Effectiveness of Health Educational Program on Nurses' Practices toward Chemotherapy-Induced Peripheral Neuropathy for Children at Hematology Center in Baghdad City

فاعلية البرنامج التعليمي الصحي في ممارسات الممرضين تجاه الاعتلال العصبي المحيطي الناجم عن العلاج الكيميائي للأطفال في مركز امراض الدم في مدينة بغداد

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المستخلص

الاهداف: تقييم ممارسات الممرضات تجاه الاعتلال العصبي المحيطي الناجم عن العلاج الكيميائي للأطفال في مركز امراض الدم، وتأثير فاعلية البرنامج التعليمي الصحي في ممارسات الممرضين تجاه الاعتلال العصبي المحيطي الناجم عن العلاج الكيميائي للأطفال ,ومعرفة العلاقات بين فاعلية برنامج التعليمي الصحي والخصائص الديموغرافية للممرضين.

منهجية البحث: استخدم التصميم شبه التجريبي في الدراسة (تصميم يقسم العينة إلى مجموعتين ، مجموعة دراسة ومجموعة ضابطة ، مع جمع البيانات على ثلاث مراحل). أجريت هذه الدراسة في مركز امراض الدم في بغداد للفترة (من ١٦ كانون الأول ٢٠١٩ إلى ٨ أيار ٢٠٢٠) ، لمعرفة مدى فاعلية برنامج االتعليمي الصحي على ممارسات الممرضين تجاه الاعتلال العصبي المحيطي الناجم عن العلاج الكيميائي للأطفال ، كانت العينة المستهدفة (غير الاحتمالية) قصدية مكونة من (٥٠ ممرضة) مقسمة إلى مجموعتين (٢٥) ممرضة لمجموعة الدراسة و (٢٥) ممرضة مجموعة ضابطة تعمل في مركز أمراض الدم. تم إنشاء استبيان كأداة لجمع البيانات ويتكون من جزأين: الجزء الأول: الخصائص الديموغرافية للمرضين مثل: (الجنس ، العمر ، المستوى التعليمي ، الحالة الاجتماعية ، سنوات الخبرة في التمريض ، وسنوات الخبرة في مركز أمراض الدم ، ودورات تدريبية تجاه الاعتلال العصبي المحيطي الناجم عن العلاج الكيميائي).

الجزء الثاني: تقييم ممارسات الممرضات تجاه الاعتلال العصبي المحيطي الناجم عن العلاج الكيميائي ويتكون من أربعة مجالات (٤١) قائمة مرجعية. تم التحقق من مصداقية الاستبيان والبرنامج التعليمي بعرضه على (١١) خبيراً.

موثوقية الاستبيان تم إجراؤه بواسطة أسلوب الاختبار وإعادة الاختبار على ستة ممرضين في مركز أمراض الدم بفاصل زمني مدته ٢١ يومًا.

النتائج: بينت الدراسة الحالية أن هناك تغير واضح في ممارسات الممرضين تجاه الاعتلال العصبي المحيطي الناجم عن العلاج الكيميائي في مركز امراض الدم حيث قيمة (p-value=0) للبيانات المسبقة والاختبار البعدي الاول وكذالك للختبار البعدي الثاني في مجموعة الدراسة.

بينما كان هناك فرق ضيل جدا بين الاختبارات المسبقة والاختبار البعدي الاول والاختبار البعدي الثاني حيث قيمة (p-value=0.46) ل للبيانات المسبقة و الاختبار البعدي الاول، وقيمة (p-value=0.46) ل للبيانات المسبقة و الاختبار البعدي الثاني في المجموعة الضابطة.

التوصيات: بناءً على نتائج الدراسة المذكورة ، يوصي الباحث بتنفيذ هذا البرنامج التعليمي في جميع مستشفيات ومراكز أمراض الدم والأورام لدى الأطفال ونخاع العظام في العراق.

الكلمات المفتاحية: فاعلية ,البرنامج التعليمي الصحي، ممارسات ، الممرضين ، الاعتلال العصبي المحيطي الناجم عن العلاج الكيميائي ، امراض الدم .

