.24	.002*
▪ Regulate the flow rate as physician's order.	21	52.5	.525	.458	.345	.732

P < 0.005

Table no8: Implementation items of extravasation, anaphylaxis, and chemotherapy spillage management activities of the proposed observation checklist of the performance of nurses as observed among study nurses

Proposed standards	Done (n = 40)		X	SD	T – test	P
	F	%				
Nursing activities of managing extravasation: ▪ Stop administration of vesicant drugs and IV fluids.	11	27.5	.283	.256	- 5.30	.000
▪ Leave needle in place.	11	27.5	.283	.256	- 5.30	.000
▪ Aspirate the residual drug from the catheter by using a small syringe	5	12.5	.125	.222	-11.0	.000
▪ Administer the appropriate antidote as ordered by physician	0	0	.000	.00[a]	-	-
▪ Measure area of extravasation	0	0	.000	.00[a]	-	-
▪ Provide instructions related to the care of the extravasation site	1	2.5	.008	.053	-59.0	.000
Nursing activities of managing anaphylaxis: ▪ Stop chemotherapy infusion immediately.	5	12.5	.133	.236	- 9.80	.000
▪ Stay with the patient and another one call the physician.	5	12.5	.125	.195	- 12.0	.000
▪ Maintain an IV line with normal saline.	3	7.5	.083	.165	- 16.0	.000
▪ Place patient in supine position.	2	5	.033	.101	- 29.0	.000
▪ Maintain patency of airway.	0	0	.000	.00[a]	-	-
▪ Administer oxygen if needed.	0	0	.000	.00[a]	-	-
▪ Monitor vital signs as physician orders.	4	10	.108	.175	- 14.0	.000
. Nursing activities of chemotherapeutic agents spillage : ▪ Clean up a hazardous drug spill done by trained personnel only.	0	0	.000	.00[a]	-	-
▪ Wear PPE immediately when spill occur.	0	0	.000	.00[a]	-	-
▪ Place absorbent gauze pad over spill.	0	0	.000	.00[a]	-	-
▪ Use tweezers to pick up glass fragments.	1	2.5	.008	.053	- 59.0	.000
▪ Clean the spill area three times, beginning with the least contaminated area and finishing with the most contaminated area.	1	2.5	.008	.053	- 59.0	.000
▪ Use a detergent solution followed by water.	0	0	.000	.00[a]	-	-
▪ Remove PPE and place in waste bag.	0	0	.000	.00[a]	-	-
▪ Seal the waste bag and place it in a puncture proof container	0	0	.000	.00[a]	-	-

P < 0.005

Table no9: Implementation itemsof post-chemotherapy administration activities of the proposedobservation checklist of the performance of nurses as observed among study nurses

Proposed standards	Done (n = 40)		X	SD	T – test	P
	F	%				
. Nursing activities post – chemotherapy administration 1. The chemotherapy nurse shall disconnect chemotherapy IV line. ▪ Wash hands.	9	22.5	.217	.334	-5.37	.000
▪ Wear PPE.	24	60	.608	.439	1.56	.127
▪ Discontinue the drug.	39	97.5	.992	.053	59.0	.000
▪ Apply pressure at cannula site with sterile gauze for 3-4 min after removal.	37	92.5	.942	.167	16.7	.000
▪ Keep administration sets and containers intact	36	90	.900	.216	11.7	.000

whenever possible.						
▪ Monitor the patient for side effects of chemotherapy.	1	2.5	.025	.089	-33.8	.000
2. Nursing activities to dispose chemotherapeutic agents safely: ▪ Store waste container out of patient's room.	40	100	1.00	.000[a]	-	-
▪ Seal the waste container when it is 75% full.	30	75	.750	.344	13.8	.000
▪ Store the waste container on a cart off the floor.	1	2.5	.008	.053	1.00	.323
Precautions taking with body fluids for 48 hours post administration: ▪ Use latex gloves and gown when handling body fluids.	26	65	.658	.417	9.99	.000
▪ Encourage men to sit on toilet to void instead of standing.	1	2.5	.008	.053	1.00	.323
▪ Encourage use of toilet versus bedpan and urinal.	0	0	.000	.000[a]	-	-
▪ Ask patient to flush toilet once.	0	0	.000	.000[a]	-	-
▪ Dispose of drainage systems as intact. These include drainage systems for pleural fluids, ascities and other body fluids.	0	0	.000	.000[a]	-	-
Protect the skin of incontent patients from their own excreta by: ▪ Cleansing the skin with soap and water.	2	5	.042	.112	2.36	.023
▪ Applying clean disposable diaper.	2	5	.042	.112	2.36	.023

P < 0.005

V. Discussion

The results of this study revealed that, there is strong agreement of all expert groups regarding the importance of developing standard of care for patient receiving chemotherapy. This result is consistent with previous research studies that revealed, there is an importance needs for periodic review and revision of the standards because, there is a change of oncology practice, so have chemotherapy administration safety standards, advances in technology, cancer treatment, education and training (Houser, 2012 et al., and Neuss et al., 2013).

