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Effectiveness of self-learning module on pediatric nurse's knowledge regarding protein energy malnutrition for children in Mosul Teaching Hospitals

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Abstract

Introduction: A frequent childhood condition called protein-energy malnutrition is largely brought on by a lack of energy, protein, and micronutrients. This study is designed to measure effective of the self-learning module for the knowledge of nurses concerning protein energy malnutrition for children in Mosul teaching hospitals

Methodology: Pre-experimental pretest with a posttest of one-group study design was applied at Ibn Al-Atheer Teaching Hospital inside Mosul City from 1st of June 2021 to 2ed of January 2022. The sample was chosen using a not-randomly purposive sample that contains (60) nurses.

A preliminary study was conducted on selected (10) nurses for 2 days, the period from 18-17 March 2021. The program booklet and questionnaire were created and made available to nurses. This is divided into two parts. The initial part deals with socio-demographic data, while the second component is broken up into six parts, each including five multiple-choice questions. A panel of 11 professionals from various areas evaluated the program booklet and questionnaire to determine its validity. The pilot research was conducted to assess the questionnaire's dependability. During the period from 1st to 4 August 2021. It included (10) nurses that non- probability selected. Using the Cronbach's Alpha test, the result (0. 791) using SPSS version 25.

Results: The study sample was female gender that 66.7% (40) of the sample at age (23-25). The total nurses' knowledge was 56.7% (34) at a failure level in the pre-test but 43.3% (26) of the post-test at good level. The results of both tests showed a significant difference; the mean was (1.833), the standard deviation (0.905), the t-test (-15.690), and the p-value (0.000) were all significant. Age and gender were the only socio-demographic factors with which total knowledge in the pre-test the post-test significantly differed, but no other socio-demographic factors were significantly different. At $p<0.05$ value.

Recommendations: Another study regarding protein energy malnutrition should be done for the nursing staff by other researchers.

Keywords: Effectiveness, self-learning module, nurses' knowledge, protein energy malnutrition.

Introduction

The World Health Organization defines protein energy malnutrition (PEM), which includes marasmus, kwashiorkor, and intermediate phases of marasmus-kwashiorkor, as the cellular imbalance between the availability of nutrients and energy and the body's requirements for them in order to ensure development, maintenance, and specific activities. Children may have more subtle signs of under nutrition or a combination of marasmus and kwashiorkor (1).

Malnutrition in which there is insufficient protein consumption, often known as protein-energy malnutrition or protein-calorie malnutrition, comprises Marasmus kwashiorkor, frequently mentioned as the greatest severe of malnutrition types, refers to significant protein deficiency and substantial calorie insufficiency indicators present. Kwashiorkor refers to protein malnutrition predominate and marasmus refers to shortage in calorie intake (2).

The decades of important research on the prevalence of protein-energy malnutrition in children have revealed that incidence has an effect on children's growth and development, especially those aged 0 to 5. A healthy child will have weight and height measurements that are roughly comparable to the average height (H) and weight (W) distributions of children their age and gender (3).

The WHO estimates that there were 181.9 million (32%) malnourished children in developing countries in 2000. In addition, according to weight for age calculations, an estimated 149.6 million children under the age of 5 are malnourished. According to the same research, PEM-related growth retardation affects roughly half of children in South Central Asia and Eastern Africa (4).

The Research Question

What is the efficiency of a Self-learning module for the knowledge of pediatric nurses concerning protein energy malnutrition for children in Mosul teaching hospitals?

The objective of study
1. To assess nurses' degree of knowledge needs concerning children with protein-energy malnutrition.
2. To evaluate, using pre-and post-tests, the efficiency of the self-learning module (booklet information) program addressing protein energy malnutrition in children.
3. To find out the correlation between the results of the Self-learning module (Booklet Information) the knowledge of pediatric nurses and their socio-demographic characteristics.

Methodology
Study Design: To ascertain the effect of the self-learning module on the knowledge of nurses concerning children with protein-energy malnutrition for, this study employed a pre-experimental design for one pretest-posttest group from 1st of June / 2021 till 2ed of January / 2022.

Study Sample: A not-randomly purposive. The sample contains (60) nurses who work in the paediatric wards at Mosul City, Ibn Al-Atheer Teaching Hospital. Inclusion Criteria: Nurses who are working in pediatric wards on the morning and night shifts. Nurses who agreed and were willing to participate were also ready to fill out the online instrument questionnaire of the study. And nurses from both sexes (male and female). Exclusion Criteria: Nurses who are not working in pediatric wards. Nurses who not agreed and were willing to participate were also not ready to fill out the online instrument questionnaire of the study. And pilot study sample.

