EFFECTIVENESS OF HEALTH EDUCATIONAL PROGRAM ON PEDIATRIC NURSES' KNOWLEDGE REGARDING CHEMOTHERAPY ADMINISTRATION IN HIWA CANCER HOSPITAL IN SULAIMANI CITY

Hiwa Sidiq Sadiq [a], and Bahar Nasradeen Majeed [b]

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ABSTRACT

Background

Cancer is the uncontrolled growth and spread of cells. Chemotherapy is a potentially life-saving medication for people with malignancies that act by targeting cancer and non-cancer rapid dividing cells. Nurses are the prominent persons exposed to these drugs during the preparation and administration of antineoplastic agents.

Objectives

To find out the effectiveness of educational program on pediatric nurses' knowledge about chemotherapy administration.

Methods

Quasi-experimental research design (pre-posttest) has been utilized in this study. Tool of data collection was built; the program was constructed. To obtain validity (15), experts were selected from different specialties. The pilot study was done on six nurses in the pediatric department in Hiwa cancer hospital within the first two weeks of January 2018, and reliability of the tool was done. Sixty-nine nurses were selected purposively.

Data were collected in three phases; before the educational program, the data was collected as a pre-test, an educational program which was consist of 12 sessions was applied, and the last phase collected data in the same questionnaire after the educational program as post-test. Data was analyzed by using the Statistical Package of Social sciences (V-21).

Results

The result of the study has shown significant differences in mean scores between pre- and post-program application, which indicates the effectiveness of the applied program to the nurses at a P-value (<0.001).

Conclusion

According to the study's findings, the educational program was effective, and nurses' level of knowledge has risen after they participated in educational sessions.

Keywords: *Educational program, Pediatric nurse, Knowledge, Chemotherapy administration.*

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[a] Hiwa Cancer Hospital, Bone Marrow Transplant (BMT) Department, Sulaimani, Kurdistan Region, Iraq.
Correspondence: hiwa.hawramy@yahoo.com
[b] College of Nursing, University of Sulaimani, Kurdistan Region, Iraq.

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INTRODUCTION

Cancer is defined as uncontrolled cell proliferation and spread. It has the potential to impact nearly any part of the body. The tumors frequently infiltrate surrounding tissue and can spread to other parts of the body [1]. It is a leading cause of death in children and adolescents worldwide. More than 80% of children with cancer are cured in high-income countries, but in many Low- and Middle-Income Countries LMICs, only 20% are cured. A correct diagnosis is essential to treat children with cancer. Treatment regimen include (surgery, radiotherapy, and chemotherapy) [2]. Chemotherapy is potentially a life-saving medication for people with malignancies. They act by targeting cancer and non-cancer rapidly dividing cells, which contributes to the potential toxicity of normal cells and increased risk of side effects [3]. Chemotherapy administration is the principal modality of management of most malignant disorders, with numbers exceeding one million infusions each day worldwide [4]. Nurses are the primary group exposed to these medicines in hospitals, especially when dealing with children with cancer. The production and delivery of antineoplastic drugs, in general, are the occupational tasks that offer the most significant risk of exposure. Handling and management of chemotherapy spills, which is a sensitive domain in oncology nursing where little negligence or mistake may lead to adverse consequences for patients, staff, and environment [5]. Many variations in prescribing, dispensing, and administration related to these agents lead to an increased potential for errors that may result in fatal adverse outcomes [6].

METHODS

A quasi-experimental research design (pre-posttest) has been utilized to assess the effect of educational programs on pediatric nurses' knowledge about chemotherapy administration from Feb 20 to Apr 10, 2019. The study was conducted at Hiwa Cancer Hospital, the only hospital for oncology and hematology disorders for all ages in Sulaimani governorate – Kurdistan – Iraq. The study was accepted by the scientific committee of the college of nursing, approved by the ethical committee at the college of the Medicine/University of Sulaimani; in addition, that formal administrative approval was obtained from the general directorate of the health of Sulaimani, a verbal agreement was taken from all participants after clarification the purpose of the study, and reassure them that the information would be confidential. The non-probability purposive sample technique was used; sixty-nine nurses who worked previously and now in the pediatric department in Hiwa hospital were included. Questionnaire form and educational program about chemotherapy administration were conducted by the researcher as a tool of data collection. The questionnaire form consisted of socio-demographic characteristics of the sample, and thirty items concerning knowledge about chemotherapy administration, concerning the educational program that implemented after the pre-test consist of twelve sessions about chemotherapy administration. After validity and reliability, data was collected through the distribution of questionnaire form on participants in pre-test and redistributed after the intervention phase when the educational program was applied. The data were analyzed by using the statistical package for social science (SPSS version 21) by using Frequencies, percentage, Standard deviation (S.D.), Mean of the score, t-test of two independent samples was used to compare two means and (ANOVA) test: it was used to determine the significant differences between the level of knowledge and practice with socio-demographic data of the study population.

