
EFFECT OF IMPLEMENTING EDUCATIONAL GUIDELINES ABOUT CHEMOTHERAPEUTIC DRUGS ON NURSE'S KNOWLEDGE AND PRACTICE.

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Abstract:

Chemotherapy is one of the treatment modalities for cancer. Chemotherapeutic agents had described as carcinogenic, teratogenic, also mutagenic to staff worker so that occupational exposure to chemotherapeutic agents had a highly potential risk. Educational program is a valid tool for providing nurses with updating knowledge and practice about this drugs. Therefore, *the aim of this study*, examine the effect of implementing educational guidelines about chemotherapeutic drugs on nurse's knowledge and practice. *Method and sample*, Quasi-experimental research design was conducted in the medical department and outpatient chemotherapy unit at Mansoura Oncology Center of Mansoura University Hospital. The sample of this study composed of 35 nurse who are dealing with this drugs through preparation and administration for cancer patients. *Results*, indicates significant improvement into nurses knowledge and practice after implementation of educational guidelines. *Conclusion*, positive effect of educational guidelines about chemotherapeutic drugs on nurse's knowledge and practice.

Key words: Educational guidelines, chemotherapeutic drugs, Nurses, Knowledge, Practice

Introduction:

Cancer is a major public health problem in the United States and many different parts of the world⁽¹⁾. WHO (2015), mentioned that cancer deaths will continue to rise with an estimated 9 million people dying from cancer in 2015, and 11.4 million dying in 2030⁽²⁾. In Egypt, based upon results of National Cancer Registry Program (NCRP), the crude incidence rates (CIR) of cancer per 100.000 were 113.1 of both sexes. And according to Age-standardized incidence rates (ASRs) per 100.000 were 166.6 from both sexes⁽³⁾. Chemotherapy is the utilization of chemotherapeutic agents in the

treatment of cancer for providing cure, control, or palliation from cancer cells⁽⁴⁾. Therapy can be taken into 2 main ways, systemic manner and regional manner. Accidental exposure and absorption of nurses to chemotherapeutic drugs will occur throughout preparation and administration in health care setting through 3 main ways enclosed dermal, inhalation, and oral method^(5,6). So that acute exposure of nurses to this agents causes transient symptoms such as hair loss, headache, cough, nausea, dizziness, skin rash, mucous membrane irritation, and eye or throat irritation. While chronic

hazards included infertility, low birth weight, spontaneous abortions, fetal abnormalities, and menstrual-cycle abnormalities ⁽⁷⁾. Moreover genotoxic activity of some cytotoxic drugs in humans has been noted in both patients and healthcare worker who administering this drugs ⁽⁸⁾. Therefore all employee addressing chemotherapeutic drugs directly or indirectly ought to wear protective measures to guard themselves from its hazards, furthermore strict safety protocol is needed at all times for every hospital ⁽⁹⁾, in addition to nurses caring for patients receiving therapy need specialized data so as to make sure safety for each patient life and for her own life, several nurses are discharged from their job due to problems of medication errors. So educational program is a great method for providing nurses with updating knowledge and practice about chemotherapeutic drugs.

1. The study aim: the aim of this study was to examine the effect of implementing educational guidelines about chemotherapeutic drugs on nurse's knowledge and practice.

2. Research hypothesis:

- Nurses knowledge after chemotherapy educational guidelines will be improved than before applied

chemotherapy educational guidelines.

- Nurses performance during practicing with chemotherapy may be improved after applying chemotherapy educational guidelines.

Subjects & method :

Research Design: Quasi – experimental research design was utilized in this study.

Setting: This Study was conducted at Medical Department and in Outpatient Chemotherapy Unit At Oncology Center at Mansoura University Hospital.

Subjects: Sample of this study comprised of 35 nurse of both sexes. Staff nurses who are dealing with chemotherapy drugs through preparation and administration for cancer patients.

Tools: Two tools had used in this study as the following:

Tool I: Structure interviewing questionnaire: this tool divided into two parts. Part I: Socio-demographic data sheet: To assess personal data such as age, marital status, level of education, years of experience worked as oncology nurse. Part II: Nurses Knowledge Questionnaire about chemotherapy: This tool consisted of five subscale parts, to evaluate nurses knowledge about chemotherapy. Each item given a score one mark

was given to correct answer, and a zero for incorrect answer or unknown.

Tool II: Observational check list for nursing practice: It consisted of 6 sub scale checklist. Each item in each checklists was given a score, one mark was given if nurse was done this step, and a zero was given if nurse wasn't done this step.

