Iraqi National Journal of Nursing Specialties

Effectiveness of an Educational Program on Nurse's Knowledge towards Neonatal Total Parenteral Nutrition

Aseel Ali Sakran, MSc.*; Khatam M. Al-Mosawi, ,Ph.D.**.

*Training and Development/ Heet, Al-Anbaar, Iraq.
Email: aseel.ali2104m@conursing.uobaghdad.edu.iq.

** Department of Pediatric Nursing, College of Nursing, University of Baghdad, Baghdad, Iraq.
Email: dr.khatam@conursing.uobaghdad.edu.iq.

ARTICLE INFO

ABSTRACT

Objective(s): This study aims to evaluate the effectiveness of an educational program on nurse's knowledge toward neonatal total parenteral.

Methods: A quasi-experimental design has been used in the present study conducted at Medical City Hospitals including Baghdad Teaching Hospital, Privat Nursing Home, and Pediatric Teaching Hospital from November 12th, 2022 to May 1st, 2023. A convenience sample of 55 nurses was chosen: (25) nurses were in the study group and (25) nurses were in the control group. Five nurses were excluded from the study sample as part of a pilot study. The data was analyzed and interpreted through the use of the application of Statistical Package for Social Sciences (SPSS), version 26.0.

Results: This study shows that 80% of nurses in the study group and 58% of them in the control group reported their source of information is from books as reported by 76% of them in the study group and 68% of them in the control group. The study finding reveals that nurses in the study group had poor level of knowledge during the pre-test time (96%, M±SD= 28.80±1.871), while they are showing good level of knowledge during the post-test 1 (96%, M±SD= 68.92±1.352) and post-test 2 (92%, M±SD= 68.00±.1. 825.indicates significant change in nurses' level of knowledge after applying the program.

Conclusion: Nurses demonstrated a significant improvement in their knowledge following the implementation of the program.

Recommendations: Further research is recommended to explore the relationship between nurses' demographic data and their knowledge and practice about parenteral nutrition. Also, Further study about applications of the same study to the nurses in the other pediatrics Hospitals.

*Corresponding author: Training and Development/ Heet, Al-Anbaar, Iraq. **Email**: aseel.ali2104m@conursing.uobaghdad.edu.iq. (A. A. Sakran,). ORCID: https://orcid.org/0009-0004-3288-1444, https://doi.org/10.58897/1rdtcr79

فاعلية برنامج تعليمي على معارف الممرضين والممرضات حول التغذية الوريدية الكلية لحديثي الولادة

المستخلص

الأهداف: الهدف من الدراسة هو لتقييم فاعلية البرنامج التعليمي على معارف الممرضين حول التغذية الوريدية الكاملة لحديثي الولادة.

المنهجية: تم استخدام التصميم شبه التجريبي للدراسة في هذه الدراسة لتقييم مدى فعالية برنامج تعليمي حول معرفة الممرضات تجاه التغذية الوريدية الكاملة لحديثي الولادة خلال الفترة من 12تشرين الثاني 2022 إلى 1 أيار 2023. وقد حصل الباحث على موافقة من جميع المشاركين في البحث وتم جمع البيانات بدون ذكر الاسماء. كما قام الباحث بشرح البحث وأهدافه للجميع. ولذلك، تم الحصول على معلومات كاملة عن مهمتهم. وأخبر الباحث جميع المشاركين أنه سيتم استخدام نتائج الاستبيان لأغراض بحثية محددة. كما وضح لهم أن جميع المشاركين هم أفراد مستقلون ويحق لهم رفض المشاركة. أجريت الدراسة في مستشفيات مدينة الطب بما في ذلك مستشفى بغداد التعليمي، دار التمريض الخاص، مستشفى الأطفال التعليمي. تم اختيار عينة ملائمة مكونة من 55 ممرضة: 25 ممرضة تعرضت للبرنامج التعليمي كمجموعة دراسة، و25 ممرضة أخرى لم تتعرض للبرنامج كمجموعة ضابطة. تم استبعاد 5 ممرضات من عينة الدراسة كجزء من دراسة تجريبية.