RESULTS

Table (1) shows that majority of the sample, 68.1% were female, their age ranged between 20 – 29 years old, most of them living in urban, and more than two-thirds of the sample had a burly sufficient economic status as well as having diploma degree. About half of the sample were volunteers, more than one-third of them working in the inpatient ward, with the fewest percentage of the sample working in the isolation ward. The highest percentage of the sample have not participated in any training course about chemotherapy administration.

Table (2) reveals that nurses' level of knowledge about chemotherapy administration, in general, were at an acceptable level of knowledge 40.23 ± 6.162. Out of 30 items, the participants got a fair level of knowledge in 14 items, a good level of knowledge in 13 items, and a poor level of knowledge in only three items.

Table (3) demonstrate nurses' level of knowledge after receiving an education program about chemotherapy administration; the vast majority of the sample was at a good level of knowledge after receiving an educational program about chemotherapy administration. In only item number (9), the participants were at an acceptable level of knowledge. The total mean score and S.D. in general was (51.00 ± 3.901).

Table (4) shows the considerable diffidence has in mean and S.D. in both pre and post-test, changed from (40.23 ± 6.162) to (51.00 ± 3.901). Furthermore, and highly significant relationships were found at P-value (< 0.001).

Tables (5) demonstrate that no significant relationships were found between nurses' level of knowledge and their socio-demographic characteristics in terms of (gender, age, residency, economic status, level of education, employment status, place of work, and previous chemotherapy course participation). Therefore, this table was analyzed by using the (ANOVA) test.

Table 1. Distribution of sample according to socio-demographic characteristics.

Characteristics	F	%
Gender		
Male	22	31.88
Female	47	68.11
Age group		
20 - 29	49	71
30 - 39	14	20.3
40 - 49	3	4.3
50 - 59	3	4.3
Residency		
Urban	59	85.5
Suburban	8	11.6
Rural	2	2.9
Economic status		
Sufficient	17	24.6
Barely sufficient	48	69.6
Insufficient	4	5.8
level of education		
Preparatory	3	4.3
Diploma	48	69.6
Bachelor	18	26.1
Employment status		
Permanent/formal employment	21	30.4
Contract	13	18.8
Volunteer	35	50.8
Place of work		
Inpatient ward	24	34.8
Outpatient ward	15	21.7
Isolation ward	12	17.4
Other	18	26.1
Training course and its duration		
No participated	56	81.2
2- 4 Hours	7	10.1
5 - 8 hours	4	5.8
9 - 20 hours	2	2.9

Table 2.Distribution the level of nurses' knowledge regarding chemotherapy administration in the pre-test.