Abstract

Objectives: the study aims to assess nurses' practices toward chemotherapy-induced peripheral neuropathy (CIPN) for children at the hematology center, and to determine the effectiveness of the health education program on nurses' practices toward CIPN, and to find out the relationships between the effectiveness of Health education program and demographic characteristics of nurses.

Methodology: Use quasi-experimental design in the study (a design that divides the sample into two groups, a study group and a control group, with data collection in three stages). This study was conducted at a hematology center in Baghdad city for the period (from December 16th, 2019 to 8th May 2020), to find out the effectiveness of the health education program on nurses' practices toward CIPN, a targeted (non-probability) sample was purposive consisting of (50 nurses) divided into two groups (25) nurses for the study group and (25) control group nurses working in the hematology center.

A questionnaire was constructed as a tool to collect data and consisted of two parts:

Demographic characteristics of the nursing (age, gender, years of experience in nursing, years of experience in hematology center, marital status, level of education, and Participation in training courses toward CIPN).

assess of nurses' practices towards CIPN consisting of four domains (41) checklist. Validity of the study instrument to the educational program was verified by presenting it to (11) experts, reliability of the questionnaire done by test and re-test approach on six nurses at Hematology center interval period of 21 days.

Results: The study showed that a clear changing in nurses' practices toward CIPN at hematology center, where the value (P-value =0.00) for a pre-test and a post-test I), as well as a post-test II in the study group.

While a little difference changing in nurses practices, where the value (P-value =0.46) for a pre-test and a post-test I, as well as a post-test II where the value (P-value =0.46) in the study control.

Recommendations: Based on the results of the mentioned study, the researcher recommends implementing this educational program in all hospitals and centers for pediatric hematology, oncology and bone marrow in Iraq.

Keywords: Effectiveness, Educational program, Nursing, Practices, Chemotherapy-induced peripheral neuropathy, Hematology.

Introduction:

A pediatric oncology nurse has an important role to assessing children receive neurotoxic anticancer drugs, especially in clinical care for surviving children, Although the weakness of nurses assessment skills in assessing children, However, nurses have a responsibility in assessment, education, management of symptoms, and care coordination to children, so one of the greatest challenges in providing care for cases their deficit of nursing assessment guidelines or standard of care assessment for children experiencing CIPN [(1)].

Pediatric oncology nurses must recognize the widespread problem of CIPN in children receiving neurotoxic chemotherapy agents and continually assess children for evidence of CIPN during and after use neurotoxic chemotherapy so nurses must be familiar with evidence toward the effectiveness of pharmacological and nonpharmacological approaches to managing CIPN, and Oncology nurses should be an assessment of sensory symptoms, motor symptoms, and autonomic symptoms [(2)].

Chemotherapy-induced peripheral neuropathy can define a clinical problem that effects on neurological system to children received anticancer drugs such as platinum-based compounds, taxanes, vinca alkaloids; biologics, antiangiogenesis agents, and proteasome inhibitors used for treating of a wide range of solid and hematologic malignancy, the clinical problem can notice the sensory loss, paresthesia, numbness, or tingling sensation and loss of balance, muscle weakness, burning and pain distribution in hands and feet, that affecting on QOL children [(3)].

Chemotherapy-induced peripheral neuropathy can happen during or shortly after receiving of chemotherapy, progresses with increasing doses, or degrade after some drugs have been stopped, which is called coasting; CIPN may be persistent and usually partially reversible over weeks to months after chemotherapy completion, or maybe irreversible with Severe CIPN, and children could have residual numbness and burning sensation in their hands and feet, years after finishing chemotherapy [(4)]. Peripheral neuropathy defines as a

neurological disorder that affecting on peripheral nerve fiber including autonomic, sensory, and motor fibers, not fully understood the etiologies of the Peripheral neurotoxicity mechanism of chemotherapy but maybe result from interaction with an ion channel, mitochondria, Deoxyribonucleic acid (DNA), glutamate neurotransmission [5].

The progress into anticancer drugs to the treatment of various cancers, taking into account the children's long-term treatment, importance major in the hematology practice [6].

Ethical Considerations

The Institutional Review Board (IRB) at the University of Baghdad, College of Nursing approved the study to be conducted. The study protocol meets both the global & the Committee on Publication Ethics(COPE) standards of respecting humans subjects' rights.