النتائج: فيما يتعلق بالمعلومات حول إجمالي التغذية الوريدية، أفاد 80% من الممرضات في مجموعة الدراسة و58% منهم في المجموعة الضابطة أن لديهم معلومات؛ وان مصدر معلوماتهم من الكتب كما أفاد بذلك 76% منهم في مجموعة الدراسة و 68% منهم في المجموعة الضابطة. واثناء التقييم الشامل لمعرفة الممرضات حول التغذية الوالدية الكاملة لحديثي الولادة؛ كشفت النتائج أن الممرضات في مجموعة الدراسة يظهرن مستوى ضعيف من المعرفة خلال وقت الاختبار القبلي96% ، (M±SD= 28.80±1.871) في حين يظهرن مستوى جيد من المعرفة خلال الاختبار البعدي 1 (96%) ، (M±SD= 68.92±1.352) والاختبار البعدي 2 (92%)، (M±SD= 68.00±1.825) التي تشير إلى التغيرات الكبيرة في مستوى المعرفة لدى الممرضات بعد تطبيق البرنامج. وتم تحليل البيانات وتفسيرها من خلال استخدام تطبيق الحزمة الإحصائية للعلوم الاجتماعية (SPSS) الإصدار 26.0.

الاستنتاج: أظهر المشاركون مستوى منخفض من المعرفة خلال مرحلة ما قبل الاختبار، لكنهم أظهروا تحسنًا كبيرًا في المعرفة خلال الاختبار البعدي 1 والاختبار البعدي 2، بعد تنفيذ البرنامج.

التوصيات: يوصى بإجراء مزيد من البحث لاستكشاف العلاقة بين البيانات الديموغرافية للممرضات ومعارفهم وممارساتهم حول التغذية الوريدية الكاملة، بالإضافة إلى دراسة إضافية حول تطبيقات نفس الدراسة على الممرضات في مستشفيات الأطفال الأخرى.

الكلمات المفتاحية: الممرضات، المعرفة، حديثي الولادة، البرنامج التعليمي، التغذية الوريدية.

Introduction

Neonates in a critical care setting who are hospitalized to neonatal intensive care units (NICUs) undergo significant metabolic alterations, resulting in an augmented need for supplementary energy sources. Poor nutrition can have a negative impact on patient outcomes and hence, it is vital that the dietary needs for neonates who are being treated in the NICU be met [1]. Malnourished patients in critical care exhibit a higher propensity for compromised immune function, weakened musculature, reduced adipose tissue, heightened reliance on mechanical ventilation, prolonged hospitalization, diminished quality of life, and elevated rates of mortality and morbidity [2]. There is a correlation between hunger and extended durations of hospitalization of the neonates [2,3].

Postnatal growth failure, which can worsen neurodevelopmental outcomes, can be avoided with proper feeding for newborns, especially preterm neonates. Babies born prematurely benefit greatly from this. When oral or enteral nourishment cannot be obtained due to factors such as premature birth, surgery, severe sepsis, or intestinal failure, parenteral nutrition (PN) is the medical intervention of choice [3]. When oral or gastrointestinal feedings are insufficient, parenteral nourishment can be given [3,4].

Neonates who are receiving critical care typically do not receive oral nutrition because of the clinical setting

they are in. As a result, a significant number of these individuals require the assistance of artificial nutrition, which can take the form of either parenteral or enteral nutrition. When a patient is unable to intake, chew, or swallow food, enteral nutrition is a technique that can be used to deliver nutrients to the patient through the gastrointestinal tract [4].

A comprehensive comprehension of the indications for total parenteral nutrition (TPN), along with the associated risks and challenges associated with its administration, is crucial for registered nurses. Essential skills and knowledge for nurses include the precise calculation and mixing of TPN solutions, as well as the vigilant monitoring for indicators of adverse reactions or problems. For the purpose of efficiently coordinating TPN care with the other members of the healthcare team, nurses need good knowledge, excellent communication and teamwork skills are required, in addition to the technical expertise required [5].

Methods
Study Design and Setting
A quasi-experimental study design has been used to assess the effectiveness of an educational program on nurse's knowledge and toward neonatal total parenteral nutrition during the period from November 12th, 2022 to May 1st, 2023. The study was conducted in the Medical City Hospitals including Baghdad Teaching Hospital, Privat Nursing Home, and welfare Teaching Hospital.

Study Sample and Sampling
A convenience sample of 55 nurses was divided into two groups: 25 nurses in the the study group, and 25 nurses in the control group. 5 nurses were excluded from the study sample as part of a pilot study.

