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Comparing pharmacology knowledge and pharmaceutical calculations skill in Cardiac Care Unit (CCU) among nursing students of Oroumiyeh and Khouy

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ABSTRACT

Introduction: One of the effective education evaluation methods in higher education is evaluating students in the area of knowledge and using specialized courses that one of these courses is pharmacology course. Nowadays, doing pharmaceutical orders is an important part of nursing cares. Awareness of the precautions concerning drugs and using them is counted as one of the increasing factors of nursing cares in drug therapy. The present study had been done with the aim of "determining the amount of pharmaceutical knowledge and pharmaceutical calculations skill in CCU among nursing students of Oroumiyeh and Khouy and comparing them".

Methods: This cross-sectional study had been done on 120 nursing students of Orumiyeh and Khouy through census method in the academic year of 2013. Data collection tool was a questionnaire including three parts: demographic information, pharmacology knowledge and pharmaceutical calculations that had been analyzed after their collection through descriptive statistic and long linear (row effect) test by using SAS 92 software and chi 2 test in SPSS16 software.

Results: Findings showed that pharmaceutical knowledge in the area of nursing cares among nursing college students of Oroumieh; 43.3% and Khouy students; 48.3% was good and there was no significant difference. In the area of drug class, the amount of familiarity , Oroumieh nursing students; 76.7% and Khoy students; 48.3% was good and there was significant difference ($p=0.0$). About pharmaceutical calculations, Oroumieh students 48.3% and Kouy students 16.7% was good and there was significant difference ($p<0.001$).

Conlusion: Considering the results of the study, the pharmaceutical calculation power of all the nursing students is not in the appropriate level. So it is required to promote pharmaceutical knowledge and pharmaceutical calculations skills by the professors and teachers for decreasing risks and increasing patient's safety and it needs exact planning in nursing students educational programs.

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1. Introduction

The final aim of training health area students is providing better and more effective services to the patients [1]. Nursing education is an infrastructure for providing efficient manpower to meet community needs [2].

Nursing education as a part of higher education system is developing rapidly in recent years, which causes concern about quality of education in this field due to abundance of the students [3].

Nursing education is encountered with some challenges in the world such as; graduates' qualification, quality of education and curriculum of nursing field [4].

Although nursing education in Iran had positive growth and process in recent years, like many other countries it has been encountered with undeniable challenges [5].

By increasing extent of health and treatment and growth of nurses' new roles, pharmacology training is necessary for the nurses [6, 7]. Pharmacology is an important part of nurse's clinical performance [8].

On the average, nurses spend 40% of their work time for medication in the hospital [9]. However, there is less attention to teaching and learning pharmacology among teachers and students [10].

Nurses play an important role in managing patients' pharmacology in hospital and society. Nurses as a group who has one of the main professions of health and spends lots of time in interacting with the patients should have enough knowledge, regarding pharmacology, in order to be able to provide safe and high quality care.

So it is necessary to assess the patients before giving medicine to them, determine care aims, prescribe the medicines safe and effective, and then evaluate the efficiency of the prescribed medicines, also it is necessary to talk to the patients about their medicines and to help doctor and pharmacist in solving potential problems and setting care aims.

In order to create these features in nurses, learning knowledge and drug therapy skill is necessary [8].

Learning and teaching pharmacology is very important for the nursing students. Almost 25% of the nurses in England educational institute in the qualitative study of Griffith et al stated that most of the time for education should be for learning pharmacology [11].

In the study of Manias & Bullok nursing students stated that, they don't have enough preparation regarding pharmacology principles and they considered it due to surficial learning processes [10].

By increasing complexity of health and treatment and growth of nurses' new roles, pharmacological education is necessary for the nurses [6, 7].

Effective and safe prescription of drugs needs having knowledge in different fields such as; theoretical and clinical knowledge of prescribing drug, pharmacology knowledge and ability of doing drugs clinical calculation.

In addition, a nurse should have information about diagnosing patient [11].

In order to be sure about drug prescription through standard method, 5 things should be completely observed: correct drug, correct dose, correct patient, correct method and correct time [12].

Studies of the European countries showed that 19% to 28% of the hospitalized patients were encountered with medical errors [13].