Study Steps: The following steps were taken to fulfill the goals of the research.

1. Nurse's Assessment Needs: In the pediatric wards of the Ibn Al-Atheer Teaching Hospital in Mosul City, preliminary research was carried out in order to prepare and approve the assessment instruments. In all, ten nurses were chosen over the course of two days, on June 21 and 22, 2021. There were open-ended questions in the preliminary research. Each nurse is given between 30 and 40 minutes to do the preliminary research. According to the preliminary study's findings, the common of employed nurses in pediatric teaching institutions lack sufficient awareness about children's protein and energy deficiencies. A booklet with details on a self-learning module program has been made for nurses' needs.

2. Construction of an interventional program
Contents of the program: A self-learning module (booklet information) program for nurses regarding protein energy malnutrition for children inside the pediatric wards is developed mostly based on the findings of the nurses' assessments, examining the relevant literature, and the expert's opinions. A self-learning module (booklet information) program is designed according to nurses' assessment needs results, to gain adequate knowledge of nurses regarding protein energy malnutrition. After translating the program booklet into the Arabic language then viewed by three experts in Arabic, given that Arabic is the sample language.

The questionnaires: Prior to the implementation of the Self-learning module "Booklet Information" the program and tools on the nurses' demographic data and their knowledge of protein-energy malnutrition, which is divided into two sections, a questionnaire is created and presented to the nurses.
The initial part is about the demographic information about nurses. While the second component is broken into six categories and comprises five multiple-choice questions in each area.
Part I of the gender and age of the sample are included in the socio-demographic information. However, the second part of the questionnaire deals with the knowledge of nurses concerning children with protein-energy malnutrition. The tool's key foundations include data from the preliminary study's findings, information from the literature review, and expert comments. Regarding the knowledge of nurses, this component of the questionnaire is divided into six sections: The initial part of the chapter focuses on nurses' broad understanding of protein-energy malnutrition in children. The section second focuses on the knowledge of nurses concerning signs and symptoms of protein energy malnutrition for children. The section third aimed at identifying the knowledge of nurses concerning marasmus for children. The section fourth is focused on the knowledge of nurses concerning kwashiorkor for children. Section fifth aimed at identifying the knowledge of nurses concerning the prevention of protein energy malnutrition for children. Section sixth focuses on the knowledge of nurses concerning the management and nursing care of protein energy malnutrition for children.

The Validity: Eleven experts from various medical and nursing professions evaluated the questionnaire and the self-learning module (booklet information) program. The questionnaire and booklet's material were sent to the experts to assess for clarity, applicability, and sufficiency. Their suggestions were taken into account, and some of the things underwent modifications. These alterations were made in response to their insightful remarks, ideas, and suggestions.

The Reliability (Pilot Study): Before the Self-Learning Module's practical phase could begin, a pilot study was conducted from August 1 to August 4, 2021. To evaluate the internal consistency of the questionnaire, it comprised (10) nurses who were non-probability chosen (this sample was left out of the original research sample). Researchers used Cronbach's Alpha to evaluate the nurses, the results were (0. 791) using SPSS version 25.

Implementation of the interventional program: A self-learning module (booklet information) program was put into practice in this research as follows:
1. Self-learning module (booklet information) program complete application for all nurses during the period 18/ August up to 13 September 2021.
2. All nurses were given the pre-test. For the purpose of evaluating the nurses' knowledge, it took each nurse 40-60 minutes to respond and finish. By using the MCQ questions that were direct answer by the nurses. The

pre-test was completed at the hall of Ibn Al-Atheer Hospital inside Mosul city and held under the supervision of the researchers, the pre-test was taken one day of the period at 18 August 2021.

3. The application of the Self-learning module (booklet information) program by giving booklet information to every nurse that participate in the study after doing the pre-test, then giving the booklet about the study that depending on self-learning also the period of self-learning that was from 19 August up to 12 September 2021.

4. To all nurses, the post-test was given. For the purpose of evaluating the nurses' knowledge, it took each nurse 40-60 minutes to respond and finish. By using the MCQ questions that direct answer. The pre-test was completed at the hall of Ibn AL-Atheer Hospital inside Mosul city and held under the supervision of the

researchers; the post-test was taken one day of the period at 13 September 2021.

Collection of Data: The information was gathered from nurses who worked in the pediatric wards of Ibn AL-Atheer Teaching Hospital in Mosul City between August 18, 2021, and September 13, 2021.