Results:

Table (1): Distribution of the Study Samples (Study and Control) According to the Demographical Data

Variable	Groups	Study Group		Control Group	
		Freq.	%	Freq.	%
Age Groups	20-25	9	36.0	10	40.0
	26-30	9	36.0	10	40.0
	31-35	5	20.0	4	16.0
	36-40	2	8.0	1	4.0
	Total	**25**	**100.0**	**25**	**100.0**
Gender	Male	10	40.0	9	36.0
	Female	15	60.0	16	64.0
	Total	**25**	**100.0**	**25**	**100.0**
Marital Status	Married	16	64.0	15	60.0
	Single	9	36.0	10	40.0
	Total	**25**	**100.0**	**25**	**100.0**
Educational Levels	Nursing high school	5	20.0	6	24.0
	Diploma in nursing	10	40.0	10	40.0
	Bachelor's in nursing	10	40.0	9	36.0
	Total	**25**	**100.0**	**25**	**100.0**

Freq. = frequency, % = percentages

Table (1) displays the frequency counts for selected variables. As mentioned above, the two groups (control versus study) were equal in size (25) participants for each of them. Most

of the participants in the study group are in the (20 – 25) and (26-30) years-old age groups (n = 18; 72.0%), and its approximate age groups in the control group (n=20; 80%).

Most of the participants in both groups according to their gender are female (n= 15; 60.0 %) in the study group, while the number in the control group is (n= 16; 64.0 %).

Most of the participants in the study group are married (n = 16; 64.0 %), and almost the same proportion of the married participants in the control group (n = 15; 60.0 %).

Most of the participants in the study group are graduated from nursing college (n = 10; 40.0 %), and from institute of nursing (n = 10; 40.0 %), followed by those who graduated from nursing high school (n=5; 20.0), While, almost the same proportion in the control group, the most of them are institute graduated (n = 10; 40.0 %), followed by those who graduated from nursing college (n = 9; 36.0 %), and who graduated from nursing high school (n=6; 24.0). These findings would suggest that the randomization process provide an acceptable level of equality between the groups.

Table (2): Distribution of the Study Samples (Study and Control) According to Their Years of Experience and Training Courses

Variable	Groups	Study Group		Control Group	
		Freq.	%	Freq.	%
General years of experience in nursing	1-5	15	60.0	16	64.0
	6-10	7	28.0	7	28.0
	11-15	3	12.0	2	8.0
	Total	**25**	**100.0**	**25**	**100.0**
Years of experience in hematology center	1-5	18	72.0	19	76.0
	6-10	6	24.0	5	20.0
	11-15	1	4.0	1	4.0
	Total	**25**	**100.0**	**25**	**100.0**
Participation in training courses toward CIPN	Yes	0	00.0	0	00.0
	No	25	100.0	25	100.0
	Total	**25**	**100.0**	**25**	**100.0**

Freq. = frequency, % = percentages

Table (2) shows that the general years of experience in the study group ranged from 1-5 years are (n = 15; 60.0 %), followed by those who have 6-10 years (n = 7; 28.0 %), and who have 11-15 years (n = 3; 12.0 %) respectively. While regarding the general years of experience in the control group almost the same proportion that ranging from 1-5 years are (n = 16; 64.0 %), followed by those who have 6-10 years are (7; 28.0), and 11-15 years are (n= 2; 8.0%).

Years of experience in hematology center in the study group ranged from 1-5 years are (n = 18; 72.0 %), followed by those who have 6-10 years (n = 6; 24.0 %), and who have 11-15 years (n = 1; 4.0 %) respectively. While regarding the general years of experience in hematology center in the control group almost the same proportion that ranging from 1-5 years are (n = 19; 76.0 %), followed by those who have 6-10 years are (5; 20.0), and 11-15 years are (n= 1; 4.0%).

Both of the study and control groups, (n = 25; 100.0 %) reported that they had no specific training courses toward CIPN.