Nurses' pharmaceutical calculation is an international problem [14].

Studies showed that both nurses and nursing students have problems in simple math calculations and drug clinical calculations [11, 12, 14].

Studies showed that in all the countries and different hospitals, medication errors can widely happen.

Paying attention to nurses' pharmaceutical calculations is an important factor for decreasing medication errors and as the result, patient's care situation and treatment prognostic

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and taking care of the patient would be improved[13,15].

In 2006, there was a study with the aim of assessing pharmaceutical calculations skill among the nurses of the second year of their education.

The highest score of this test was 30, but the score of the nurses was between 7 to 29 and none of the students could achieve all of the scores.

Most of the students stated that they have to have time for improving pharmaceutical calculations skill and to practice these skills in clinical environment [16].

In order to promote pharmaceutical calculations method, both perceptual and calculations skills should be attended.

Defect in pharmaceutical calculations and correct prescription of its dose leads to serious risks and threatens the patient's life [5, 6]. Studies have shown that there is one error from every 5 cases of giving drug that 33% of these errors are related to drug dose calculation [15, 17].

Results of another study on the nursing students showed that these students are skillful in drug dose calculation between 11%-45% [15]. Nowadays performing pharmaceutical orders is an important part of nursing cares.

Being aware of the precautions related to drugs and using them is counted as one of the increasing factors of nursing cares quality in drug therapy.

So far, there was no study regarding evaluation of nursing students' awareness level of cardiac drugs, regarding this, in this study researchers started to monitor this kind of education in the approach of nursing cares, drug mechanism, drug calculation, drug level and pharmaceutical calculations skill, which are with behavioral aims in evaluation headlines approved by health and treatment ministry.

Considering several studies of clinical teachers and surveying from faculty members about students' education situation at bedside, most of the professors complained low information of pharmaceutical data and cares related to it in internships.

So we decided to assess the level of familiarity of the nursing students of Oroumiyeh Medical Sciences University in two Oroumiyeh and Khoy Universities and they have to be studied from pharmacology lesson information point of view, that in addition to work on positive aspects, to increase their negative aspects in planning, thus, this study had been done with the aim of comparing familiarity level of nursing students of Oroumiyeh and Khouy Midwifery and Nursing college with cardiac drugs and pharmaceutical calculations skill.

2. Materials and methods

It was a cross-sectional study and all the nursing students of semester 7 and 8, nursing expert of Oroumiyeh and Khouy participated in the second semester of 2012-2013 through census sampling. Choosing students of semester 7 and 8 was because of that they have experienced different clinical teachers and clinical environments and behavioral aims related to drug prescription was in lesson plan of their practicum or internship units.

Information collection tool is a researcher-made questionnaire that is made of three parts.

The first part is related to demographic information, including: semester, average score of the last semester, being a native or non-native.

The second part is related to pharmacology knowledge about cardiac drugs that included: drug class (four items), nursing care (10 items), drug complication (5 items), drug mechanism (9items) and the third part included; drug calculations skill (9 items).

Totally this questionnaire had 37 items with the least acquired score of 37 and the highest score of 74, scores between 63-74 showed a good position, scores between 51-62 showed moderate position and scores between 37-50 showed a weak position.

In order to determine content validity of the questionnaire, firstly the questionnaire was

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given to some of the Oroumiyeh University nursing professors, and after achieving their ideas; necessary changes had been done in the questionnaire. Reliability of the tools had been estimated through test-retest form.

The tool was given to 10 students and after 10 days, again the tool was given to the same 10 students for completion. Correlation coefficient of the two tests was 0.80.

For distributing questionnaires, researchers went to the students' internship units when the students had free time, and after explaining about the way of completing questionnaire and its aim and ensuring them about confidentiality of the information, it was asked from nursing students to complete the questionnaire.

After filing the questionnaire, they had been collected.

Participating in the test and writing first and last name were optional. Data analysis had been done by descriptive statistic and Log linear test (Row effect) by using SAS 9.2 software and chi 2 test in SPSS 16 software.

3. Results

This study had been done in order to assess the amount of awareness of nursing students of Oroymiyeh and Kouy nursing college about cardiac drugs and using them and the amount of their drug calculations skills and the aim was to assess students' educational need level about understanding and using cardiac drugs and drug calculation skill in 2013.