Method:

- A permission to conduct this study was obtained from the administrator of Oncology Center.
- A verbal consent was taken from the study sample before inclusion into this study.
- A pilot study was carried out on five nurses for testing the feasibility and applicability of the tools and are excluded from sample. The needed correction, modification, omission, and addition was made.
- Tools tested for content validity by seven experts in the field of the study.
- Tools tested for reliability using test-retest methods. It indicated that tools had reliability ($r = 0,81$).
- Data collection extended over a period of six months.
- A booklet containing the content of guidelines was designed by the researcher, it was written in simple Arabic language, supplemented by photos and illustrations to help

the nurses understanding of its contents.

- The field of working included the following phases:

A. Assessment phase: The researcher started by introducing herself to the nurses and giving them a brief idea about the aim of the study. Each nurse was interviewed before applying educational sessions in order to collect the baseline data. During this phase the researcher started by assessing nurses knowledge and practice about chemotherapy drugs, route of administration, its side effect, routes of nurses exposure, health problems among nurses during handling with this drugs, precaution that should take during preparation and administration.

B. Planning phase: Based on the finding of the assessment phase goals, priorities, and expected outcomes was formulated. Four sessions were be planned by the researcher for nurses to provide them with general knowledge about chemotherapy, improve their practice throughout implementation of safety measures during chemotherapy preparation and administration. Each session took thirty to forty five minutes according to items that would be discussed in each session and attention span of nurses. The nurses were divided into seven small

groups, and each group consisted of five nurses.

C. Evaluation phase: Each nurse was interviewed immediately after applying educational sessions for evaluate nurses knowledge and practice (Immediately post test).

And second post test was done after two months to evaluate nurses practice.

Results: The data collected were analyzed statistically and the results are categorized as following parts:

Table (6.1): Scio-demographic characteristic of the studied sample(n=35).

Socio demographic data	No	%
Age		
▪ 19-29year	29	82.9
▪ 30-39year	6	17.1
Gender		
▪ Male	1	2.9
▪ Female	34	97.1
Marital status		
▪ Single	7	20.0
▪ Married	28	80.0
Educational level		
▪ Nursing school	20	57.1
▪ Nursing technical Institution	13	37.1
▪ Nursing bachelor	2	5.7
Years of experience in chemotherapy unit		
▪ <5 year	8	22.9
▪ 5-9 year	15	42.9
▪ 10+ year	12	34.3
Work place		
▪ Outpatient unit	8	22.9
▪ Inpatient unit	27	77.1

Table (6.1):Shows the general socio-demographic characteristic of the studied sample. As observed from this table more than three quarter of nurses were aged from nineteen to twenty nine year, and (17.1%) their age ranged were thirty to thirty nine year. Female nurses constituted the majority, but

(2.9%) were male nurses. The most proportion were married, while lowest proportion were single. Regarding educational level slightly above half had diploma nursing school, nursing technical institution constituted above one third, and only (5.7%) had nursing bachelor in this presented study.

Concerning years of experience in chemotherapy unit, less than half had working experience between five to nine years, above third had working more than ten years, while less than one quarter had working less than five years. The majority of nurses worked at inpatient unit.

Table (6.2): Effect of educational guidelines on the knowledge of the studied sample (n=35) :

Knowledge items	Phase				MH	P
	Pre test		Immediate Post test			
	No	%	No	%		
Preparation of chemotherapy					2.5	0.029*
▪ Poor	2	5.7	0	0.00		
▪ Fair	4	11.4	3	8.57		
▪ Good	29	82.9	32	91.43		
Routes of chemotherapy administration and it's duration					4.2	0.000*
▪ Poor	3	8.57	0	0.00		
▪ Fair	24	68.57	7	20.00		
▪ Good	8	22.86	28	80.00		
Side effect of chemotherapy					3.6	0.000*
▪ Poor	3	8.57	0	0.00		
▪ Fair	10	28.57	2	5.71		
▪ Good	22	62.86	33	94.29		
Patient's preparation before & during dose					3.9	0.000*
▪ Poor	0	0.00	0	0.00		
▪ Fair	10	28.57	4	11.43		
▪ Good	25	71.43	31	88.57		
precaution during and after chemotherapy administration					3.0	0.000*
▪ Poor	2	5.71	0	0.00		
▪ Fair	25	71.43	5	14.29		
▪ Good	8	22.86	30	85.71		
Overall knowledge					4.6	0.000*
Poor	2	5.71	0	0.00		
Fair	18	51.43	3	8.57		
Good	15	42.86	32	91.43		

MH: test of Marginal Homogeneity

* P < 0.005 (significant)

Table(6.2): Illustrated the effect of chemotherapy educational guidelines on nurses knowledge. There was improvement into nurse's knowledge post educational guidelines than pre-educational guidelines. Less than half of nurses had good knowledge pre-educational guidelines

about overall items of educational guidelines about all knowledge compared to more knowledge items differed to than three quarter had good none had poor level post knowledge post-education, also educational guidelines. (5.71%) had poor knowledge before implementation of

Table (6.3): Effect of educational guidelines on the practice of the studied sample(n:35) .