Table (3): Comparison Significance Between the Two Periods (Pre-Test & Post-Test I, And Post-Test II) Related to Nurses' Practices of the Study and Control Groups

Domains	Main Domains of Practice	Study Group			t test (pre & post I)	P value at 0.05 (pre & post 1	t test (pre & post II)	P value at 0.05 (pre &post II)	Control Group			t test (pre & post 1)	P value at 0.05 (pre & post 1)	t test (pre & post 2)	P value at 0.05 (pre & post 2)
		Pre	Post I	Post II					Pre	Post I	Post II				
		Mean	Mean	Mean					Mean	Mean	Mean				
Domain 1	Observational checklist for nursing practices regarding Basic principles in nursing practices	1.31	2.66	2.13	16.54	0.00	9.38	0.00	1.3	1.31	1.3	0.07	0.47	0.02	0.48
Domain 2	Assessment of the child's pain, sensory and motor.	1.09	2.05	1.73	6.5	0.00	4.61	0.00	1.08	1.09	1.09	0.28	0.38	0.37	0.35
Domain 3	Non-pharmacological nursing interventions to relieve pain	1.05	2.05	1.8	7.85	0.00	6.12	0.00	1.04	1.05	1.06	0.16	0.43	0.55	0.29
Domain 4	Nursing practices around preventive measures to reduce CIPN.	1.01	1.58	1.37	22.99	0.00	9.59	0.00	1.01	1.01	1.01	0.00	0.5	0.27	0.39
Overall Domains		1.12	2.08	1.76	4.19	0.00	3.78	0.00	1.11	1.12	1.12	0.07	0.46	0.08	0.46

Table (3): shows that there is a highly significant difference between pre-test & post-test I, and post-test II in the study group, while there is trivial significant difference between pre-test & post-test I, and post-test II in the control group related to overall domains of nurses' practices.

Table (4): Association between Nurses' Socio-Demographic and Their Overall Practices

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
Age	-.723	1.358	-.253	-.532	.597	-3.462	2.016
Gender	1.173	1.612	.223	.727	.471	-2.078	4.423
Years of Experience in Nursing	2.338	1.664	.494	1.405	.167	-1.017	5.694
Years of experience in hematology center	-2.660	1.403	-.700	-1.896	.065	-5.488	.169
Marital Status	2.496	1.603	.476	1.557	.127	-.737	5.729
Level of Education	-.440	1.077	-.131	-.409	.685	-2.611	1.731

B= unstandardized coefficients; Std. Error= standard errors; Beta= standardized coefficients; t= t-statistics; Sig. = significance

Table (4) shows that; there is no association between nurses' practices, and their socio-demographic characteristics (age, gender, year of experience in nursing, years of experience in hematology center, marital status, and level of education).

Discussion:

Part I: Discussion of the Socio-demographic characteristics, years of experience, and specific training courses of the sample.

Age

The results showing in the table (1 - 2 – 4) The majority of the participants in the study group (18; 72.0%) and the majority of the participants in the control group (20; 80.0%) are in the age group of (20-25) and (26-30) years respectively and there are no statistical differences between nurses' practices with their age (p-value 0.597).

These results supported by a descriptive study was carried out in the pediatric ward of teaching hospitals in Baghdad city, the study showing that about (72.7%) of the nurses were in the age group of (20-30) years [(8)].

Agreed with other study stated there were no statistical differences between nurses' knowledge and practices with their age was (p-value 0.232) [(9)].

Gender

Table (1 - 2 – 4) showing results demonstrated that the highest percentages of the participants in the study group are female (15; 60.0 %), and (16; 64.0%) in the control group, it shows no statistical differences association between nurses' practices and gender (p-value 0.471).

The finding agrees with a study concerning nurses who were working at the hematology center in Baghdad city which stated that the majority of the sample was female (65.0 %) with (p-value 0.655) [(7)].

The finding also agrees with other study about nurses' Knowledge Concerning Medication Error at Teaching Hospital in AL-Nasiriyah City which stated that the majority of the sample was female (54.4 %) with (p-value P=0.846)[(10)].

Marital Status

As per marital status most of the participants in the study group are married (16; 64.0 %), and almost the same proportions of the married participants are in the control group (15; 60 %), there is no statistical difference between nurses' practices with their marital status (p-value 0.127).

This result comes with a study conducted in Baghdad city which show that most of the participants in the study and control groups were married (68%) [(9).]

