Effect of an Educational Program for Nurses on Prevention and Management of Chemotherapy Extravasation

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Abstract

Background: Extravasations injuries are medical emergency that have the potential to cause serious disability that diminish the patient's quality of life, and leave nurses vulnerable to the risk of malpractice claims. **Aim of the study:** Was to evaluate the effect of chemotherapy extravasation (prevention and management) program for oncology nurses on their knowledge and practice. **Research design:** Quasi-experimental research design was conducted to achieve the aim of the current study. **Sample:** A sample of 34 nurses of both sex to achieve the aim of the study responsible for administration of chemotherapy in the two selected places (24 nurses) at oncology department at Benha University Hospitals and (10 nurses) at oncology department in Health Insurance Hospital were constitute the study sample and convenient sample of all available male and female patients for a period of six months. **Setting**: Oncology department at Benha University Hospitals and oncology department in Health Insurance Hospital. **Tools of data collection:** The following tools were used (**I):** Interviewing Self Questionnaire for Nurses (**II):** Chemotherapy Nurses Knowledge Assessment Sheet (Pre/Post)**. (III):** Nurses' Performance Observation Checklist Regarding Prevention of Chemotherapy Extravasations. **(IV):** Extravasations Record & Management Checklist**. Results:** There is a statistically significant positive correlation between total nurses' knowledge level and total practice level. Hence, there is a positive linear correlation, when the knowledge increased the practice also increased. And (76.4 %) of nurses had satisfactory knowledge and satisfactory practice while 11.6% of nurses had unsatisfactory knowledge and unsatisfactory practice. **Conclusion**: Nurses attending chemotherapy extravasations educational program sessions had a significant improvement into their knowledge and practice about extravasations (prevention and management). **Recommendation**: Nurses' knowledge and clinical management of extravasation must be developed through conducting in-service education programs and developing a standardized protocol of care for extravasations managements at chemotherapy departments.

Key words: Chemotherapy Extravasations, Educational Program, Nurses

Introduction

Chemotherapy is the most widespread worldwide modality used in the treatment of cancer and other autoimmune disease. Currently, more than hundred different chemotherapy agents are available till date. It is also known as antineoplastic, cytotoxic, or anticancer drugs/agents which are working by interrupting the cell cycle and killing cancer cells that are rapidly dividing **(Pluschnig et al., 2015).** The chemotherapy intravenous

applications can lead to some complications such as extravasation, ecchymosis, hematoma and phlebitis **(Dougherty, 2013).**

Extravasation is defined as'' accidental leakage of a chemotherapeutic agent from a vessel into the surrounding tissues, it is an unwanted and distressing complication that can lead to irreversible local injuries and severe disability" **(Kimmel et al., 2018).** Extravasation is manifested by a wide range of symptoms, early effects include: swelling at the infusion site, redness and changes that may include a cold sensation, burning, stinging or pain. **(Chang et al., 2014).**

The nurse should serve as an advocate for the patient when the prescribed intervention is ineffective. In addition, the nurse needs to understand the effects of extravasation on the patient and family and needs to be knowledgeable about extravasation strategies and appropriate resources to assist effectively with extravasation management (**Yu et al., 2013).**

Significant of the study

Cancer is the second leading cause of death globally and is estimated to account for 9.6 million deaths in 2018 **(World Health Organization (WHO), 2019)**. Chemotherapy services in Egypt have been the subject of national policy directives for the past decade. Chemotherapy nurses have been much respected for their drug knowledge, information-giving, and communication skills, but in the past have lacked assessment skills**.**This paper offers a guide to assessment of chemotherapy, including the process of chemotherapy administration; key information needs about prevention and managements about chemotherapy extravasations **(Ibrahim et al., 2014)**.