NO.	Items	Correct answer		Don't know		Incorrect answer		Mean	Level
		F	%	F	%	F	%		
1.	Most antineoplastic drugs are effective against resting cancer cells	31	44.9	26	37.7	12	17.4	1.28	Fair
2.	There are seven types of chemotherapy	30	43.5	30	43.5	9	13	1.30	Fair
3.	Chemotherapy drugs can cause /lead to increase Hb	53	76.8	5	7.2	11	15.9	1.61	Good
4.	Neoadjuvant chemotherapy is chemotherapy administered before surgery or radiation	25	36.2	30	43.5	14	20.3	1.16	Fair
5.	The aim of chemotherapy can be curative or palliative	27	39.1	5	7.2	37	53.6	0.86	Fair
6.	The purpose of palliative chemotherapy is used for the treatment of cancer where full recovery is expected	45	65.2	10	14.2	14	20.3	1.45	Good
7.	Growth factor GCSF (peg GCSF, Neupogen, Granulocyte) is given to decrease cancer cells	53	76.8	8	11.6	8	11.6	1.65	Good
8.	the most common side effects of chemotherapy are nausea and vomiting	63	91.3	3	4.3	3	4.3	1.87	Good
9.	Administering Mesna with Cyclophosphamide is to increase the action of Cyclophosphamide	27	39.1	42	60.9	-	-	0.78	Poor
10.	Chemotherapy can enter the body through breathing	41	59.4	11	15.9	17	24.6	1.35	Fair
11.	Chemotherapy can enter the body through ingestion	39	56.5	10	14.5	20	29	1.28	Fair
12.	Chemotherapy cannot enter the body through contact with contaminated surfaces	18	26.1	8	11.6	43	62.3	0.64	Poor
13.	Chemotherapy in liquid form can be absorbed through the skin	16	23.2	11	15.9	42	60.9	0.62	Poor
14.	Chemotherapy can more easily enter the body through damaged skin	49	71	7	10	13	19	1.52	Good
15.	Chemotherapy could not enter the body through contaminated foods, beverages, or cosmetics	46	66.7	10	14.5	13	18.8	1.48	Good
16.	Tablets or capsules should not be handled directly; all staff should use a non-touch technique to minimize the risks of exposure.	60	87	5	7.2	4	5.8	1.81	Good
17.	Chemotherapy administration required wearing sterile gloves	35	50.7	7	10	27.1	39.1	1.12	Fair
18.	If the patient check, patient prescription, and the chemotherapy drugs do not all match, then the chemotherapy should NOT be administered.	59	85.5	7	10	3	4.4	1.81	Good

Table 2. Continued ...

19.	**If using central lines, patency must be established by aspirating blood before commencing the treatment.**	51	73.9	12	17.4	6	8.7	1.65	Good
20.	**The most important purpose of Central Venous Catheter (CVC) is for preventing extravasation during the administration of vesicant chemotherapy.**	53	76.8	10	14.5	6	8.7	1.68	Good
21.	**Shaving of the arm before cannulation should be performed**	23	33.3	15	21.7	31	44.9	0.88	Fair
22.	**Cannula site selection should be initiated in the distal areas of the upper extremities**	51	73.9	5	7.2	13	18.8	1.55	Good
23.	**subsequent cannulation should not be made proximal to the previously cannulated site**	35	50.7	15	21.7	19	27.5	1.25	Fair
24.	**All type of chemotherapy needs pre-treatment hydration**	45	65.2	5	7.2	19	27.5	1.38	Fair
25.	**The only specific type of chemotherapy needs antiemetic agents**	39	56.5	12	17.4	18	26.1	1.30	Fair
26.	**Every type of chemotherapy require pre-treatment hydration**	37	53.6	7	10	25	36.2	1.17	Fair
27.	**The only specific type of chemotherapy needs antiemetic premedication**	43	62.3	15	21.7	11	15.9	1.46	Good
28.	**The purpose of slow IV infusion of chemotherapy is to reach sufficient dose to brain**	33	47.8	24	34.8	12	17.4	1.30	Fair
29.	**The purpose of intrathecal (I.T.) administration of chemotherapy is for minimizing adverse effects**	35	50.7	17	24.6	17	24.6	1.26	Fair
30.	**Chemotherapy drugs should be prepared in the treatment room or special treatment area**	59	85.5	4	5.8	6	8.7	1.77	Good
Total mean & S.D.					**40.23 ± 6.162**				

Table 3. Distribution of sample according to the level of knowledge regarding chemotherapy administration in post-test

