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Effectiveness of an Educational Program on Nursing Students' Abilities Regarding Drug Dosage Calculation

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Abstract

Objectives: the study aimed to assessment of the effectiveness of an educational program on nursing students abilities regarding drug dose calculation (pre and post test) A quasi-experiment design was carried out at college of nursing/ university of Kirkuk for fourth stage students from 1st of March, 2018, up to the 1st of March, 2019. The program and the instrument were designed by the researcher to achieve the purpose of the study. A non-probability (convenience sampling) of (40) students both male and female from morning (20) and evening (20) studies was selected. All of the study sample were included in the program (study group) the questionnaire was consisted of three parts: part one the demographic data of the sample, part two the abbreviation and conversion skills. And part three the calculation skills. The data were collected through the use of pretest and posttest the program was explained to the students mathematically to the students and then after two week they given the questionnaire. they were analyzed through the application of descriptive statistical analysis and inferential statistical data analysis. The findings of the study indicated that (52%) of the samples were female, (48%) were male (50%) of the sample were morning study students, (50%) also were evening study students.

Keywords: *Abilities, Educational program, Drug dose, Drug dose calculation.*

Introduction

As core skills of nurses' work, nursing staff and nursing students should understand the medication preparation, medication administration, and medication dosage calculation effectively before injecting the drugs to the patients in order to prevent the hazards resulting from medication errors and to promote more patients safety. National Patient Safety Agency (NPSA) reported that 59.3% of medication administration errors occur during of drug preparation. Dose calculation errors comprise 28.7% of all reported drug errors [1] Drug dose calculation applied through mathematic and numerical formula, some of formula applied for tablet drugs and others for liquid medication as used in the program for the students [2] Increasing students' knowledge and skills regarding drug dose calculation should be emphasized in the curriculum in to the students to increase their skills regarding drug dose calculation.stated that the knowledge and calculation skills of nursing students were inadequate [3]. Emphasized that 92% of 229 nursing students in England failed a drug calculation test and reported that efforts to improve essential numerical and drug calculation skills should be integrated into the university curriculum[(4)]. Objective of the study:

To determine the effect of an educational program on students' knowledge about drug dose calculation.

To assess pre-test knowledge of students regarding drug dose calculation in both groups (study, control).

To assess post-test knowledge of students regarding drug dose calculation in both groups (study, control) after implementation of program.

To comparing the level of knowledge before and after the implementation of educational program in both groups (study and control)

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To find out the relationship between the level of knowledge regarding drug dose calculation in the study group with selected demographical variables such as gender and type of the study.

Methodology

A quasi experimental research design with pre and post-test to the study groups approach was used to evaluate effect of the educational program regarding drug dose calculation skills was carried out from 1stMarch 2018 to1st March 2019.The study was conducted in college of nursing/ university of Kirkuk in Kirkuk city.A Probability randomsampling was chosen for the present study. The sample consists of (40) student nurse the entire sample included in the program (experimental group). An instructional program about drug dose calculation was constructed depending on the results obtained from the assessment of nurses knowledge from reviewing the related literatureand the experts opinion. The questionnaire was constructed for the purpose of the study. The Instruments consisted two parts: Part 1: Demographic Date: This part concerned with personal information include, the (gender, type of the study), Part 2:Abbreviation and conversion skills: which include 8 question about abbreviation and 8 questions about conversion skills regarding medication. part 3: calculation of drug dose skills: which consist of three mathematic questions about liquid medication and two mathematic questions about tablet medication. The researcher fed the computer by all the data collected in the study, the data were analyzed through the use of Statistical Package for Social Science (SPSS) version 20. The statistical procedures which were applied for the data analysis and assessment of the results include the following: descriptive statistics (frequencies, percentages) and statistical inferential (chi-square test) in order to find the differences between the experimental group. Table 1: shows that female constitute (52%) of the study sample, (48%) was male. Morning and evening students were (50 %) equally. Table 2: shows that the effect of a program on the students' abilities regarding abbreviation skills was effect on students. Table 3: shows that the effect of a program on the students' abilities regarding conversion skills was high effect. Table 4: shows that the effect of a program on the students' abilities regarding calculation skills was high effect.

Results and Discusion

Table (5) shows that there is no significant difference between (pre and post abbreviation skills) domain with their gender. And there is significant differences between (pre and post conversion and calculation skills) domain and their gender at P value ≤ 0.05. Table (6) shows that there is no significant difference between (pre and post abbreviation skills) domain with their type of the study. And there is significant differences between (pre and post conversion and calculation skills) domain and their type of the study at P value ≤ 0.05. Table 1: shows that female constitute (52%) of the study sample, (48%) was male. Morning and evening students were (50 %) equally, Explanation of our results the system in our faculty usually accept 75% from students female and 25% male there for we are find most of the students female this results is agreement with other study conducted by Guneş and others 2014 mathematical and drug calculation skills of nursing students in turkey and find , 64.8% were female[5]. Also the results shows in table (2) that the effect of a program on the students' abilities regarding abbreviation skills was effect on students ,this result is disagreement other study conducted by Guneş and others 2014 mathematical and drug calculation skills of nursing students in turkey and find Based on a passing grade of 60%, 52% of the students had grades below 60, and based on a passing grade of 80%, 73.6% of the students were determined to have failed[5] With regard to the effect of a program on the students' abilities regarding conversion skills was high effect in table (3) this results is agreement with other study conducted by Cohen and Weeks and shows that An implication of an education program the can be to let nurses regularly attend an e-learning course followed by a screening test to uncover the weak calculation topics there for find improve conversion skills[6] Also the results shows in table (4) shows that the effect of a program on the students' abilities regarding calculation skills was high effect. The educational method used in teaching drug-dose calculations has a substantial impact on educating students. The efficacy of various educational methods related to developing nursing students' skills with dose calculation has been evaluated[7]. Table (5) shows that there is no significant difference between (pre and post abbreviation skills) domain with their gender. And there is significant differences between (pre and post conversion and calculation skills) domain and their gender at P value ≤ 0.05. Pentin and Smith found