Data Collection and the Study Instruments
The data was collected utilizing a constructed knowledge questionnaire, which was then responded to through interviews with closed-ended structured questions about nurses' knowledge. The always response was given a score of (3), the sometimes answer was given a score of (2), and the never answer was given a score of (1). During the morning shifts, the nurses were tested on his or her knowledge. Each nurse was given about (10-15) minutes to complete the test. Concerning the data collection of knowledge, the researcher determined (1-1.33) for the poor knowledge, (1.34-1.67) for the moderate knowledge, (1.68-2) for the high knowledge. To achieve the objectives, the researcher developed a questionnaire, which was then used to collect data for a research project Baghdad Teaching Hospital, Home Nursing Privat Hospital, Pediatric welfare Teaching Hospital in medical City on neonatal total parenteral nutrition for nurses.
It is divided into three sections:
Nurses socio-demographic characteristics.
This part is concerned with the collection of demographic data obtained from the intensive care unit nurses through an interview questionnaire sheet which included (5) items related to (age, gender, years of experience, educational status, do you have any previous Knowledge about total parenteral nutrition for neonates).
Nurses' knowledge about total parenteral nutrition.
The second part of the instrument consists of (24) items. Nurses 'practice about neonatal total parenteral nutrition. The third part of the instrument consists of (41) items divided into five main domains which are: questions focus on nurses' practice. Secondly: practices about discontinuing Neonatal Total parenteral nutrition.

Thirdly: Practices of nurses concerning psychological and educational support for the parents of a newborn with total parenteral nutrition.
1. Nurses' practices about neonatal total parenteral nutrition.
2. Practices pre-total parenteral nutrition administration.
3. Practices during-total parenteral nutrition administration.
4. Practices post-total parenteral nutrition administration.

Concerning the data collection of knowledge, nurses knowledge was determined as (1-1.33) for the poor knowledge, (1.34-1.67) for the moderate knowledge, (1.68-2) for the high knowledge.

Validity and Reliability of the Instrument
The questionnaire instrument and program were presented to a panel of seventeen (11) specialists to assess its validity for the study project. In each field, the professionals had more than (5) years of experience. The experts' examination of the questionnaire and program found that the items on the questionnaire and program were clear and sufficient for the study. According to the experts' recommendations, minor changes were made to a few sections of the questionnaire and the program.
The internal consistency type of reliability was determined in a current study; internal consistency reliability measures the consistency between different items of the instrument. The internal consistency between items was determined by using Cronbach`s alpha coefficient which calculated through application of Statistical Package for Social Science Program (IBM SPSS) version 26.0 on a sample of (5) participants which were selected randomly.
The reliability analysis in this table shows accepted evaluation for knowledge (0.730) and practices' scales (0.765) which means that the questionnaires had adequate level of internal consistency and equivalence measurability.

Construction of the instructional Program
The instructional program was constructed to improve the nurses' knowledge concerning neonatal total parenteral nutrition depending upon findings obtained from the results of nurses' preliminary assessment of knowledge needs, reviewing of related scientific literature, previous studies, and scientific-practical experiences of the researcher.
Lectures of the instructional program are as the following:
First lecture: The following activities and topics were conducted on the first week of the program:
1. General Introduction to Complete Parenteral Nutrition for Newborns.
2. Nurses' knowledge about the causes of complete parenteral nutrition of newborns.
Second lecture: The following activities and topics were conducted on the first week of the program:
1.Contraindications and caveats for the use of complete parenteral nutrition.
2.Nurses' knowledge about the complications of giving full venous nutrition to newborns.
3.Nurses' knowledge about the components of intravenous full nutrition for newborns.
Third lecture: The following activities and topics were conducted on the second week of the program:
1.Nurses' knowledge about ways to give full venous nutrition to newborns
2.Nurses' Practices on When to Stop giving Full Parenteral Nutrition to Newborns.
3.Nurses' practices on family psychological and educational support

for the child's parents about complete parenteral neonatal nutrition.

4.Nurse Practices on Full Venous Nutrition of Newborns.

Place of lecture: Private Nursing Home, Pediatric Teaching Hospital, Baghdad Teaching Hospital.

Time of lecture Morning shift at 09.00 Am to 11 am.

Learning devices that are used in all sessions are :

1. Illustrations poster and specific cart
2. Illustrative lectures.

Ethical Considerations

A consent was obtained from college of nursing University of Baghdad, and targeted hospitals. all nurses and the names of the nurses were not collected. Also, the researcher explains the research and its goals for all. Therefore, fully informed about their participation was obtained. All participants were informed that the results of the questionnaire would be utilized specifically for research purposes. Also, all participants were informed that autonomous individuals have the right to refuse involvement.