NO	Items	Correct answer		Don't know		Incorrect answer		Mean	Level
		F	%	F	%	F	%		
1.	Most antineoplastic drugs are effective against resting cancer cells	69	100	-	-	-	-	2.00	Good
2.	There are seven types of chemotherapy	61	88.4	5	7.2	3	4.3	1.84	Good
3.	Chemotherapy drugs can cause /lead to increase Hb	67	97.1	-	-	2	2.9	1.94	Good
4.	Neoadjuvant chemotherapy is chemotherapy administered before surgery or radiation	50	72.5	9	13	10	14.5	1.58	Good
5.	The aim of chemotherapy can be curative or palliative	5.	72.5	-	-	19	27.5	1.45	Good
6.	The purpose of palliative chemotherapy is used for the treatment of cancer where The full recovery is expected	61	88.4	2	2.9	6	8.7	1.80	Good
7.	Growth factor GCSF (peg GCSF, Neupogen, Granulocyte) is given to decrease cancer cells	67	97.1	-	-	2	2.9	1.94	Good
8.	the most common side effects of chemotherapy is nausea and vomiting	67	97.1	-	-	2	2.9	1.94	Good
9.	Administering mesna with Cyclophosphamide is to increase the action of Cyclophosphamide	45	65.2	3	4.3	21	30.4	1.35	Fair
10.	Chemotherapy can enter the body through breathing	68	98.6	-	-	1	1.4	1.97	Good
11.	Chemotherapy can enter the body through ingestion	69	100	-	-	-	-	2.00	Good
12.	Chemotherapy cannot enter the body through contact with contaminated surfaces	63	91.3	-	-	6	8.7	1.83	Good
13.	Chemotherapy in liquid form can be absorbed through the skin	65	94.2	2	2.9	2	2.9	1.91	Good
14.	Chemotherapy can more easily enter the body through damaged skin	67	97.1	1	1.4	1	1.4	1.96	Good
15.	Chemotherapy couldn't enter the body through contaminated foods, beverages, or cosmetics	66	95.7	-	-	3	4.3	1.91	Good
16.	Tablets or capsules should not be handled directly; all staff should use a non-touch technique to minimize the risks of exposure.	67	97.1	-	-	2	2.9	1.94	Good
17.	Chemotherapy administration required wearing sterile gloves	62	90	2	2.9	5	7.1	1.83	Good
18.	If the patient check, patient prescription and the chemotherapy drugs do not all match, then the chemotherapy should NOT be administered.	64	92.8	1	1.4	4	5.8	1.87	Good

19.	**If using central lines, patency must be established by aspirating blood prior to commencing the treatment.**	67	97.1	-	-	2	2.9	1.94	Good
20.	**The most important purpose of Central Venous Catheter (CVC) is for preventing extravasation during the administration of vesicant chemotherapy.**	62	90	3	4.2	4	5.8	1.84	Good
21.	**Shaving of the arm before cannulation should be performed**	58	84.1	1	1.4	10	14.5	1.70	Good
22.	**Cannula site selection should be initiated in the distal areas of the upper extremities**	64	92.8	-	-	5	7.2	1.86	Good
23.	**subsequent cannulation should not be made proximal to the previously cannulated site**	52	75.4	-	-	17	24.6	1.51	Good
24.	**All type of chemotherapy needs pre-treatment hydration**	61	88.4	-	-	8	11.6	1.77	Good
25.	**The only specific type of chemotherapy needs antiemetic agents**	60	87.0	1	1.4	8	11.6	1.75	Good
26.	**Every type of chemotherapy require pre-treatment hydration**	59	85.5	3	4.3	7	10.1	1.75	Good
27.	**The only specific type of chemotherapy needs antiemetic premedication**	56	81.2	2	2.9	11	15.9	1.65	Good
28.	**The purpose of slow IV infusion of chemotherapy is to reach sufficient dose to brain**	61	88.4	1	1.4	7	10.1	1.79	Good
29.	**The purpose of intrathecal (I.T.) administration of chemotherapy is for minimizing adverse effects**	65	94.2	3	4.3	1	1.4	1.93	Good
30.	**Chemotherapy drugs should be prepared in the treatment room or special treatment area**	68	98.6	-	-	1	1.4	1.97	Good
	Total mean & S.D.				**51.00± 3.901**				

Table 4. Statistical differences between pre and post-tests concerning the nurses' knowledge regard chemotherapy administration.

knowledge	N	Mean & S.D.	P-value
Pre Score	69	40.23 ± 6.162	**< 0.001**
Post score	69	51.00 ± 3.901	

Table 5. Association between nurses' level of knowledge and socio-demographic characteristics.