that nurse's ability to calculate drug dosages without a calculator remains contentious and many nursing programmes test their students but allow them to use a calculator or do not assess the process of the calculation when a calculator is used. Moreover they support that the issues for healthcare practice in relation to drug dosages calculation requires further investigation, including establishing if there is any difference in drug calculation error between nurses who use a calculator only and those who perform maths calculation with and without a calculator[8]. Table (6) shows that there is no significant difference between (pre and post abbreviation skills) domain with their type of the study. And there is significant differences between (pre and post conversion and calculation skills) domain and their type of the study at P value ≤ 0.05. The study by Cook and others (2015) was not able to demonstrate an overall difference in learning outcome between the two didactic methods, either of statistical or clinical importance. Both methods resulted in improvement of drug dose calculations after the course, although the learning outcome was smaller than what was defined as clinically relevant. Adjusted for other contributing factors for learning outcome in the multivariable analysis, the classroom method was statistically superior to e-learning, and so was the case for a subgroup with a low pretest result. This finding from the post hoc analysis was probably the only outcome that could have a meaningful practical implication for choice of learning strategy, if reproduced in new studies. These results were in accordance with a meta-analysis of 201 trials comparing e-learning with other methods[9]. Table (5) shows that there is no significant difference between (pre and post abbreviation skills) domain with their gender. And there is significant differences between (pre and post conversion and calculation skills) domain and their gender at P value ≤ 0.05. Table (6) shows that there is no significant difference between (pre and post abbreviation skills) domain with their type of the study. And there is significant differences between (pre and post conversion and calculation skills) domain and their type of the study at P value ≤ 0.05

Table 1: Percent distribution of demographic data of the study sample

No.	**Variable**		**F.**	**%**
1	gender	Male	19	48
		Female	21	52
		Total	40	100
2	Type of study	Morning	20	50
		Evening	20	50
		Total	40	100

Table 2: Effectiveness of educational program on students' abilities regarding abbreviation skills

No.	**Items**	**Pretest**		**Posttest**	
		F	**%**	**F**	**%**
1	low	2	5	1	2.5
2	mild	9	22.5	4	10
3	high	29	72.5	35	87.5
4	total	40	100	40	100

Table 3: Effectiveness of educational program on students' abilities regarding conversion skills

No.	Items	Pretest		Posttest	
		F	%	F	%
1	low	21	52.5	1	2.5
2	mild	10	25	7	17.5
3	high	9	22.5	32	80
4	total	40	100	40	100

Table 4: Effectiveness of educational program on students' abilities regarding calculation skills

No.	Items	Pretest		Posttest	
		F	%	F	%
1	low	32	80	4	10
2	mild	4	10	13	32.5
3	high	4	10	23	57.5
4	total	40	100	40	100

Table 5: Association between pre and posttest of students' abilities to calculate drug dose with their gender

Male						
No.	**variable**	**total**	**Chi-square**	**Crit. $\chi 2$**	**Df.**	**Sig.**
1	Abbreviation abilities	40	2.533	5.99	2	NS
2	Conversion abilities	40	16.8	5.99	2	S
3	Calculation abilities	40	14.46	5.99	2	S
Female						
1	Abbreviation abilities	40	0.65	5.99	2	NS
2	Conversion abilities	40	16.42	5.99	2	S
3	Calculation abilities	40	27.52	5.99	2	S

Table 6: Association between pre and posttest of students' abilities to calculate drug dose with their type of study

Morning study						
No.	**variable**	**total**	**Chi-square**	**Crit. X^2**	**Df.**	**Sig.**
1	Abbreviation abilities	40	0.78	5.99	2	NS
2	Conversion abilities	40	15.56	5.99	2	S
3	Calculation abilities	40	25.6	5.99	2	S
Evening study						
1	Abbreviation abilities	40	1.96	5.99	2	NS
2	Conversion abilities	40	16.76	5.99	2	S
3	Calculation abilities	40	16.26	5.99	2	S

Conclusion

The educational program was effect on nursing students skills regarding abbreviation, conversion and calculation skills. The association was significant differences between (conversion and calculation skills) domain and their gender The association was significant differences between (conversion and calculation skills) domain and their type of study

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Nursing/ University of Kirkuk/ Iraq and all experiments were carried out in accordance with approved guidelines.

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