Data Analysis

The data was analyzed and interpreted through the use of the application of Statistical Package for Social Sciences (SPSS), version 26.0. and Microsoft Office Excel 2016.

Descriptive Statistical Tests used as follows:

Frequency (F): In statistics the frequency of an event is the number of times the event occurred in an experiment or study. It was used to describe the sociodemographic characteristics of nurses as well as their levels of knowledge and practices.

Percentage (%): a number or rate that is expressed as a certain number of parts of something divided into 100 parts. It was used to describe the sociodemographic characteristics of nurses as well as their levels of knowledge and practices.

Mean of Score (M.S): The arithmetic mean is the sum of the individual values in a data set divided by the number of values in the data set. It was used to determine the levels of knowledge and practices among nurses.

Standard Deviation: is a measure that is used to quantify the amount of variation or dispersion of a set of data values. It was used to determine the levels of knowledge and practices among nurses.

Inferential Statistical Tests:

Cronbach Alpha (α): Cronbach's alpha coefficient measures the internal consistency, or reliability, of a set of survey items. Use this statistic to help determine whether a collection of items consistently measures the same characteristic. Cronbach's alpha quantifies the level of agreement on a standardized 0 to 1 scale. Higher values indicate higher agreement between items. It was used to estimate the internal consistency of the study instrument.

Spearman's rank correlation coefficient: The measure of the strength of the correlation for the measurable and non-measurable features that can be and set in the form of a correlation series. Spearman's coefficient has similar properties as Pearson's linear correlation coefficient since it shows the force (absolute value) and the direction (sign) of the correlation of the two features of the analyzed population. The value of this coefficient is in the closed interval [-1, 1]. And the closer to the ends of this range, the stronger the correlation between the features. It was used to determine the relationship among nurses' knowledge and practices with their sociodemographic characteristics.

Point Biserial Correlation: The point biserial correlation, r pb, is the value of

Pearson's product moment correlation when one of the variables is dichotomous, taking on only two possible values coded 0 and 1. The point biserial correlation is a useful measure of effect size, that is, statistical magnitude, of the difference in means between two groups. It is based on Pearson's product moment correlation. It was used to determine the relationship among nurses' knowledge with some of their variables.

Repeated Measure ANOVA: Repeated measures ANOVA is the equivalent of

the one-way ANOVA, but for related, not independent groups, and is the extension of the dependent t-test. A repeated measures ANOVA is also referred to as a within-subjects ANOVA or ANOVA for correlated samples. All these names imply the nature of the repeated measures ANOVA that of a test to detect any overall differences between related means. This test was used to assess the effectiveness of an instructional program among nurses.

Results

Table 1. Socio-demographic characteristics of nurses in the study and control groups (No.: 50)

No.	Characteristics		Study group		Control group	
			f	%	f	%
1	**Age (Years)**	20 – less than 25	10	40	4	16
		25 – less than 30	9	36	10	40
		30 – less than 35	5	20	7	28
		35 – less than 40	1	4	4	16
2	**Sex**	Male	5	20	9	36
		Female	20	80	16	64
3	**Years of experience (year)**	1 – less than 4	18	72	12	48
		4 – less than 7	6	24	5	20
		7 – less than 10	1	4	3	12
		10 or more	0	0	5	20
4	**Level of education in nursing**	Secondary school	2	8	7	28
		Diploma	8	32	12	48
		Bachelor	15	60	6	24
		Postgraduate	0	0	0	0
5	**Having information**	No	5	20	8	32
		Yes	20	80	17	68
6	**Sources of information**	None	0	0	8	32
		Internet	6	24	0	0
		Books	19	76	17	68
		Television	0	0	0	0

No= Number, **f**= Frequency, **%**= Percentage.

Table "1" shows that 40% of nurses ages in the study group ranges between 20-25" years, while ranged between 25-30" years among 40% of nurses in the control group. 80% of nurses in the

study group and 64% of nurses in the control group were female. Nurses had less than 4 years of experience in the study group with 72% of them and 48% in the control group. 60% of nurses in the study group held a bachelor degree in nursing and less than half held Diploma in nursing in the control group. 80% of nurses in the study group had information about total parenteral nutrition and 58% of them in the control group; their source of information is from books as reported by 76% in the study group and 68% of them in the control group.