Findings of this study showed that among 120 students participating in the study, 59% of the students were female and 41% males. Regarding familiarity with nursing cares and cardiac drugs by doing Chi 2 statistical test in significance level ($p<0.05$) scores of 43.3% of Oroumiyeh students were in good level, 53.3% in moderate level and 3.4% in weak level that this statistic in compare with Khouy students 48.3 were in good level, 41.7% in moderate level, and 10% in weak level.

There was no significant difference in the results statistically. About familiarity with the area of cardiac drugs class by doing Chi-2 statistical test in significant level ($p<0.05$),

Table 1: comparing the amount of familiarity with cardiac drugs in Oroumiyeh and Khoy

Area	The amount of familiarity city	Good	Moderate	Weak
48.#%Nursing care	Oroumiyeh	43.3%	43.3%	3.4%
	Khouy	48.3%	41.7%	10%
p=0.881 df=1				
Drug class	Oroumiyeh	76.7%	21.7%	1.6%
	Khouy	48.3%	45%	6.7%
p=0.01 df=1				
Pharmaceutical mechanism	Oroumiyeh	25%	70%	5%
	Khouy	36.7%	45%	18.3%
p=0.884 df=1				
Cardiac calculations	Oroumiyeh	48.3%	41.7%	10.%
	Khouy	16.7%	46.7%	36.7%
p<0.001 df=1				
Pharmaceutical calculations	Oroumiyeh	13.3%	76.7%	10%
	Khouy	16.7%	55%	28.3%
p=0.161 df=1				

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Table2: comparing the amount of familiarity with cardiac drugs and pharmaceutical calculations in Oroumiyeh and Khouy

The amount of familiarity city	Good	Moderate	Weak
Oroumiyeh	46.7%	50%	3.3%
Khouy	20%	73.3%	6.7%
Df=1	p=0.004		

scores of 76.7% of Oroumiyeh students was in good level, 21.7% in moderate level, and 1.6% in weak level that this statistic in compare with Khouy students was 48.3% in good level, 45% in moderate level, and 6.7% in weak level. There was significant difference statistically (p_0.01), which showed better position of Oroumiyeh students in compare with Khouy students.

About familiarity with the area of cardiac drugs mechanism, through doing Chi-2 statistical test in significant level (p<0.05), scores of 25% of the students were in good level, 70% in moderate level and 5% in weak level, that this statistic in compare with Kouy students was 36.7% in good level, 45% in moderate level and 18.3% in weak level. Results were not statistically significant. About familiarity with the area of cardiac drugs calculations by doing Chi-2 statistical test (p<0.05), scores of 48.3% of the Oroumiyeh students were in good level, 41.7% in moderate level and 10% in weak level, that this statistic in compare with Khouy students was 36.7% in good level, 45% in moderate level, and 18.3% in weak level. Results were not statistically significant.

About familiarity with the area of cardiac drugs calculations by doing Chi-2 statistical test in significant level (p<0.05) scores of 48.3% of Oroumiyeh students were in good level, 41.7% in moderate level and 10% in weak level that this statistic in compare with Khoy students was 16.7% of the students in good level, 46.7% in moderate level and 36.7% in weak level. Results were statistically significant (p<0.001) that showed better position of Oroumiyeh students in compare with Khoy.

About familiarity with the area of cardiac drugs complications, by doing Chi-2 statistical test in significant level (p<0.05), scores of 13.3% of Oroumiyeh students were in good level,76.7% in moderate level and 10% in weak level that

Table 3: comparing the amount of familiarity with cardiac drugs and pharmaceutical calculations skill between terms 7 and 8.

Amount of familiarity city	Good	Moderate	Weak
Term 7	37.9%	56.9%	5.2%
Term 8	29%	7.67%	3.3%
Df=1	p=0.482		

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this statistic in compare with Khoy students was 16.7% of the students in good level, 55% in moderate level and 28.3% in weak level. Results were not statistically significant (table 1).