All experts groups agreed about items of unit structure related to record – keeping system, and the data found that there was accessible and retrievable record system in the form of patient data which were maintained and stored for length of time. But there were no standardized guidelines for record keeping system. Houser et al., (2012), concluded that understanding the impacts and challenges of health record usage within cancer registries has implications for public health data management, data reporting, and policy issues. This finding emphasized the importance of record keeping system at the selected setting.

The results of the present study indicated that expert groups agreed about items of unit structure related to performance appraisal. Performance appraisal is an important process in an organization to ensure that the organization achieves its goals. This result consistent with Moradi et al., (2017), found that managers have a more positive perception, compared to the nursing staff, regarding the current performance appraisal; this difference in perception is more pronounced in the method of the performance appraisal.

The data found in this study demonstrated that, the nurses responsible for giving chemotherapy drugs are not aware or neglect their role in preventing, identification and managing of extravasation, only 2.5% provide instructions related to the care of the extravasation site, while 12.5% only stop chemotherapy infusion immediately, and measuring area of extravasation not done at all. The study presented similar result to Gozzo et al. (2017) they observed that 62.5% of the professionals did not know the order of choice of the peripheral puncture; 12.5%, that chemotherapeutic agents can't be administered to limbs with motor alterations; 43.7%, that increased infusion resistance is an indication of extravasation; 75% are unaware of the use of the hot compress for certain chemotherapeutic agents; and their conclusion was there is a need for structuring a permanent education program due to the lack of technical and scientific knowledge about the prevention and management of extravasation by chemotherapeutic drugs.

All experts agreed that there should be written policies for patient admission and discharge, occupational safety related to chemotherapy preparation and safe handling, management of chemotherapy side effects, patient education and how a nurse monitors patient receiving chemotherapy. The same result found by Neuss et al., (2016) They found that the 2016 updated standards are presented within a new organizational framework.

Infection prevention and control practices are important in maintaining a safe environment for everyone by reducing the risk of the potential spread of disease. The study findings show no infection control policy and procedures present in the study setting, but found that, the expert groups agreed about the importance of infection control policy to reduce the risk of hospital-associated infections and to ensure a safe and healthy hospital environment for patients. This result is supported by Iliyasu et al., (2016) who reported that

even with regular infection control training in the hospital; gaps have been identified in the knowledge and practice of infection control among doctors and nurses.

The findings of the study also revealed the total agreement for the three groups of experts regarding the standard statement wear personal protective equipment (PPE) during handling the chemotherapeutic agents, or before administering chemotherapy, and post administering chemotherapy. Actually, there was no one wear complete PPE during handling the chemotherapeutic agents in spite of the availability of all PPE at the study setting. This results is consistent with previous researches done by Callahan, et al., (2016) who reported that participants demonstrated the highest mean during hazardous drugs (HD) administration and lowest for handling excreta in 48 hours.

Furthermore, average patients per day significantly influenced total HD precaution: nurses exhibited more HD precaution use when assigned fewer patients. Despite high exposure knowledge, barriers to personal protective equipment use and conflict of interest may contribute to reduced adoption of personal protective practices among oncology nurses (Callahan, et al., 2016). Also, Basant, (2012) reported that in use and availability of gloves have increased but personal protective equipment like protective garments, face and respiratory protective, when handling chemotherapy have decreased and medical monitoring of exposed employees still is neither widely practiced nor consistent with Occupational Safety and Health Administration (OSHA) guidelines.