Table 2. Nurses' Knowledge about Neonatal Total Parenteral Nutrition in Study and Control Groups

List	Knowledge	Study Group (N=25)						Control Group (N=25)					
		Pre-test		Post-test 1		Post-test 2		Pre-test		Post-test 1		Post-test 2	
		M	Ass.	M	Ass.	M	Ass.	M	Ass.	M	Ass.	M	Ass.
1	Total parenteral nutrition means feeding an ill neonate with nutritional product intravenously.	1.16	Poor	2.88	Good	2.88	Good	1.20	Poor	1.28	Poor	1.20	Poor
2	Total parenteral nutrition indicated when the digestive system cannot function properly for many reasons such as obstruction and malabsorption.	1.20	Poor	2.84	Good	2.84	Good	1.24	Poor	1.25	Poor	1.32	Poor
3	In many children, the digestive system function partially that allows to feed with regular meals besides the parenteral nutrition.	1.24	Poor	2.72	Good	2.76	Good	1.28	Poor	1.29	Poor	1.36	Poor
4	Total parenteral nutrition provides a mixture of proteins, carbohydrates, fats, vitamins, minerals, and electrolytes for the neonate's body.	1.28	Poor	2.88	Good	2.88	Good	1.28	Poor	1.18	Poor	1.44	Poor
5	Parenteral nutrition helps save the lives of underweight or sick infants who are unable to digest food taken orally or through tube feeding into the digestive system.	1.24	Poor	2.88	Good	2.80	Good	1.72	Fair	1.70	Fair	1.72	Fair
6	Total parenteral nutrition is given through a vein by inserting a cannula into the child's hand, foot, head, or chest.	1.24	Poor	2.76	Good	2.84	Good	1.88	Fair	1.88	Fair	1.92	Fair
7	Premature or sick infants can receive breast milk naturally or artificially, but often it necessary to be given gradually in order for their digestive system to adapt and got mature.	1.20	Poor	2.88	Good	2.84	Good	1.40	Poor	1.41	Poor	1.52	Poor
8	Total parenteral nutrition is described when there is a failure in the function of the digestive system and difficulties with enteral nutrition.	1.28	Poor	2.88	Good	2.72	Good	1.48	Poor	1.48	Poor	1.56	Poor
9	Indications of total parenteral nutrition include patient who is unable to maintain nutritional status due to severe diarrhea or vomiting.	1.28	Poor	2.92	Good	2.80	Good	1.68	Fair	1.84	Fair	1.80	Fair
10	Indications of TPN include short bowel syndrome which	1.16	Poor	2.96	Good	2.88	Good	1.72	Fair	1.80	Fair	1.76	Fair

No.	Statement										
	result from certain surgeries.										
11	Total parenteral nutrition is not described when the digestive system is functioning with adequate absorption of both macronutrients and micronutrients.	1.24	Poor	2.88	Good	2.76	Good	1.88	Fair	1.96	Fair	1.88	Fair
12	Total parenteral nutrition is not the preferred treatment for patients who are not suffering from severe malnutrition and are expected to receive enteral nutrition for less than 5 days.	1.20	Poor	2.92	Good	2.84	Good	2.00	Fair	2.08	Fair	2.00	Fair
13	Kidney and liver failure both require careful attention when it comes to the use of amino acids and fats in TPN.	1.20	Poor	2.88	Good	2.84	Good	2.00	Fair	2.01	Fair	2.32	Fair
14	Total parenteral nutrition requires a long-term access through the vein in order for the solution to pass through and the most common complications are infection of this catheter.	1.32	Poor	3.00	Good	2.84	Good	1.68	Fair	1.88	Fair	1.84	Fair
15	When using a central venous catheter, it is preferred to use a vein under the clavicle (or jugular) due to the ease of access and the lowest incidence of complications compared to inserting a peripheral or femoral vein.	1.24	Poor	2.96	Good	2.96	Good	1.48	Fair	1.88	Fair	1.76	Fair
16	Complications of catheterization include chest discomfort, puncture of the pleura and thrombosis associated with the catheter.	1.20	Poor	2.96	Good	2.88	Good	1.68	Fair	2.04	Poor	1.06	Poor
17	Long-term central venous access leaves a foreign body in the circulatory system, and blood clots can form around this venous line.	1.16	Poor	2.88	Good	2.84	Good	1.68	Fair	1.76	Fair	1.68	Fair
18	Total parenteral nutrition increases the risk of developing severe sepsis due to complete disregard for the digestive system, which can lead to necrosis of the gut.	1.16	Poor	2.76	Good	2.72	Good	1.12	Poor	1.52	Poor	1.44	Poor
19	Infants who rely on total parenteral nutrition without oral food for prolonged periods are at risk of developing intestinal atrophy.	1.24	Poor	2.72	Good	2.76	Good	1.28	Poor	1.60	Poor	1.02	Poor
20	Patients receiving parenteral nutrition may also need to receive medication through the vein.	1.12	Poor	2.80	Good	2.88	Good	1.32	Poor	1.68	Fair	1.68	Fair
21	For providing the child with energy solutions, glucose solutions via the vein are commonly used with dextrose or glucoses.	1.08	Poor	2.92	Good	2.84	Good	1.84	Fair	2.08	Poor	1.12	Poor
22	Prepared solutions consist of water, ions, glucose, amino acids, and fats. Essential vitamins, minerals, and rare elements are added or given separately.	1.12	Poor	2.88	Good	2.84	Good	1.84	Fair	2.04	Poor	1.08	Poor