Extravasations of chemotherapy increases morbidity, as it leads to some undesirable events such as prolonged time of hospitalization of the patients, unnecessary diagnostic procedures and even treatments, extra workload for health care team, and the economic loss as well as threatening the lives of patients. The incidence of chemotherapy extravasations among adults as published in the literature varies widely, ranging from 6% to 22%**.** However, the published rate is likely to be underestimated as many cases of extravasations go unreported (**Kreidieh, Moukadem, & El Saghir, 2016).**

Nurses play an important role in the administration of cancer chemotherapeutic agents, maintaining the IV access, monitoring the patients closely, identifying adverse events one of them – extravasation- **(Pluschnig et al., 2016)**. Well-informed nurses are patient advocates and instrumental in detecting, managing, and documenting extravasations (**El-Salaheen, Ahmed & Mahmoud ., 2018).**

Aim of the study:

This study aimed to evaluate the effect of chemotherapy extravasation (prevention and management) program for oncology nurses on their knowledge and practice.

Research Hypothesis:

There would be significant statistical differences in nurse's knowledge and practice on prevention and management of chemotherapy extravasations score pre and post implementation of an educational program.

Subject and Methods

Research design:

A quasi-experimental design was used to achieve the aim of this study.

Setting:

The study was carried out at oncology departments in Benha university Hospital and Health insurance Hospital in Benha City, Qualubia Governorate, Egypt.

Subjects:

- **For Nurses**; A convenient sample consisting of all nurses responsible for administration of chemotherapy in the two selected places (24 nurses) at oncology department at Benha University Hospitals and (10 nurses) at oncology department in Health Insurance Hospital were constitute the study sample.

- **For patients**; A convenient sample of all available male and female patients for a period of six months. They were (34) patients who were receiving chemotherapy and connected with peripheral catheter (cannula) or connected with port cath, and / or central lines. And they accepted to participate in this study.

Tools of data collection:

Four data collection tools were used to collect data pertinent to this study variable.

Tool (I) Interviewing Self Questionnaire for Nurses: It was developed by research investigator based on extensive literature review. It was adapted from **Mohamed, (2015)** about nurse demographic characteristics as age, gender, level of education, current position, Nurses to Patient Ratio, number of years working as a nurse in general, years of experience in chemotherapy department.

It include the following parts:-

Part (1) Chemotherapy over view: It was adapted from (**Kreidieh, Moukadem, & El Saghir, 2016).** It consists of (10) questions to investigate nurse's knowledge about chemotherapy over view.

Part (2) Chemotherapy Extravasations: it was adapted from **(Hinkle & Cheever, ,2014).** It consists of (10) questions to assess nurses' knowledge about chemotherapy extravasation such as definition, causes, clinical pictures, patients' related risk factors, chemotherapy related risk factors and nurses related risk factors,

Part (3) Nursing Managements of Chemotherapy Extravasations: It consists of six questions related to nurses' knowledge about their nursing management related to chemotherapy extravasations.

Scoring system:

All knowledge variables were close ended questions. A score of one was given for each correct answer, and zero for the incorrect or missed answer. The total scores were recorded in percentage format. Satisfactory knowledge was counted from 80%-100% and unsatisfactory was contributed to less than 80%.

Tool (II) Nurses' Practice Observation Checklist regarding Prevention of Chemotherapy Extravasations:

This tool was developed by researcher investigator based on extensive literature review. It was adapted from (**Kreidieh, Moukadem, & El Saghir, 2016).** It was used twice before and after the implementation of the designed nursing program. It was aimed to evaluate nurse's performance regarding chemotherapy administration. It consisted of the following 4 main sub scales checklist as the following sections: **1- Pre insertion assessment before chemotherapy administration** it included (10) items. **2- Peripheral catheter insertion included (10 items).**

3- During administration of chemotherapy. It involved (6 items).

4- Peripheral catheter site monitoring and monitoring chemotherapy. It consisted of (4 items).

5- Interventions that would be taken after extravasations; it was involved (13) items.

Scoring system for Nurse's practice: The correct performance of each step was given one mark and incorrect answer was taken zero mark. Competent level was estimated to 80%-100% and incompetent level was calculated from less than 80%.

Tool (III): Extravasations Record & Management Checklist: Which was developed by the research investigator based on extensive literature/research review. It was adapted from **(Canadian Association of Nurses in Oncology, 2011)**. It was consisted of three main sections;

- **First section:** it included (10) questions related to personal and socio-demographic data for participated patients.
- **Second section**: it involved (9) items to assess the patient symptoms of extravasations.