In concern of providing instructions related to the patient care, the present study showed that, a very low nurses' performance in regard to educate their patients' about the care, while there an emphasized about the importance of patient education. Thom, et al. (2013) reported, "Special care should be given to educate patients and healthcare workers regarding measures to reduce risk of exposure to infectious pathogens, such as common bacteria, community respiratory viruses, and fungi". Moreover, clinicians and infection prevention experts should be aware of the local epidemiology and important antibiotic-resistant pathogens prevalent in the cancer center population as well as potential strategies to reduce exposure to and infection by these organisms, infection prevention experts should be aware of unique issues regarding HAI prevention in the cancer center

Most of the expert group agreed about the item concerning the Safe handling and disposing of chemotherapy, and their scores of agreement ranged between 80% and 100%. The importance of this concern is supported by Soheir and Sanaa et al., (2015) who find that poor safety measure used among nurses handling cytotoxic drugs. Therefore, there is a need to improve the safety of the work environment; make available protective equipment; develop standard practice guidelines for oncology nurses; implement good planning and design of the workplace; provide adequate specialized equipment (such as cytotoxic drug safety cabinets) and personal protective equipment and establish clinical pharmacy practice.

H Roe and Lennan (2014) concluded that chemotherapy nurses have much respected for their technical, information-giving, and communication skills. Most recently, chemotherapy nurses have developed an assessment and management skills for supporting patients through their chemotherapeutic pathway. This trend will continue as we future-proof chemotherapy services, and using assessment tools and common toxicity criteria is important for consistency. Nurses have a real opportunity to add value to the patient pathway by undertaking this exciting new role, but not before they are deemed competent to do so and never in isolation from the multidisciplinary team. This finding illustrated in the highest score of agreement of the three expert groups at the present study upon the items of monitoring patient receiving chemotherapy, assessing and managing of chemotherapy side effects.

Regarding the items of, disposing chemotherapeutic agents safely were, mostly done with low rate not exceeding than 5%. In this respect,Boiano, et al., (2014) found that the Antineoplastic drugs represent one of the most toxic classes of chemical agents used in health care. Yet, despite this distinction, and the fact that sufficient evidence exists concerning their harmful effects on exposed health care workers, the data from this survey show that nurses and other health care workers are not universally adhering to longstanding safe handling guidelines, placing themselves and even family members at risk of exposure. The most commonly reported barriers associated with lapses in the use of protective gloves and gowns suggest that there is a perception that exposures are inconsequential or so rare that they do not justify their use. Better to risk communication is needed to ensure that employers and health care workers are fully aware of the hazards and precautionary measures to minimize exposures to these highly toxic drugs reported that.

As regards the nursing process of care, standards of patient receiving chemotherapy related to nursing implementation items, the three expert groups agreed about all items with high scores of agreements, however, by observation of actual performance of the nurses their total score were below average, this finding is supported by Christopher, (2013) who implicated that a substantial amount of important nursing care is missing in patients with cancer and that missed care is associated with the staffing levels of nursing personnel. These findings may explain in part why outcomes for patients with cancer remain variable in the United States.

According to the result findings, the implementing items of pre- chemotherapy administration activities, were done by the half of nurses, while the post-chemotherapy administration, data showed that items

of disconnect chemotherapy IV line performed as follows; Store the waste container on a cart off the floor and monitoring the patient for side effects of chemotherapy was done by only 2.5% . The items of disposing chemotherapeutic agents safely were mostly done with low rate not exceeding than 5%, that mean continuous education for nurses is important to improve their performance, the same results were found by OMRAN el al., (2013) who conducted that a lot of nurses did not perform a complete physical assessment, not wear complete personal protective equipment and not provided founded suitable storage for chemotherapy drug. In addition, nurses did not implement and follow safe handling of chemotherapy drugs.

VI. Conclusion

The study concluded that the proposed standards are valid and applicable to use in Kasr El-Einy Center of Radiation Oncology and Nuclear Medicine at Cairo University Hospitals. Based on the present study findings, the following is recommended:

- The developed nursing care standards for patients receiving chemotherapy should be available and communicated in all oncology units.
- Nurses who provide chemotherapy should have specialized preparation through the availability of adequate educational opportunities for all nurses.
- Certification in oncology nursing is highly recommended to promote continuing education and keep nurses updated with new regimens of advanced chemotherapy and its management with annual updating and recertification done every 4 years.
- Job description for nurses who administer chemotherapy should be developed based on the developed standards.
- To allow more generalization to my study by day further studies on larger sample/ or more settings such as outpatient and pediatric oncology.
- The need for continued refresher training and measures to complete implementation of infection control in the hospital
- Integratehealth-monitoring programs that include the assessment and counseling of prospective nurses before they commence any work involving cytotoxic drugs and related waste.
- The study clarifies that the need for continuous education, improvement of working environment, stress on correct that the chemotherapeutic agent can harmful to them.

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