23	A limited number of emulsions are considered safe for use in injection, the most important of which is lecithin.	1.16	Poor	2.84	Good	2.92	Good	1.72	Fair	1.88	Fair	2.08	Fair
24	Egg-derived emulsions are not recommended for use in people with egg allergies.	1.08	Poor	2.92	Good	2.84	Good	1.72	Fair	1.88	Fair	1.92	Fair

M: Mean, Poor= 1-1.66, Fair= 1.67-2.33, Good= 2.34 -3

Table "2 "reveals that the study group showing poor level of knowledge during pre-test time in all items, while they show good level of knowledge during the post-test time 1 and post-test time 2 in all items as indicated by high mean scores.

Nurses in the control group show poor level of knowledge during the pre-test time which show poor among items (1, 2, 3, 4, 7, 8, 18, 19, and 20) and show fair among remaining items (5, 6, 9, 10, 11, 12, 13, 14, 15, 16, 17, 21, 22, 23, and 24). During the post-test 1 and 2, they show poor level among items (1, 2, 3, 4, 7, 8, 16, 18, 19, 20, 21, and 22) while show fair level among items (5, 6, 9, 10, 11, 12, 13, 14, 15, 17, 23, and 24).

Table 3. Total Nurses' Knowledge about Neonatal Total Parenteral Nutrition among Study and Control Groups

Levels of knowledge	Study Group (N= 25)												Control Group (N=25)											
	Pre-test				Post-test 1				Post-test 2				Pre-test				Post-test 1				Post-test 2			
	f	%	M	S.D	f	%	M	S.D	f	%	M	S.D	f	%	M	S.D	f	%	M	S.D	f	%	M	S.D
Poor	24	96			0	0			0	0			16	64			13	52			14	56		
Fair	1	4	28.80	1.871	1	4	68.92	1.352	2	8	68.00	1.825	9	36	40.52	5.606	12	48	41.48	5.650	11	44	41.88	6.476
Good	0	0			24	96			23	92			0	0			0	0			0	0		
Total	25	100			25	100			25	100			25	100			25	100			25	100		

F= Frequency, %= Percentage, M= Mean of total score, SD= Standard deviation of total score, Poor= 24 – 40, Fair= 40.1 – 56, Good= 56.1 -72.

Table (3) highlights that nurses in the study group had poor level of knowledge during the pre-test time (96%, M±SD= 28.80±1.871) while they showing good level of knowledge during the post-test 1 (96%, M±SD= 68.92±1.352) and post-test 2 (92%, M±SD= 68.00±.1.825), which indicates the significant changes in nurses' level of knowledge after applying the program.

The nurses in the control group are showing poor level of knowledge during the three times of test: pre-test (64%, M±SD= 40.52 ± 5.606), post-test 1 (52%, M±SD= 41.48±5.650), and post-test 2 (56%, M±SD= 41.88±6.476) that indicate no significant change in nurses' knowledge.

Discussion

The study evaluated the level of knowledge among nurses regarding neonatal total parenteral nutrition. The results indicated that the nurses exhibited a low level of knowledge during the pre-test phase but demonstrated a significant improvement in knowledge during post-test 1 and post-test 2, following the implementation of the programme. The results of the study indicate that the nurses in the control group exhibited a suboptimal level of knowledge during the pre-test, post-test 1, and post-test 2. Furthermore, the data suggest that there was no statistically significant change in the nurses' knowledge over the course of the study for the control group.