Level of education

The table (1 - 2 – 4) showing results most of the participants in the study and control group have diploma in nursing (10; 56.67 %), and bachelor's in nursing in the study group (10; 40%), and control group (9; 36.0), there is no significant relationship

between nurses' practices with their level of education (p-value 0.685).

These results supported by another study were descriptively carried out in 4 teaching hospitals (Al-Yarmouk Teaching Hospital, Al-Karama Teaching Hospital, Al-karkh Hospital, and Al-Kadhimiyia Teaching Hospital) in Baghdad City, These results showing no significant association between nurses' knowledge and their level of education in the delivery room toward neonatal resuscitation (p-value 0.709)[(11)].

Another study was conducted on all nurses working in the respiratory care unit at pediatric teaching hospitals in Baghdad, at the following Children Welfare Pediatric Teaching Hospital, and Child's Central Pediatric Teaching Hospital. This revealed that the majority of the participants have a nursing diploma and nursing bachelor's (86.9%) [(12).]

General years of experience in nursing

The table (1 - 2 – 4) results in a present majority of the participants in study groups (15; 60.0 %) and control groups (16; 64.0%) respectively, are ranging in their years of experience from 1-5 years there no significant relationship between nurses' practices and their general years of experience was (p-value 0.167).

The study quasi-experimental design results supported with study in the oncology wards at Baghdad City (the Children Welfare, Child's Central and Baghdad Teaching Hospitals) which show that most of the participants in the study and control groups had 1-5 general years of experience in nursing was (54.3%) with (p-value 0.175) [(7)].

The study agrees with other study about Quality of Nursing Care Provided to Neonates at AL- Nasiriyah City Hospitals had 1-5 general years of experience in nursing was sample was (90%) of participation [(13)].

Years of experience in hematology center

The majority of the participants in the table (1 - 2 – 4) results in present study groups (18; 72.0 %) and control groups (19; 76.0%) respectively are ranging in their years of experience in hematology center from 1-5 years, and, so there wasn't any significant relationship between nurses' practices and their years of experience in hematology center (p-value 0.065).

The finding agrees with study stating that the majority of the nurses working at the Intensive Care Unit in AL- Nasiriyah City Hospitals the results show the years of experience in the field from 1-5 years was (90%) of participation [(13)].

Other study supported these results by stating that the majority of the nurses working at pediatric hospitals in Baghdad city (Children Welfare Teaching Hospital and Child's Central Teaching Hospital), the oncology departments in Baghdad city are ranging in their 1-5 Years of Experience in

the leukemic wards (70%) Non-significant (P≤0.05) [14].

Participation in training courses toward CIPN

All of the participants in the table (1 - 2 – 4) results in the present study and control group (100.0 %) don't have any specific training courses toward CIPN. And there is no significant difference between nurses' practices with the specific training courses (p-value 0.5).

The study agrees with other studies stating that (70%) of the study and control samples had unrelated training courses.

There is a lack in the training courses provided in the hematology center regarding chemotherapy, this one of the main causes that decreasing the quality of care [15].

Part II: Part II: Discussion of the educational program effectiveness on nurses' practices.

Comparison significance of participants' practices, pre-test & post-test I, and post-test II and the effectiveness between study and control groups related to overall domains.

Tables (3) present results of most participants in the study group showing have Mean of score for a pre-test (1.12) low-level practice implementation before the program in the pre-test stage and then improve after implementation of education program which showing results Mean of score for the data (2.08) high-level practice implementation in a post-test I, with P-value= 0 of (pre-test & post-test I), while Mean of score of post-test II (1.76) moderate level practice implementation in an after the program with (P-value =0.00) for a pre-test and a post-test I).

while a most of participants in the control group showing no improve in practice which Mean of score for a pre-test (1.11) low-level practice implementation, post-test I with (Mean of score =1.12) low-level practice implementation, and post-test II with (Mean of score=1.12) low-level practice implementation, which showing results P-value= 0.46 of (pre-test & post-test I), and P-value= 0.46 of (post-test I, and post-test II) in the control group.