Practice items	Pre implementation		Immediate post implementation		Follow up		P
	No	%	No	%	No	%	
Before chemotherapy preparation							0.001*
▪ Unsatisfactory	5	14.3	4	11.4	5	14.3	
▪ Satisfactory	30	85.7	31	88.6	30	85.7	
During chemotherapy preparation							0.001*
▪ Unsatisfactory	35	100.0	4	11.4	5	14.3	
▪ Satisfactory	0	0.0	31	88.6	30	85.7	
Administration of chemotherapy							0.001*
▪ Unsatisfactory	34	97.1	4	11.4	5	14.3	
▪ Satisfactory	1	2.9	31	88.6	30	85.7	
After administration							0.001*
▪ Unsatisfactory	6	17.1	5	14.3	1	2.9	
▪ Satisfactory	29	82.9	30	85.7	34	97.1	
Practice to extravasations							0.001*
▪ Unsatisfactory	33	94.3	5	14.3	5	14.3	
▪ Satisfactory	2	5.7	30	85.7	30	85.7	
Spillage practice							0.001*
▪ Unsatisfactory	17	48.6	2	5.7	4	11.4	
▪ Satisfactory	18	51.4	33	94.3	31	88.6	
Over all Practice							0.001*
Unsatisfactory	27	77.1	4	11.4	6	17.1	
Satisfactory	8	22.9	31	88.6	29	82.9	

P: Cochran Q test

* significant P value

Table (6.3):This table revealed that, there was difference between levels of nurses practice pre, and post implementation of educational guidelines, diminished into

follow up but still higher than pre education. Also this table mentioned that pre-education above three quarter of nurses their level of overall practice during handling with

chemotherapy was unsatisfactory and less than one quarter was satisfactory. But post education few nurses (11.4% , 17.1%) showed unsatisfactory overall practice level after implementing educational guidelines into post and follow up phases respectively. Also there was changes into satisfactory level of nurse's overall practice (88.6% ,82.9%) into post and follow up phases respectively

Table (6.4) : Correlation between knowledge and practice of the studied sample

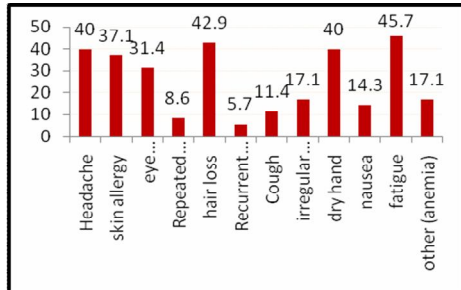
Practice	Correlation coefficient	Before preparation	During preparation	Administration of chemotherapy	After administration	Practice to extravasations	Spillage practice	Total Practical
Knowledge								
	Preparation of chemotherapy	R	-0.24	0.01	0.15	0.29	-0.27	0.31*
	P	0.168	0.961	0.374	0.088	0.118	0.050	0.48
Routes of chemotherapy and it's duration	R	0.02	0.00	-0.09	0.20	0.23	0.13	0.14
	P	0.919	0.985	0.616	0.255	0.176	0.440	0.42
Side effect of chemotherapy	R	-0.04	-0.05	-0.06	0.21	0.16	0.22	0.12
	P	0.800	0.774	0.728	0.218	0.352	0.20	0.47
Patient's preparation before & during dose	R	0.08	-0.16	-0.32	-0.24	0.09	0.08	0.22
	P	0.658	0.364	0.062	0.168	0.598	0.65	0.20
Precaution during and after chemotherapy	R	-0.20	-0.13	-0.19	-0.17	0.36*	0.04	0.11
	P	0.240	0.447	0.270	0.328	0.033	0.840	0.511
Total Knowledge	R	-0.12	-0.08	-0.12	0.17	0.23	0.24	0.09
	P	0.493	0.650	0.485	0.318	0.176	0.173	0.617

R: Pearson correlation coefficient *p< 0.005(significant)

Table (6.4) : shows the correlation between nurse's knowledge and nurse's practice. Only positive correlation was detected between nurses knowledge about preparation of chemotherapy and spillage practice where p value was found to be (p=, 050).In additional to the correlation between nurses knowledge regard precaution during and after chemotherapy administration and

extravasations practice where p value was found to be (p=, 033) . Moreover there was no statistical correlation between nurses total knowledge score and total practice score of nurses.