Additionally, the study results indicated that the nurses exhibited a low level of knowledge about Neonatal total Parenteral Nutrition during the pre-test phase for all items on the scale. However, during the post-test phase 1 and post-test phase 2, nurses demonstrated a fair level of knowledge for all items on the scale, as evidenced by high mean scores.

The results of the study suggest that the implementation of the program had a significant positive impact on the level of knowledge among nurses in the study group. This improvement could be attributed to the educational components of the program, which aimed to enhance the nurses' understanding of neonatal total parenteral nutrition. Additionally, the results indicate that the level of knowledge among nurses in the control group remained suboptimal throughout the study period. This lack of improvement could be due to the absence of a similar educational intervention in the control group. Overall, the findings underscore the importance of targeted educational and training programs in improving the knowledge and practices of healthcare professionals, particularly in specialized areas such as neonatal care.

In contrast to the outcomes of this investigation, a study carried out in Egypt found that the nurses working in PN had knowledge scores that were significantly higher than the average [6]. This is because the primary responsibility of a nurse is to monitor infant who is receiving PN for a significant portion of their work shift [6,7,8,9,10]. Similarly, the nurses working in neonatal intensive care units (NICUs) play a vital role in the pre-term children and newborns' feeding. It is important for nurses to be familiar with a wide variety of treatment methods and interventions, such as monitoring and caring for neonates when they are receiving either enteral or parenteral nourishment [7,11,12,13,14,15].

The results of this study are consistent with those of other studies that shown a significant difference between pre- and post-intervention knowledge of all aspects of parenteral nutrition, including goals, methods, the prescribing step, complications, prescription precautions, solutions, and recording [7,16,17,18]. This is due to the fact that in the study conducted by Al-Rafay, a substantial difference was detected in the aforementioned areas of knowledge before and after the educational intervention, with the exception of recording and PN monitoring [6,19,20,21,22].

In line with the findings of our research, an additional Egyptian investigation revealed that the vast majority (92%) of the nurses in the sample, possessed an inadequate overall level of knowledge of TPN [8,23,24]. Another study demonstrated that clinical staff in these teaching hospitals did not have sufficient nutrition knowledge to meet the needs of their profession [24]. A lack of suitable and sufficient nutritional knowledge among healthcare staff has been connected to the majority of failed attempts at providing nutritional treatment [9].

Conclusion

Nurses exhibited a low level of knowledge during the pre-test phase but demonstrated a significant improvement in knowledge during post-test 1 and post-test 2, following the implementation of the program.

Recommendations

Further research is recommended to explore the relationship between nurses' demographic data and their knowledge and practice about TPN.

References

1. Shpata V, Kreka M, Mjekaj E, Naço M, Gjyzari A, Soxhuku A. Malnutrition affects negatively the outcome of intensive care unit (ICU) patients: 12AP3-6. Eur J Anaesthesiol EJA. 2013;30:189.
2. Taherkhani A, Shahrokhi A, Barikani A, Rashvand F. Parenteral Nutrition Administration by Critical Care Nurses in Iran: A Performance Evaluation. J Infus Nurs. 2019;42(4):197–202.
3. Paltrinieri AL, Cheng I, Chitrit M, Turnock K. Parenteral nutrition is not a fluid! Arch Dis Child Educ Pract Ed. 2016;101(5):252–7.

4. Cotogni P. Management of parenteral nutrition in critically ill patients. World J Crit Care Med. 2017;6(1):13.

5. McClave SA, Taylor BE, Martindale RG, Warren MM, Johnson DR, Braunschweig C, et al. Guidelines for the provision and assessment of nutrition support therapy in the adult critically ill patient: Society of Critical Care Medicine (SCCM) and American Society for Parenteral and Enteral Nutrition (ASPEN). JPEN J Parenter Enteral Nutr. 2016;40(2):159–211.

6. Punsawat C. Complications and Outcomes of Nutritional Guidelines Implementation in Low Birth Weight Infants. Journal of the Medical Association of Thailand. 2023 Sep 1;106(9).

7. Ameri ZD, Vafaee A, Sadeghi T, Mirlashari Z, Ghoddoosi-Nejad D, Kalhor F. Effect of a comprehensive total parenteral nutrition training program on knowledge and practice of nurses in NICU. Glob J Health Sci. 2016;8(10):135.