Data Analysis Methods: In the current research, the statistical package for social science (SPSS), version 25, is rummage-sale for data analyze. The following descriptive statistical data analysis (frequency, percentages, means, and standard deviation), inferential statistical data analysis (Pearson coefficient correlation (r-test), and T-test), independence test, and level of significance are among the statistical procedures used for data analysis and evaluation of the results.

The Results

Table 1: The demographic variables of knowledge of nurses regarding children with protein energy malnutrition

Demographic Variables		Frequency	Percent
Age	(20-22)	6	10.0
	(23-25)	40	66.7
	(26-28)	12	20.0
	(29-31)	2	3.3
Gender	Male	13	21.7
	Female	47	78.3
Duty Shift	Morning shift	30	50.0
	Night shift	30	50.0
Total		60	100.0

Freq. = Frequency, %= Percentage

Table 2: The statistical for knowledge of nurse's results concerning children with protein energy malnutrition

Students' Knowledge	Estimate	Pre-test		Post-test	
		Freq.	%	Freq.	%
Nurses' knowledge about malnutrition among children in general	Fail	30	50.0	3	5.0
	Not Acceptable	26	43.3	16	26.7
	Acceptable	4	6.7	14	23.3
	Good	0	0.0	26	43.3
	Excellent	0	0.0	1	1.7
Nurses' knowledge about signs and symptoms of malnutrition among children	Fail	46	76.7	9	15.0
	Not Acceptable	13	21.7	12	20.0
	Acceptable	1	1.7	21	35.0
	Good	0	0.0	16	26.7
	Excellent	0	0.0	2	3.3
Nurses' knowledge about malnutrition (Marasmus) among children	Fail	45	75.0	8	13.3
	Not Acceptable	9	15.0	9	15.0
	Acceptable	6	10.0	10	16.7
	Good	0	0.0	29	48.3
	Excellent	0	0.0	4	6.7
Nurses' knowledge about malnutrition (Kwashiorkor) among children	Fail	29	48.3	5	8.3
	Not Acceptable	18	30.0	12	20.0
	Acceptable	10	16.7	12	20.0
	Good	3	5.0	28	46.7
	Excellent	0	0.0	3	5.0
Nurses' knowledge about preventing malnutrition caused by a lack of protein and energy among children	Fail	37	61.7	2	3.3
	Not Acceptable	13	21.7	15	25.0
	Acceptable	10	16.7	10	16.7
	Good	0	0.0	32	53.3
	Excellent	0	0.0	1	1.7
Nurses' knowledge of treatment measures and nursing procedures	Fail	39	65.0	1	1.7
	Not Acceptable	19	31.7	17	28.3
	Acceptable	2	3.3	27	45.0

	Good	0	0.0	13	21.7
	Excellent	0	0.0	2	3.3
Total		60	100.0	60	100.0

Freq. = Frequency. %= Percentage. Fail equals a knowledge score of 0-1. Unacceptable equals a knowledge score of (2). Acceptable equals a knowledge score of (3). Good equals a knowledge score of (4). Excellent equals a knowledge score of (5) for the answer.

Table 3: Statistical for total knowledge of nurse's results concerning children with protein energy malnutrition

		Pre-test		Post-test	
		Freq.	%	Freq.	%
1.	Fail	34	56.7	0	0.0
2.	Not Acceptable	22	36.7	6	10.0
3.	Acceptable	4	6.7	22	36.7
4.	Good	0	0.0	26	43.3
5.	Excellent	0	0.0	6	10.0
	Total	60	100.0	60	100.0

Freq. = Frequency, %= Percentage. Fail equals a knowledge score of 0-6, Unacceptable equals a knowledge score of 7-12. Acceptable equals a knowledge score of 13-18. Good equals a knowledge score of 19-24. Excellent equals a knowledge score of 25-30 for the answer.

Table 4: Statistical association paired samples t-test for the knowledge of nurses sample pre-test, post-test concerning protein energy malnutrition for children

	Items	T	P-Value	Sig.
1	Nurses' knowledge about malnutrition among children in general	-8.907	0.00	S
2	Nurses' knowledge about signs and symptoms of malnutrition among children	-10.243	0.00	S
3	Nurses' knowledge about malnutrition (humor) among children	-9.567	0.00	S
4	Nurses' knowledge about malnutrition (kwashiorkor) among children	-7.070	0.00	S
5	Nurses' knowledge about preventing malnutrition caused by a lack of protein and energy among children	-9.527	0.00	S
6	Nurses' knowledge of treatment measures and nursing procedures	-11.057	0.00	S
7	Total Nurses' knowledge about malnutrition among children	-15.690	0.00	S