Educational program booklet

- It was designed in Arabic language by the researcher based on the results obtained from assessment of the nurses' knowledge and performance and health outcomes for patients with chemotherapy extravasation before educational program implementation.
- The contents covered the theoretical and practical parts. The theoretical part was concerned with definition, causes, signs and symptoms, diagnosis, complications, medical treatment of chemotherapy extravasation and nursing role for patient with extravasation. It was included reviewing of related literature and theoretical knowledge of various aspect of the study using books, articles, internet, periodicals and magazines to develop tools for data collection.

Content validity:

The tools were revised for content validity by a jury of five experts in medical surgical nursing including one professor and two assistant professor as well as two lecturers from faculty of nursing Benha University and required modifications were done.

Testing reliability:

On the other hand reliability of the developed tools were tested using Chronbach's Alpha which is appropriate enough to confirm internal consistency of associated scores which showed satisfactory level of reliability for the

pre-post test, and nurses performance tools represented (0.759, and 0.846) respectively .

Pilot study

A pilot study was conducted on (10%) of the sample study to assess feasibility of the study, clarity &objectivity of the developed tools, as well as to examine issues related to the design, sample, data collection, procedure and data analysis approaches. Then the tool was modified according to the result of pilot study. These numbers of nurses were included from the study sample.

Ethical consideration:

The ethical consideration in this study included the following:

1. The researcher clarified the objective and aim of the study to the nurses and patients included in the study.
2. The researcher assured maintaining privacy for both nurses' and patient's data for the purpose of the research only and would not be used for another purpose.
3. Nurses and patients informed about their rights to participate or withdraw from the study at any time without giving any reason.

Field of work:

The aim and nature of the study was explained by the researcher to all nurses and patients who were included in the study and take their oral approval to participate in the study prior to any data collection. The program was implemented for nurses and patients in the previously mentioned settings. The data were collected in 10 months from the beginning of May 2019 to the end of November 2019 that included the following phases:

1. Assessment phase.
2. Planning and implementation phase.
3. Evaluation phase.

1. Assessment phase (preprogram):

- This important initial phase involved collecting data to assess educational needs before going on to develop the designed teaching program. In this phase, (knowledge and practice) related to chemotherapy extravasations were identified, as well as an assessment of the oncology department facilities and resources was done, cooperation and accessibility of the study subjects were assessed. Extensive review was carried out to explore different aspects of the research area.

- The researcher started by introducing herself to the nurses and giving them a brief idea about the aim of the study.

- During this phase the researcher started by assessing nurses knowledge about chemotherapy and their performance regarding chemotherapy administration and extravasations managements tool (II, III, IV). Than the patients was assess using tool III as a baseline assessment effect of chemotherapy extravasation.

2-Implementation phase

- The developed prevention and managements of chemotherapy extravasations program was implemented for all participated nurses.

- The research investigator visited the oncology medical unite three days weekly in the morning and afternoon

shift. The estimated time for each session was (45-60 minute) approximately, according to the scheduled items that discussed in each session and nurses workload.

- ❖ The participated nurses were divided into (7) small groups; each group consists of (5) nurses. The teaching program was implemented through seminars, group discussion and demonstration/re-demonstration using audiovisual aids such as booklet, video film, and power point presentation.

3-Planning and implementation phase:

Once the initial assessment finished, the program implementation schedule designed by the researcher. Planned learning activity and media were prepared. Based on the finding of the assessment phase, the study design, sample size, priorities, and expected outcomes were formulated. In addition to preparation for power point and verbs posters that were used for teaching and clarifications for information were formulated also. In this phase six sessions were be planned by the researcher for nurses to provide them with general knowledge about chemotherapy and follow up of prevention and managements of chemotherapy extravasations.

4- Evaluation phase (post program)

- This phase started immediately after conducting designed teaching program through reassessment of nurse's knowledge and performance regarding prevention and managements of chemotherapy Extravasations. Each nurse was interviewed individually after applying prevention and management of chemotherapy extravasations program as the time of post-test through evaluating their knowledge and practice for using tool I, II follow up post program implementation one time.