8. Khalefa AMLA, Sc M, Ismail MS, Sc DN, Ali FS, Sc DN. Assessment of Critical Care Nurse' s Knowledge and Practices Regarding Care of Patients Receiving Total Parenteral Nutrition. 2018;86(5):2763–73.

9. Vega Díaz EN, Miranda Barros AA, Castelo Reyna MA, Tenelanda López D, Tubon I. Negative Outcomes Associated with Medication in Neonates on Parenteral Nutrition Therapy. Pediatric Reports. 2023 Jun 6;15(2):360-72.

10. Jabbar HA, Hattab KM. Effectiveness of the Interventional Program on Nurses' Practices about Enteral Feeding Tube for Premature Neonates in the Neonatal Intensive Care Unit. Pakistan Journal of Medical & Health Sciences. 2022 Jun 17;16(05):544-.

11. Al-Jubouri MB. Assessment of Nurse's Knowledge about Nosocomial Infection at Hospitals in Baghdad City. Journal of Kufa for nursing science. 2014 Feb 19;4(1).

12. Obaid BK, Hussein A, Noori KA. Nurses' knowledge concerning neonatal sepsis in neonatal intensive care units at pediatric teaching hospitals in Baghdad city. Asian academic research journal of multidisciplinary. 2016;3(7):56-65.

13. Atiyah SA, Khudhair SH, Hameed NN. Effectiveness of Education Health Program on Nurses' Practices toward Neonates Care with Sepsis in Incubator in Neonatal Intensive Care Unit in Teaching Hospitals Baghdad City. Indian Journal of Public Health Research & Development. 2018 Aug 1;9(8).

14. Jawad Kadhim A, Hassan AF, Isam SR. Evaluation of Nurses' Skills on Changing the Central Venous Catheter Dressing for Patients in Baghdad Teaching Hospitals. Iraqi Natl J Nurs Spec. 2020;33(1):12–20.

15. Nashwan AJ, Yassin MA, Mohamed Ibrahim MI, Abdul Rahim HF, Shraim M. Iron overload in chronic kidney disease: less ferritin, more T2* MRI. Frontiers in Medicine. 2022 Mar 21;9:865669.

16. Al-Jubouri M. Assessment of Nurse's Knowledge about Nosocomial Infection at Hospitals in Baghdad City. J Kufa Nurs Sci. 2014;4(1).

17. Shauq AH, Obaid KB, Zaid W, Summer K, Ulaa N, Sabeh O, et al. NursesKnowledge about Universal Precautions in Neonatal Intensive Care Unit at Pediatric Teaching Hospitals in Baghdad City: Descriptive Study. kerbala J Pharm Sci. 2014;(8).

18. Morris M, Bennett S, Drake L, Hetherton MC, Clifton-Koeppel R, Schroeder H, Breault C, Larson K. Multidisciplinary evidence-based tools for improving consistency of care and neonatal nutrition. Journal of Perinatology. 2024 Apr 13:1-9.

19. Obaid BK, Hussein A, Noori KA. Nurses' knowledge concerning neonatal sepsis in neonatal intensive care units at pediatric teaching

hospitals in Baghdad city. Asian Acad Res J Multidiscip. 2016;3(7):56–65.

20. Obaid H, Mohammed S. Effectiveness of Educational Program on Nurses Knowledge toward Nursing Management for Patients Undergoing Percutaneous Coronary Intervention in Cardiac Center at Al-Dewaniyah City. Iraqi Natl J Nurs Spec. 2020;33(1):12–20.

21. Aziz AR. Nurses' Knowledge about Asthmatic Attacks in Children at Pediatric Teaching Hospitals in Baghdad City. J Nurs Heal Sci. 2018;7(3):67–74.

22. Mousa AN, Aziz AR. Impact of an Intervention Program on Nurses Knowledge towards Infection Control Measures in Pediatric Surgical Wards. Mosul J Nurs. 2022;10(3):39–45.

23. Ahmed SA, Jasim AH, Katea MJ, Foaad AS, Hashim HA, Noori DA. Assessment of Nurses' knowledge concerning Prevention of Central Venous Catheter Infection in Intensive Care Units at Baghdad Teaching Hospitals. kufa J Nurs Sci. 2019;9(1):1–7.

24. Thamer H. Assessment of Nurses' Knowledge regarding oxytocin administration during Labor at maternity hospitals in Al-Kut City. Iraqi Natl J Nurs Spec. 2014;1(27):1–10.