About total familiarity with cardiac drugs and pharmaceutical calculations skill by doing Chi-2 statistical test in significant level ($p<0.05$) scores of 46.7% of Oroumiyeh students were in good level, 50% in moderate level and 3.3% in weak level that this statistic in compare with Khoy students was 20% of the students in good level, 73.3% in moderate level and 6.7% in weak level.

Results were statistically significant (p-0.0004), which shows better situation of the Oroumiyeh students in compare with Khoy. (Table 2)

About level of familiarity with Cardiac drugs and pharmaceutical calculations skill by doing Chi-2 statistical test in significant level ($p<0.05$) between term 7 and 8 of nursing, results showed that familiarity level of 37.9% of the students of term 7 were in good level, 56.9% in moderate level and 5.2% in weak level.

This statistic among students of term 8 was 29% in good level, 67.7% in moderate level, and 3.3% in weak level, that results were not statistically significant (Table 3).

4. Discussions

Findings of the study showed that the level of students' familiarity with cardiac drugs and pharmaceutical calculations are in moderate level in both colleges.

So necessity of students' training regarding pharmacology and especially pharmaceutical calculations can be seen.

Systematic education about applied mathematics calculations in giving medicine is one of the necessities of nursing lesson plan, since problem and deficiency can have vital risks for patient and professional liability for nurse.

Our study showed that regarding familiarity with cardiac drugs calculations skill, awareness level of Oriumiyeh student was better than Khouy, however, awareness level of both colleges was moderate, Salimi et al had done a study in this subject in 1997.

Results showed that pharmaceutical calculations skill in nursing students was weak [18].

There was a study on nursing students of Sweden, which showed that students, who were educated in knowledge and skill completely are able to do pharmaceutical dose calculations appropriately.

It is while problems in drugs prescription can lead to serious treatment errors [20].

Results of the study of Hajihoseini et.al in 2012 indicated that students had very little skill in calculating drug dose and drops of serum [21].

It has been cleared in the results of this study that one/sixth of drug errors among nurses is because of wrong pharmaceutical calculations [22].

About the reasons of students' drug errors also Wolf-et al writes that 3.56% of the cases of wrong calculations and 17.6% of prescribing wrong dose caused students' error [23].

In the present study results showed that the amount of students' familiarity with pharmaceutical information including: drug mechanism, drug complications and drug class in both colleges was in moderate level , there was a study in this regard in Japan and results showed that the most important reason of educated nurses' pharmaceutical errors is their less knowledge of pharmacology [24].

Also study of Leap et al [1995] showed that 15% of drug errors in nurses are because of shortage of pharmacology information [25].

Our study showed that 46.7% of nursing students of Orouymiyeh college and 20% of nursing students of Khouy college were in good level considering knowing and using cardiac drugs and pharmaceutical calculations skill and they had significant difference ($p<0.004$). Considering the areas of nursing care, drug class, drug mechanism, drug calculations, students of Oroumiyeh College were better

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than Khouy that the percentage of wrong answers among students of Khoy were more than Oroumiyeh.

Study of Panjeh Shahin et.al (1987) showed that score of pharmaceutical information of treatment educational center staff was 16.67 from 20 [26].

Abtahi et.al (1986) showed that 100% of nursing students had little information about drugs [27].

5. Conclusions

Results indicated that despite professors and teachers' efforts for training students, the amount of knowledge and usage of students of cardiac drugs and the amount of pharmaceutical calculations skill were moderate.

Results showed that students of Oroumiyeh college were better than students of Kouy college regarding; nursing care in cardiac drugs, familiarity with drug class, drug mechanism, drug complications and pharmaceutical calculations skill that it can be due to teaching pharmacology lesson in nursing college of Oroumiyeh by specialist people (pharmacologist faculty members), which had been done in Khoy college by non-faculty pharmacist (it is as a guess).

Evaluation had been done in this regard and evaluation indicated professors in pharmacology lesson in good level.

It is necessary to pay more attention to applied math skills in drug calculations including; fraction, equation, rounding, percent, unit change, point and percent in lessons such as nursing or pharmacology principles or using appropriate training methods.

In addition, during passing internship courses in clinical environments, emphasis on systematic education of this skill by faculty members of nursing group can increase their professional skill in this regard to the high extent and causes promotion of clinical education quality in nursing. Performing intervention studies is suggested for advancement of this skill.

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