- In this stage comparison between nurses pre- post knowledge and pre- post performance after implementation of an educational program was done to evaluate the effect of implementing the program on nurse's knowledge and practice on prevention of chemotherapy Extravasations through filling tools (II, III, IV) using tool III.

Statistical analysis:

Statistical package of the social science (SPSS version 20) was utilized for statistical analysis of the information. Descriptive statistics additionally inferential statistics were utilized to analyze data acquired in this study. The descriptive statistics included frequency, percentage distribution, mean and standard deviation. The inferential statistics test of significance was performed to test hypotheses; paired t-test used to test the differences, the threshold of significance was fixed at the 5% level (p-value). A p-value > 0.05 indicates non-significant result and the p-value < 0.05 indicates a significant result and the p-value is a degree of significance. The smaller the p-value obtained, the more significant is the result.

Results

Table (1): Represents that 88.2 % &67.6% of participated nurses were female and their age were ranged between 18 to less than 30 respectively. While 88.2% & 41.2% were staff nurses and had experience more than ten years in nursing field respectively. Regarding nurse to patient's ratio, 82.4% were providing care to fifteen patients at chemotherapy units per shift. Moreover, all of participated nurses reported that they did not receive any training courses related to chemotherapy extravasations. And there weren't at the oncology unit neither extravasations kit nor any written polices about chemotherapy extravasations managements.

Figure (1): Shows that, 82.4% of the studied nurses had secondary nursing school, while 5.9% had technical institute degree.

Figure (2): Shows that 35.34% of participated nurses had more than ten years experience in oncology field whilst 11.8% had experience ranged between 5 to less than 10 years**.**

Figure (3): Shows there is a statistically significant difference between pre and post program satisfactory knowledge level among studied nurses regarding chemotherapy and extravasations. There is a great increase in satisfactory knowledge from 11.8 % pre to 88.2 % post program implementation.

Figure (4): Displays that there is a statistically significant difference between pre and post program implementation in satisfactory practice level of nurses regarding chemotherapy and extravasations. Pre the program, 12.2 % of nurses had satisfactory practice while, post the program, 87.8% of nurses had satisfactory practice.

Table (2): Illustrates that 55. 9% & 38.2% of the studied patients were females and there age ranged between 41-50 years respectively. While 55. 9 % of them cannot read or write and married. Moreover, 47.1 % & 52.9 % of studied patients had hepatitis and had thin veins respectively. In addition to 91.2 % of them had no speech disorders.

Table (3): Illustrates that there is a statistically significant positive correlation between total nurses' knowledge level and total practice level at p-value < 0.0001*.

Table (1): Distrubution of Studied Nurses regarding theire Personal Charastaristics (n=34).

Personal charastaristics	No.	%
Gender		
Female	30	88.2
Male	4	11.8
Age		
18-<30	23	67.6
30-<45	9	26.5
45+	2	5.9
Current position		
Staff nurse	30	88.2
Charge nurse	4	11.8
Years of nursing experience		
<1	12	35.3
1-<5	4	11.8
5-<10	4	11.8
10+	14	41.2
Nurses to patient ratio		
1:5	4	11.8
1:10	2	5.9
1:15	28	82.4
Training related to chemotherapy Extravasations		
No	34	100.0
Written Polices about Chemotherapy Extravasation		
None	34	100.0
Availability of Extravasation Kit		
No	34	100.0

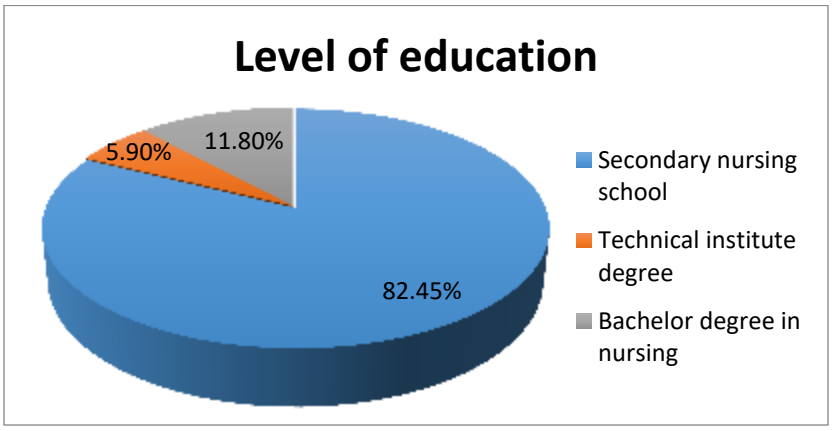

Figure (1): Level of Education of Participated Nurses (n=34).