Table 5: Statistical Consequences ANOVA for the knowledge of nurses sample pre-test, post-test concerning protein energy malnutrition for children

Study Group		Sum of Squares	DF	Mean Square	F	Sig.
Knowledge	Regression	81.333	1	81.333	272.017	0.00
	Residual	17.346	58	0.299		
	Total	98.679	59			

DF=Degree of Freedom, F=Calculator F. Sig=Significant at p-value equals or less than 0.05 level

Table 6: The correlations statistical among the demographic variables with nurses sample results concerning protein energy malnutrition for children

Nurses' knowledge	Age		Gender		Duty shift	
	Pre	Post	Pre	Post	Pre	Post
Nurses' knowledge about malnutrition among children in general	0.667	0.360	0.035	0.039	0.410	0.382
Nurses' knowledge about signs and symptoms of malnutrition among children	0.526	0.243	0.624	0.603	0.418	0.058
Nurses' knowledge about malnutrition (Marasmus) among children	0.168	0.549	0.466	0.021	0.847	0.001
Nurses' knowledge about malnutrition (kwashiorkor) among children	0.530	0.082	0.685	0.783	0.321	1.000
Nurses' knowledge about preventing malnutrition caused by a lack of protein and energy among children	0.896	0.579	0.952	0.557	0.028	0.025
Nurses' knowledge of treatment measures and nursing procedures	0.251	0.579	0.040	0.037	0.818	0.127
Total Nurses' knowledge about malnutrition among children	0.980	0.031	0.011	0.030	0.666	0.980

Pre=Pre-test. Post=Post-test, Correlation is significant at p-value equals or less than 0.05 level

The Results Discussion

The study's nurse respondents' demographics are shown in Table 1 with 66.7% (40) of the sample being between the ages of 23 and 25, 78.3% (47) being female, and equal levels of education at the fourth stage (A, B) of the sample at a nursing college. These findings concur with Mohammed A. *et al.* (2017) [5], who found that 39.4% of the sample's total female population was between the ages of 26-35. In contrast, Mogahed (2011) stated that the common of the nurses' samples were male nurses ranging age from 20 to 30 years (5). The statistical result for nurses' knowledge regarding protein energy malnutrition or parts. That nurses knowledge about malnutrition among children in general is 50.0% (30) of the nurses' results at fail level in pre-test but 43.3% (26) of the nurses' results at a good level in post-test, Nurses knowledge about signs and symptoms of malnutrition among children is 76.7% (46) of the nurses' results at fail level in pre-test but 35.0% (21) of the nurses' results at Acceptable level in post-test, Nurses knowledge about malnutrition (Marasmus) among children is 75.0% (45) of the nurses' results at fail level in pre-test but 48.3% (29) of the nurses' results at a good level in post-test, Nurses' knowledge about malnutrition (kwashiorkor) among children is 48.3% (29) of the nurses' results at fail

level in pre-test but 46.7% (28) of the nurses' results at a good level in post-test, Nurses' knowledge about preventing malnutrition caused by a lack of protein and energy among children is 61.7% (37) of the nurses' results at fail level in pre-test but 53.3% (32) of the nurses' results at good level in post-test, Nurses' knowledge about treatment measures and nursing procedures is 65.0% (39) of the nurses' results at fail level in pre-test but 45.0% (27) of the nurses' results at Acceptable level in post-test as shown in Table (2). These results agree with Pawar P and Mendagudli V. (2019) [6] Regarding the definitions of malnutrition and PEM, the significance of nutrients and sources of nutrients, and the main types of PEM, the majority of the 21 (42%) sample had average knowledge, 29 (58%) had poor knowledge, and 0 (%) had good knowledge; however, in the posttest knowledge level of the sample of under-five children regarding these topics, the majority of the sample had good knowledge (6).

The statistical of total knowledge of the sample nurses concerning protein energy malnutrition for children. That 56.7% (34) of the nurses' results were at a failure level in the pre-test but 43.3% (26) of the nurses' results were at a good level in the post-test as shown in Table (3). These results agree with Rahman1 J. and Ahmed N. (2017) [7]. The researcher demonstrated hence, in order to assess the efficacy of the Self Training Module, the mean post-test knowledge scores and practice scores were apparently higher than the pretest knowledge scores and practice scores. Consequently, the self-learning module was a beneficial method for improving the expertise of staff nurses (7). The statistical differences paired samples t-test between the pretest with posttest knowledge scores for knowledge of nurses sample concerning children with protein-energy malnutrition are highly significant relationships at p-value 0.05, as demonstrated in Table (4). These findings support Moon P and Josy S (2016) [8], who to show the effectiveness of the intended teaching program, it is said that provided knowledge levels during the pretest and post-test are compared. They said that the Tabulated 't' value is compared with the computed 't' value in order to determine if a difference is significant at a level of significance of 5%. The student's paired test is used with a 5% level of significance to compare the mean, standard deviation, and mean percentage score values. The computed "t" value is much greater than the tabular value at a 5% level of significance, which is a statistically significant difference. The tabulated value for N=50-1, or 49 degrees of freedom, was 2.00; the value determined was 25.08 (8).