Variables	Knowledge mean scores		Prost – the pre-knowledge difference	P-values
	Pre knowledge Mean ± S.D.	Post knowledge Mean ± S.D.		
Gender				
Male	41.3 ± 4.844	50.1 ± 3.778	8.7 ± 6.7	**0.112**
Female	39.72 ± 6.678	51.40 ± 3.927	11.6 ± 7.1	
Age Groups				
20-29	40.53 ± 6.19	51.12 ± 4.16	10.59 ± 7.44	
30-39	39.07 ± 7.32	51.00 ± 3.35	11.92 ± 6.99	**0.811**
40-49	39.00 ± 1.00	50.00 ± 4.58	11.00 ± 4.35	
50-59	42.00 ± 1.0	49.67 ± 50.99	7.66 ± 2.51	
Residency				
Urban	40.15 ± 6.39	51.02 ± 4.04	10.86 ± 7.27	
Suburban	39.63 ± 4.809	51.13 ± 3.18	11.5 ± 5.68	**0.441**
Rural	45.00 ± 1.414	49.50 ± 3.536	4.5 ± 4.94	
Economic status				
Sufficient	38.94 ± 4.59	51.19 ± 3.22	12.25 ± 5.17	
Barely sufficient	40.77 ± 6.53	51.02 ± 3.87	10.25 ± 6.81	**0.121**
Insufficient	43.00 ± 6.0	47.50 ± 5.74	4.5 ± 10.87	
level of education				
Preparatory	40.67 ± 2.51	50.00 ± 1.73	9.33 ± 4.04	
Diploma	40.56 ± 6.38	50.63 ± 4.03	10.06 ± 7.15	**0.349**
Bachelor	39.28 ± 6.08	52.11 ± 3.7	12.83 ± 7.08	
Employment status				
Permanent/formal employment	39.81 ± 5.455	52.00 ± 2.966	12.19 ± 5.86	
Contract	41.77 ± 5.166	49.54 ± 4.313	7.76 ± 5.96	**0.201**
Volunteer	39.91 ± 6.921	50.91 ± 4.154	11.0 ± 7.90	

Table 5. Continued ...

Place of work				
Outpatient ward	42.50 ± 6.10	51.17 ± 4.219	8.66 ± 7.20	
Inpatient ward	38.09 ± 6.51	50.87 ± 3.46	12.78 ± 6.66	**0.304**
Isolation ward	39.58 ± 6.65	50.75 ± 4.88	11.16 ± 6.83	
Other wards	39.50 ± 5.044	51.00 ± 3.37	11.50 ± 7.23	
Training course and its duration				
Not participated	39.06 ± 5.90	50.79 ± 4.08	11.72 ± 7.18	
1 – 4 hours	41.83 ± 8.21	51.17 ± 2.85	9.33 ± 6.37	**0.143**
5 – 8 hours	41.80 ± 5.02	53.20 ± 2.58	11.40 ± 4.72	
≥ 9 hours	49.50 ± 4.95	50.50 ± 4.95	1.00 ± 0.00	

DISCUSSION

The current study provides valuable information about nurses' knowledge of chemotherapy administration before and after receiving educational programs. The proportion of females were higher than the proportion of male. The highest percentage of sample their age ranged between (20-29-year-old, findings in the present supported with the result of the study done in Egypt [5]. They mention that females record the highest percentage, and most of their samples are between (20-29) years old. The researcher's point is that females are more interested in nursing professionals than males in our country. His hospital is located inside Sulaimani city, that is why the majority of the sample were from urban, and the rest of the sample were from suburban and rural. More than half of the sample was in an intermediate economic state, only approximately one-quarter of the sample at good economic status, due to about more than half of sample they were not employed formally.

In regards to the level of education, the highest percentage of the sample was graduated from technical institute (diploma); unfortunately, more than one-quarter of the sample was graduated from the college of nursing, and the fewest percentage of the sample was graduated from preparatory nursing. Recently in Sulaimani city, all primary and preparatory schools of nursing were closed, and only institute one-third of the nursing remained. The finding in the present study is supported by the result was done in Kirkuk city [7], "which mentions that nurses with diploma degree record the highest percentage among other educations levels"

Concerning samples workplace, although no significant differences were found between nurses' workplaces but, more than one-third of the sample was working in the inpatient ward, and fewest percentage of the sample we were working in an isolation ward, deference in some nurses in workplaces depend on numbers of patients' bed in units.

Unfortunately, the majority of the sample has not participated in any training course regarding chemotherapy administration. Only very few percentages of the sample participated in training courses, and the course was not specifying to chemotherapy administration; it is about childhood cancer in general and chemotherapy involved with it.

Concerning samples level of knowledge before receiving educational program/ in pre-intervention phase, respondents show that (43%) of the items have got a high mean of the score (1.40 - 2) and (46.7%) of the items have got the middle level of the mean score (0.80 - 1.39) and while only (10%) of the items have got a low level of the mean score (0 – 0.79). Moreover, the total mean score and S.D. in the pre-test was (40.23 ± 6.162) which indicates a fair level of knowledge.