These results agree with other study finding indicate that half of the nurses showing a fair level of practices during the pre-test period (50%) and the remaining were distributed between poor and good practices (25%), while during the post-test I and II, the nurses are showing good practices toward caring of hydrocephalus baby (100%) their engagement in an educational program[16].

Other study about the effectiveness of the program through the p-value=0.00 of the nurses' responses concerning their knowledge about the side effects of chemotherapy among children with leukemia between the pre-test and the post-test [7].

References:

1. Mohrmann, C., Armer, J., & Hayashi, R. J. (2017). Challenges Evaluating Chemotherapy-Induced Peripheral Neuropathy in Childhood Cancer Survivors: Which Instrument Should Nurses Use?. Journal of Pediatric Oncology Nursing, 34(2), 1-2.
2. Boland, B. A., Sherry, V., & Polomano, R. C. (2010). Chemotherapy-induced peripheral neuropathy in cancer survivors. Oncology, 24(2).
3. McAllister, R. D. (2010). Evaluation of Oncology Nurses' Knowledge, Practice Behaviors, and Confidence Specific to Chemotherapy Induced Peripheral Neuropathy.1-2.
4. Starobova, H., & Vetter, I. (2017). Pathophysiology of chemotherapy-induced peripheral neuropathy. Frontiers in molecular neuroscience, 10, 174.
5. Eldridge, S., Guo, L., & Hamre III, J. (2020). A Comparative Review of Chemotherapy-Induced Peripheral Neuropathy in In Vivo and In Vitro Models. Toxicologic pathology, 0192623319861937.
6. Ferrier, J., Pereira, V., Busserolles, J., Authier, N., & Balayssac, D. (2013). Emerging trends in understanding chemotherapy-induced peripheral neuropathy. Current pain and headache reports, 17(10), 1-9.
7. Mohammed, A. Q., & Aburaghif, L. F. (2018). Effectiveness of Teaching Program on Nurses' Knowledge Concerning the Side Effects of Chemotherapy among Children with Leukemia at Oncology Wards in Baghdad City. nursing national Iraqi specility, 31(1), 14-23.
8. Mohammed, A. Q., Sultan, M. A., & Abdulhassan, S. A. (2017). Assessment of Nurses' Knowledge Concerning Protein Energy Malnutrition for Children under Age Five Years at Medical Wards in Baghdad City. **Mosul Journal of Nursing**, 5(2), 87-91.
9. Jaddoua, B., Mohammed, W., and Abbas, A. (2013). Assessment of Nurse's Knowledge Concerning Glasgow Coma. **Kufa Journal for Nursing Science,** 4-7.
10. Ltheeth, H., & Abbas, S. (2017). Effectiveness of an Educational Program on nurses' Knowledge Concerning Medication Error at Teaching Hospital in AL-nasiriyah City. International Journal of Science and Research, 6(8), 2.
11. Khudhair, S. H.(2012). Assessment of Nurses' Knowledge toward Neonatal

Needs for Resuscitation in the Delivery Room.

12. Mua'ala, E. G., & Abbas, F. H. (2013). Impact of Education Program upon Nurses' Knowledge towards Children under Mechanical Ventilation at Pediatric Teaching Hospitals in Baghdad.
13. Aziz, A. R., & Mansi, Q. H. (2017). Assessment Quality of Nursing Care Provided to Neonates with Respiratory Distress Syndrome at Intensive Care Unit in AL-Nasiriyah City Hospitals. kufa Journal for Nursing sciences, 7(2), 1-12.
14. Maala, E. (2012). Evaluation of nurses' knowledge toward pain management of leukemic child under chemotherapy. Iraqi National Journal of Nursing Specialties, 3(25), 50-57.
15. Jissir, S. A.-R., and Hassan, H. B. (2015). Effectiveness of an Educational Program on Nurses Knowledge about Nosocomail Infection: Case- Control Study. Kufa Journal for Nursing Sciences, 5(1), 4-6.
16. Baewy, S. H., & Aziz, A. R. (2020). Effectiveness of Health Education Program on Nurse's Practices toward Hydrocephalus Neonatal Baby Care at Intensive Care Unit at Medical City Complex in Baghdad City. Indian Journal of Public Health Research & Development, 11(4), 959-963.