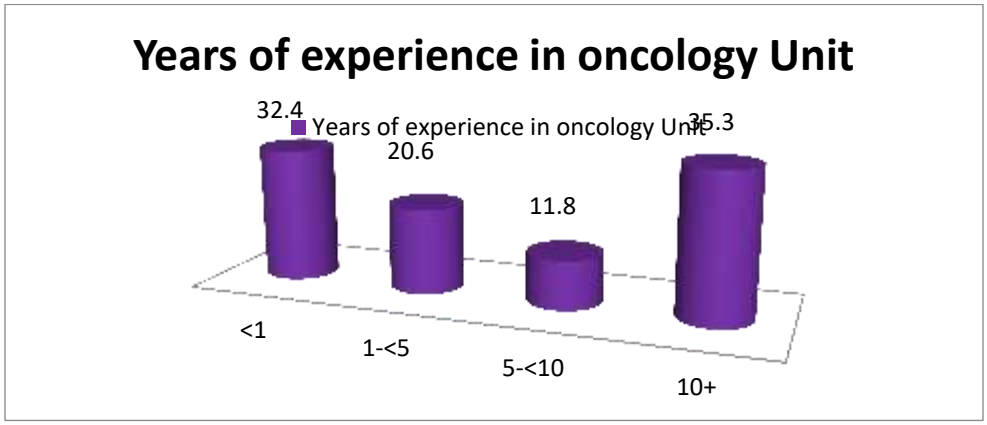

Figure (2): Years of Experience of Participated Nurses in Oncology Unit (n=34).

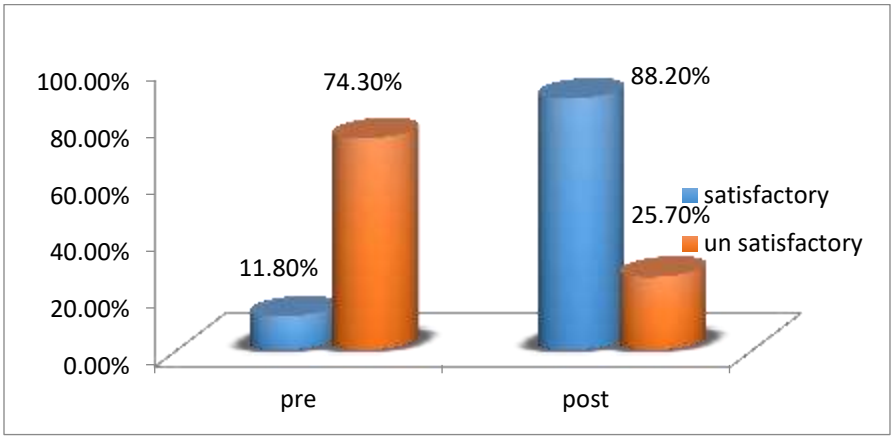

Figure (3): Total knowledge Level among Studied Nurses Pre and Post Program Implementation (n=34).

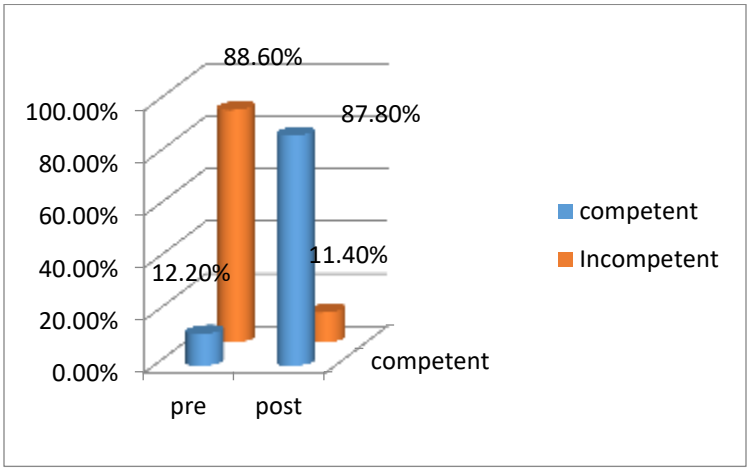

Figure (4): Pre and post practice level of studied nurses Pre and Post program implementation (n=34).