The consequences statistical of ANOVA for knowledge of the samples' regarding protein energy malnutrition for children, those outcomes are highly significant relationships are (0.00) for samples' knowledge at p-value ≤ 0.05 as shown in Table (5). This result agrees with K. Kavitha, Patil N (2015) [9] that when using paired 't' tests to compare the knowledge scores between the pre-test and post-test in the research, it is shown that there is a significant difference between the knowledge scores from the pre-test and the post-test at p-value ≤ 0.05 (9).

The correlations statistical of nurses sample between the demographic variables with pre-test results regarding protein energy malnutrition for children, that not statistical correlation of the age with all the study parts, also the

gender with all the study parts except nurses knowledge about malnutrition among children in general, nurses' knowledge about treatment measures and nursing procedures, and total nurses knowledge about malnutrition among children, but there is no found statistical correlation of study stage with all the study parts except the nurses' knowledge about preventing malnutrition caused by a lack of protein and energy among children at p-value ≤ 0.05 level as shown in Table (6). These results disagree with Pawar P and Mendagudli V (2019) [6] that the association between the demographic characteristics and the data gathered prior to the examination was investigated using the chi-square test. The fact that the p-value of the association test with knowledge was more than 0.05 for every sociodomographic variable demonstrates that the knowledge regarding the prevention of protein energy deficiency among a sample of children under five is independent of these sociodomographic factors (6).

The statistical correlations of nursing students sample between the demographic variables with post-test results regarding protein energy malnutrition for children, that no statistical correlation of age with all the study parts except Total nurses' knowledge about malnutrition among children, also the gender with all the study parts except nurses knowledge about malnutrition among children in general, nurses knowledge about malnutrition (marasmus) among children, nurses' knowledge about treatment measures and nursing procedures, and total nurses knowledge about malnutrition among children, but there is no found statistical correlation of study stage with all the study parts except the Nurses' knowledge about preventing malnutrition caused by a lack of protein and energy among children at p-value ≤ 0.05 level as shown in Table (6). These results disagree with Moon P and Josy S (2016) [8]. There was a non-significant correlation between score of knowledge and chosen socio-demographic characteristics when provided knowledge levels throughout pretest, and post-test were associated in order to demonstrate the success of the intended training program (8).

The Conclusion
Consequences according to a current study, the researchers typically conclude that the characteristics of the nurses' sample, the common greatest usually female at age (23-25) years. The pre-test and post-test show extremely significant relationship findings for the knowledge of nurses concerning protein energy malnutrition for children. For that, there was the effectiveness of the self-learning model program showed throughout the highly significant level of relationship for the knowledge of nurses between pre-test with post-test for the knowledge of nurses concerning children with protein energy malnutrition. There is no statistical correlation between age in all the study parts, also gender in all the study parts except student knowledge about malnutrition among children in general, students' knowledge about treatment measures and nursing procedures, and total student knowledge about malnutrition among children, but there is no found statistical correlation of study stage with all the study parts except the students' knowledge about preventing malnutrition caused by a lack of protein and energy among children. There is no statistical correlation between age with all the study parts except total student

knowledge about malnutrition among children, also the gender with all the study parts except student knowledge about malnutrition among children in general, student knowledge about malnutrition (marasmus) among children, students' knowledge about treatment measures and nursing procedures, and total student knowledge about malnutrition among children, but there is no found statistical correlation of study stage with all the study parts except the Students' knowledge about preventing malnutrition caused by a lack of protein and energy among children (3).

The Recommendations
1. The College of Nursing and health institute in Nineveh governorate should increase the focus on the vocabulary of all nursing subjects by giving it to students in the theory and practical side.
2. Training course and workshops for nurses at Nineveh Health Directorate staff in all hospital units of Mosul city regarding protein energy malnutrition for children
3. Another study regarding protein energy malnutrition should be done for the nursing staff by other researchers or by Nineveh Health Directorate staff in all hospital units of Mosul City.

Authors' Contributions: Mohammed Ahmed Sultan Alwily is in charge of authoring the whole book. The last draft of the work was reviewed and approved by both writers.

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