It is worth mentioning that item number (8) got the highest mean score (1.87), which related knowledge about the common side effect of chemotherapy, followed by item number (16), which related to the technique of chemotherapy tablet or capsule handling, which directly not to be touched. In addition to that, the respondent in only three items got the lowest mean

score, which indicates a poor level of knowledge. There is a study in Nepal [8] that supports the current result, which "indicates that the level of knowledge of the nurses on this issue is not satisfactory." Moreover, there was another support study in 2019 [9] "revealed that the majority of the sample (55%) had poor knowledge".

Tables (3) explore the respondents' level of knowledge about chemotherapy administration. in post-test/ intervention phase, while Table (4) explore the difference between respondents' level of knowledge about chemotherapy administration. Findings in both tables indicate a marked increase in the mean scores after the educational program. It shows that the mean score and standard deviation in post-intervention were become higher (51.00 ± 3.901) compared to the pre-intervention (40.23 ± 6.162), which indicates that the level of knowledge was improved by (10.77) mean of scores. P-value is less than (0.001). This shows a highly significant difference in mean score between pre-intervention and post-intervention, reflecting that the planned teaching program was effective in increasing the nurses' level of knowledge regarding chemotherapy administration.

This result is similar to a study done by Najma Khan [10]," who highlighted that only 3% of the participants were able to get 80% scores and 54.3% able to get 60% scores in knowledge regarding chemotherapy administration". Another study was done in 2018 [11] articulated that the overall post-test mean with S.D. (19.9±4.19) was higher than the pre-test means with S.D. (13.9±4.07) at $p<0.05$.

Nurses caring for chemotherapy patients require specialized knowledge to ensure safety for both patients' lives and their safety of the jobs [12].

For improving nurses' knowledge regarding chemotherapy administration, a designated educational program in its content and relevancy is one of the best ways; therefore, the current study has designed an educational program to evaluate its effectiveness.

Chemotherapy drugs are a wide range of therapeutic medications used in the managing of cancer diseases. The nursing staff prepares and administers chemotherapeutic drugs; therefore, they need more knowledge and competency to decrease the adverse effects of the drugs on cancer patients [12]. A study was done in Iran [13] supports this result which showed a significant difference in the mean scores (18.7±8.6, 26±11) respectively before and after applying for the educational course at ($p<0.01$).

A study conducted in the Iraqi capital [14] found highly significant differences in the p-value (>0.05) concerning the effectiveness of nurses' knowledge when analyzing pre and post-test study results on the control group, which agree with the result of the current study.

The results in Table (5) reveals that, statistically, there is no significant relationship between socio-demographic characteristics of the study sample in terms of (gender, age, Residency, Economic status, level of education, employment status, place of work, previous chemotherapy courses participation) and mean differences between pre and post-intervention at $P>0.05$. A study in India mentions the "association between pre-test knowledge score and the socio-demographic variables; There was no significant association established between demographic variables with test knowledge" [15]. Mohammed and Aburaghif [14], in their study, were opposed to the present study, which indicated that "significant relationships were found between samples (sample's level of education, years of employment and years of experience in oncology wards) and samples level of knowledge.

The relevancy and content of the educational program and the participants' willingness had a tremendous effect on their knowledge concerning chemotherapy administration, as shown in Table (5), regardless of their socio-demographic characteristics.

This result is supported by a study done by Muthuram [15] in India, which shows, there is no significant association between the background variables of the study sample and level of knowledge and practice regarding chemotherapy for cancer patients.

In addition, another agreed result in Kirkuk city at 2018 [16] with the current result shows that there is no significant association between knowledge score and samples' selected demographic variable in terms of age, gender, education, occupation of parents, previous information about chemotherapy.

A recent study 2018 [17] agrees with the current result that there was no significant association between selected background variables such as age, gender, educational qualification and medium of education, and level of knowledge.

The association between the sample's level of education, years of employment, and years of experience in oncology wards results from a study [18] that disagrees

with the current study results.

In conclusion, educational programs about chemotherapy administration positively affect nurses' knowledge; it increases the level of knowledge from fair to good level. Statistically, significant differences were found between nurses' levels of knowledge in pre-test and post-test. Statistically, no significant association was found between nurses' level of knowledge and nurses' socio-demographic characteristics in terms of gender, age, residency, economic status, level of education, years of employment, years of experience in the pediatric oncology ward, workplace, employment status and participating in the previous training course.

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