Table (2): Distribution of Personal and medical charastaristics among the studied patients (N=34).

Personal and medical charastaristics	No.	%
Gender		
Female	19	55.9
Male	15	44.1
Age		
21-30	12	35.2
31-40	3	8.8
41-50	13	38.2
51-60	6	17.6
Level of education		
Cannot read and write	19	55.9
Primary	5	14.7
Preparatory	5	14.7
University	5	14.7
Marital status		
Married	19	55.9
Single	7	20.6
Widow	4	11.8
Divorced	4	11.8
Type of chemotherapy		
a)vesicant	19	55.9
b)Not vesicant	3	8.8
c) irritant	5	14.7
d) not irritant	7	20.6
Comorbid diseases		
a. diabetes Mellitus	10	29.4
b) Hypertension	8	23.5
c) Hepatitis	16	47.1
Nature of patient veins		
Small	3	8.8
Fragile	6	17.6
Fibrosed	7	20.6
Thin	18	52.9
Local vascular problems		
a.Lymphedema	19	55.9
b) Peripheral neuropathy	8	23.5
c)Phlebitis	7	20.6
Speech disorders		
No	31	91.2

Table (3): Correlation between studied nurses' knowledge level and total practice level (n=34).

Nurses total Practice					Chi-square	r	p-value
Nurses total knowledge	**Satisfactory**		**Unsatisfactory**				
	No.	**%**	**No.**	%			
Satisfactory	26	76.4	0	0.0	13.0	0.61	0.0001*
Unsatisfactory	4	11.6	4	11.7			

***Significant at p-value** < 0.0001*

Discussion

Chemotherapy is a type of cancer treatment that uses drugs to destroy cancer cells. Among the most common complications associated with intravenous chemotherapy drugs administration are extravasation and infiltration. Extravasation is defined as the accidental leakage of a vesicant drug or fluid from a vein into the surrounding tissue during intravenous administration. A vesicant is defined as a drug or solution which has the potential to cause blistering, severe tissue damage and even necrosis if extravasated **Klinegman, Stanton & Schor (2011).**

In relation to gender, the result of the current study presented that the majority of studied nurses were females. This result is in agreement with study done by **Raghurama (2019**) about " Knowledge and practice of nurses on cancer chemotherapy Extravasations prevention and management" who found that the majority of nurses were females.

Regarding to the age**,** the result of the current study found that, more than half of studied nurses their age were ranged from 18 to less than 30 years, This result is in agreement with study done by **Mohsen &Fareed (2013)** about" chemotherapy safety protocol for oncology nurses: It's Effect on their protective measures practices found that less than half (41.03%) of the studied nurses the age of them were ranged between 25-35 years. This result was in contrast with study done by **Abdullah & Rasheed (2018)** about "nursing Staff knowledge regarding safe chemotherapy administration at oncology center" who reported that nurses age in their study the mean age of the studied nurses was 36.08 years ±3.35 (range from 32 to 42 years)**.**

Concerning level of education, the majority of studied nurses had secondary nursing school. This finding is consistent with many Egyptian studies such as **Mohamed (2015)** about" Effect of Designed Nursing Protocol on Nurse's knowledge And Practice Regarding Chemotherapy" who reported that more than two third of his studied sample had secondary nursing school. This could be attributed that nurses in Egypt who have secondary nursing school are constitute 139.249 (86%) nurses of the total manpower**.** The result of the current study is in agreement also with **El-Hamed et al (2017)** who found that slightly less than two thirds of the studied nurses had secondary

nursing school. This result was incongruent with **Sharour (2020),** who reported that according to his study most studied nurses held a bachelor's degree in nursing**.**