Figure (6.1): this figure illustrated that largest proportion of nurses suffered from fatigue, in the same line less than half of the studied sample complained from hair loss, headache, and dry hand.



Discussion

Chemotherapeutic drugs are cluster of agents falling below the classification of hazardous substances, they had a toxicity risks for patients also as nurses, extravasations and spillages are the most fearful complication when therapy administration and had harmful result on both nurses and patients^(10,11). So that protection of health care supplier who are exposed to this drugs is an international concern. Despite the implementation of detailed guidelines for the safe handling with this drugs, nurses still being exposed to those substances. A vital step for nurses protection from this hazards can be achieved through specially trained staff, handiness of safety measures like isolators, biological safety cabinets, and personal protective equipment.⁽¹²⁾

Discussion of the current results will be presented under the following: The socio-demographic background of the present study showed that, the largest proportion aged from nineteen to twenty nine year years. In contrast, Sunita *et al*, 2009⁽¹³⁾ found that nearly half of the subjects were more than forty one years of age. In relation to gender, the results of this study revealed that nearly all of nurses were female. This

result in the same line with Shahrabi *et al*, 2014⁽¹⁴⁾ who reported that, the highest of study sample are female. (This may prove the fact that most nurses in our community are female). In the current study above two-third of sample was married, this is in harmony with Momeni *et al*, 2013⁽⁷⁾ who reported that the majority of the subjects were married. Regarding educational level, this study showed that above half had diploma nursing degree. This result supported by Verity *et al*, 2008⁽¹⁵⁾ who indicated that more half had qualified to nursing diploma level. In contrast study conducted by Polovich & Martin, 2011⁽¹⁶⁾ who reported that above half of the nurses had university degree. (This may related to differences of setting and places can affect on results of educational level). About years of experience in chemotherapy unit, the results of presented study revealed that more than one third had experience from five to nine years. This goes on line with Rizalar *et al*, 2012⁽¹⁷⁾ who mentioned that nearly one third had experience from 5 to 9 year in chemotherapy unit. In contrast Khan *et al*, 2012⁽¹⁸⁾ mentioned that nearly half had less than five years of experience as a chemotherapy nurse. Regarding nurses health problems resulting from chemotherapy drugs were fatigue, hair loss, headache, and dry hands. In the same line study of Constantinidis *et al*, 2011⁽¹⁹⁾ who proved that the most common health problem are included headache, and hair loss.

A changes was observed among nurses regarding their knowledge after apply chemotherapy educational guidelines where p values

was found to be ($p=.000$). In a study conducted by Mohsen &Fareed, 2013⁽²⁰⁾ similar results was found an improvement in total knowledge score after applying chemotherapy educational training. (So that findings of this study shows clear need for providing nurses with continuous in-services educational sessions to maintain high modality of nurse's knowledge).

About effect of educational guidelines on nurses practice, in the presented study there was a significant improvement into nurses practice immediately and diminished in follow up, but still higher than the pre-educational data. This is in accordance with study carried out by Khan *et al*, 2011⁽¹⁸⁾; Shokier *et al*, 2012⁽²¹⁾ who reported that there was statistical significant improvements in total practice score before and after educating them the safety protocol and decreased in follow up phase but remain higher than pre-program. (This denotes the importance and usefulness of educational sessions as a tool for improving and maintaining nurses practices during handling with chemotherapy).

Analysis of data showed that no statistically differences between nurses performance total score and their knowledge total score. In consistence with Tulin, 2014⁽²²⁾who reported that there was no a statistically relationship between nurses skill score and their knowledge score. Moreover in the present study there was a correlation between preparation of chemotherapy and practice among spillages where p values was found to be ($p= .050$). In

additional to positive correlation between precaution during and after chemotherapy preparation and practice to extravasations where p value was found to be ($p=.033$).In the same line Attia, 2001⁽²³⁾ found that there was difference between subtotal practice and levels of knowledge.

Conclusion: The results of the current study proved the importance of chemotherapy educational guidelines on improvement of nurse's knowledge and practice.

Recommendation: Based on the finding of the current study the following recommendations are suggested:

A. For the nurses:

- Applying periodic refresh in-service training and educational program for nurses working in chemotherapy unit (inpatient &outpatient).
- Conferences, workshops should be applied continuously for nurses to upgrade their level of knowledge and practice.
- Training program should be concluded for a newly oncology nurses.

B. For the hospital's administration:

- Chemotherapy safety protocol should be instituted for oncology nurses, and evaluate their compliance with this protocol.
- Strategies and polices should be established according to published guidelines.
- Continues check –up for oncology nurses.

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