Regarding years of experience in oncology unit, the result of the current study showed that more than third of studied nurses had experience more than ten years in oncology field. In the same line **Mohsen &Fareed (2013)** who mentioned that the majority of studied nurses had years of experience more than ten years in oncology unit. This result is in consistent with **Abdullah & Rasheed (2018) about "**nursing Staff knowledge regarding safe chemotherapy administration at oncology center" who reported that the majority of nurses had experience ranged from one to five years at day care Oncology unit. All of studied nurses reported that they did not receive any training courses related to chemotherapy extravasations. This result in agreement with similar study done by **Karius & Colvin (2021)** about "Managing Chemotherapy Extravasation across Transitions of Care: A Clinical Nurse Specialist Initiative'. Their findings revealed that more than one third (36.8%) of the staff nurses not receive any training courses about chemotherapy extravasations.

High workload, lack of time of nurses and unavailability of training programs may interpret the presence of extravasation regarding nurse's related factors. The result of the current study is in agreement with **El-Hamed et al (2017)** about "Effect of Intervention Guidelines on Nurses' Performance Regarding Prevention and Management of Intravenous Extravasation Chemotherapy for Children who mentioned that no in- service training program related to chemotherapy extravasation was given to the studied nurses. This result may be due to absence of in- service training department in the hospital, lack of motivation for training and increased workload in oncology unit. **Mohamed (2015)** added that there is limited work investigating practitioners' educational preparation for this aspect of cancer nursing in Egypt.

The result of the current study revealed that there is a statistically significant difference between nurse's knowledge score regarding chemotherapy pre and post program implementation. This result is in harmony with study done by **Taibi et al (2020)** about " Managing chemotherapy extravasation in totally implantable central venous access: Use of subcutaneous wash-out technique" they found that nurses have insufficient knowledge about chemotherapy. And they mentioned also that nurses need more education about chemotherapy in nursing school and through in-hospital continuing education. This result is consistent with study also done **Abdullah & Rasheed (2018)** who indicated that the studied nurses have inadequate knowledge regarding chemotherapy extravasations and the administration of chemotherapy.

The result findings of the current study showed that there was a statistical significant improvement in knowledge score for studied nurses regarding all dimensions of knowledge about (chemotherapy overview, chemotherapy administration, extravasations overview, extravasations risk factors and nursing care for chemotherapy post program implementation. This result is in agreement also with study done by **Kreidieh et al (2016)** about " Overview, prevention and management of chemotherapy extravasation" who reported that one fifth of the study sample had no previous information

regarding chemotherapy extravasations and there was statistically significant improvement of nurses' knowledge after implementing the study program.

The result findings of the current study revealed that there was a positive effect of the program on increasing nurses' practice regarding pre procedure preparation. And there is a statistically significant difference between pre and post program implementation. The highest improvement in nurse's practice was for performing venous assessment and selecting appropriate venipuncture site. This findings come in consisted with **Mohamed (2015)** who found that the mean practice scores of the oncology nurses regarding pre procedure preparation pre-test was very low and there was an increased in the nurses practice score after implementing of the study protocol.

As regard to the gender of patients with extravasation, it was noted that more than half of participated patients were females. This result is in agreement with **Camp- Sorrell (2010)** about "State of the science of oncology vascular access devices" who mentioned that the majority of studied patients with extravasation were females and drew that woman diagnosed with breast cancer at higher risk for exposure to extravasation.

Concerning age of studied patients with extravasation, more than half of them there age ranged between 41-50 years. This result supported by **Schulmeister (2011)** about "Extravasation Management" who reported that young at more risk for occurrence of extravasation this result is in contrast with **Karius & Colvin (2021) "** about " Managing Chemotherapy Extravasation Across Transitions of Care: A Clinical Nurse Specialist Initiative**"** who urged that the fifteen years old or more are more risk for exposure to extravasation due to fragility of their veins. Regarding educational level, the majority of patient with extravasation reported that they cannot read and write, this result supported by **Dougherty (2013)** who reported that uneducated and inexperienced personnel may pose a higher risk for extravasation.

The result of this study reported that half of participated patients with extravasation had thin veins. This result supported with **Mohamed(2015)** who reported that those patients receiving chemotherapy and exposure to multiple attempt's for sampling and cancer patients usually receive numerous infusion, all these reasons often lead to thin, mobility disorders and vascular catheterization difficulties vessels.

The result of current study found that there is a statistically significant positive correlation between total nurses' knowledge level and total practice level when the knowledge increased, the practice also increased. Nurse's performance can be easily acquired and improved especially if linked with relevant strong scientific base of knowledge. Also they added that a statistically significant difference between nurses' knowledge and their practice pre implementing designed nursing protocol as the majority of nurses had unsatisfactory level of knowledge and inadequate practice and there was significant difference between nurses' knowledge and their practice score post nursing program implementation. This result is supported with study done by **Mansour (2019)** who found that there was significant correlation between knowledge and practice of management of extravasation. The same author added that there

is a positive linear correlation, when the knowledge increases practice also increases.

In the present study, there was positive correlation between socio demographic characteristics (age - years of experience), and nurses knowledge after implementing chemotherapy extravasation program and when years of experience increase, the knowledge of staff nurses on prevention and management of extravasation has increased also. This result is in agreement with **Abdullah & Rasheed (2018)** who found that there was a statistically significant positive correlation between total nurse's knowledge level and their level of education, years of experience in nursing and in oncology unit.

The result of this study mentioned that there is a statistically significant positive correlation between total nurses' knowledge level and total practice level. This finding might be referred to the nurses gained new knowledge and skills that enabled them to be competent during their practice. From the researcher's point of view, this might be due to knowledge being a prerequisite to practice, reflecting the need for continued supportive education.

Finally, this study shows that most nurses had an unsatisfactory level of total knowledge and inadequate total practice regarding the prevention and management of chemotherapy extravasation pre-program implementation. This result improved significantly regarding all knowledge and practice elements immediately post-program implementation, where the majority of the nurses had a satisfactory level of their total Knowledge.

Conclusion

There was a significant improvement in knowledge, practice of the studied nurse's regarding prevention and management of chemotherapy extravasation. There was a statistically significant positive correlation between total nurses knowledge level and their level of education, years of experience in nursing and in oncology unit, and nurses to patient ratio at P< .0001* . And there is a statistically significant positive correlation between total nurses' knowledge level and total practice level at p-value < 0.0001*.

Recommendations

- In-service training program should be conducted periodically and regularly for teaching to the oncology nurses the basic clinical skills regarding chemotherapy administration and prevention of chemotherapy extravasation.
- Conducting work shop(s) to orient nurses about risk factors of extravasation and sequence of this complication.
- Replication of the study on large probability sample size and acquired from different geographic areas to facilitate generalization of results.

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تقييم تأثير برنامج تعليمي للمرضات لمنع وعلاج الانصباب الدموي الناتج من العلاج الكيميائي

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عرف ظاهره الانصباب الدموي بانها خروج غير مقصود للعلاج الكيميائي خارج الوريد وتعتبر هذه الظاهرة من أخطر مضاعفات العلاج الكيمائي الوريدي ويوجد الكثير من العوامل المرتبطة بحدوث هذه الظاهرة منها ما هو خاص بالمريض وما هو خاص بالعلاج الكيميائي وكذلك ما هو خاص بممارسات التمريض، العوامل التي تخص المريض تشمل وجود بعض المشاكل التي تصيب الأوردة منها ان تكون الأوردة رفيعة جدا ومتليفه. لذلك هدفت هذه الدراسة الي تقييم تأثير برنامج تعليمي للمرضات لمنع وعلاج الانصباب الدموي الناتج من العلاج الكيميائي. وقد أجريت هذه الدراسة في قسم الأورام بمستشفيات جامعة بنها و قسم الأورام بمستشفى التأمين الصحي على ٣٤ ممرض و٣٤ مريض من الجنسين. حيث خلصت الدراسة بوجود علاقة إيجابية ذات دلالة إحصائية بين معلومات الممرضات وممارساتهم فيما يتعلق بمنع وعلاج الانصباب الدموي الناتج من العلاج الكيمياي. كما اوصت الدراسة بضرورة تنفيذ برامج تعيمية للمرضات وذلك لتحسين مستوى معلوماتهم وممارساتهم في مراكز العلاج الكيميائي.