

THE EFFECT OF TRIPLE-JUMP EXAMINATION (TJE)- BASED ASSESSMENT ON CLINICAL REASONING OF NURSING INTERNS IN ZABOL DURING 2017-2018

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ABSTRACT

BACKGROUND

Assessment is the most fundamental part of any curriculum, because it can help identify and resolve the weaknesses of the curriculum. Evidence shows that to accurately evaluate the clinical reasoning as one of the essential skills of nursing students in diagnosing and solving clinical problems of patients, it is better to use problem-based assessment methods. We wanted to determine the effect of triple-jump examination (TJE) based assessment on the clinical reasoning of nursing interns in 2017.

METHODS

In this quasi experimental study, all nursing interns were selected based on the census sampling and randomly divided into two groups- control (n=20) and experimental (n=20). First, routine assessment was carried out in both groups. After completing the internship course in the respiratory ward, the assessment was carried out using TJE method in the experimental group and routine method in the control group. TJE-based assessment included three stages of presenting clinical scenarios to students, allocating time to studying and searching in electronic resources, and finally responding to clinical scenario questions. Clinical scenarios of common respiratory diseases such as tuberculosis, pneumonia and emphysema were designed based on library studies, and validity and reliability of these scenarios were also approved by experts. The overall score of the test was 0-20. Data analysis was carried out using SPSS ver. 23 and independent t-test, paired t-test, Wilcoxon, chi square test, and Chi-square tests.

RESULTS

The mean \pm standard deviation (SD) of the clinical reasoning score of the experimental group was 12.97 ± 1.09 before the intervention, which increased to 14.57 ± 1.35 after intervention and were statistically significant ($p < 0.001$). Mean \pm SD of the clinical reasoning score of the control group increased from 12 ± 1.24 to 12.50 ± 1.20 , and was also reported to be statistically significant ($p = 0.001$). The change in the clinical reasoning mean score in the experimental group (1.60 ± 1.01) was more than the control group (0.57 ± 0.51), which was statistically significant ($p < 0.001$).

CONCLUSIONS

The results showed that TJE-based assessment is a suitable method for assessing the clinical reasoning skills of nursing students; it also increases students' level of satisfaction. Therefore, the inclusion of such new method in clinical assessment programs is recommended to improve clinical skills of nursing students.

KEY WORDS

Clinical Assessment, Triple-Jump Examination, Clinical Nursing Reasoning

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BACKGROUND

One of the important pillars of nursing education system is clinical education. Clinical education is a process in which students gain clinical experiences while dealing with patients' clinical problems⁽¹⁾ and is considered as the core of professional education, since it accounts for about half of the time allocated for nursing education programs.^(2,3)

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Internships play a significant role in shaping the basic skills and professional abilities of nursing students.⁽⁴⁾ Clinical education refers to activities facilitating learning in the clinical setting, in which the educator and the student are equally involved and its aim is to make measurable changes in students while performing clinical care. In fact, effective clinical education refers to the training and guidance provided by the educator in a situation with an appropriate curriculum, while the student takes care of the patient directly, and practically applies the concepts learned in the form of a curriculum while interacting with the educator and the environment.⁽⁵⁾ Clinical education is affected by various factors and variables such as curriculum, instructor, learner, and educational environment, and it makes it difficult to judge students' clinical skills. Assessment is the key element in each curriculum.⁽⁶⁾ Assessment is considered as a major step in the education process and weaknesses and strengths of the educational process are identified based on the results

obtained, and it is possible to take a proper step towards reforming and transforming of the education system by removing educational failures. On the other hand, ineffective assessment can lead to poor professional skills of graduates and a reduction in the quality of medical care.⁽⁷⁾ The curriculum and assessment complement each other in the education process. The role of assessment is to monitor the behavioural changes of learners in particular and monitor the effectiveness of other elements of nursing education.⁽⁸⁾ Despite the importance of assessment, especially clinical assessment, this issue remains a mental, time-consuming, and often confusing problem, and most of the instructors and students are not satisfied with the clinical assessment procedure.⁽⁹⁾ According to the results of Hadizadeh et al., 41% of nursing and midwifery students described the quality of clinical assessment at a poor level.⁽¹⁰⁾ In another study, students stated that assessment tools do not pay much attention to their functional skills.⁽¹¹⁾ According to the results of a study by Farokhi et al. (2002), nursing and midwifery students in Mashhad referred to the lack of control of the work of each student, giving unrealistic grades to students, the lack of student participation in the assessment, the composition-based and multiple-choice assessment, and the lack of assessment based on the educational goals as the common errors of clinical assessment.⁽¹²⁾ Although there are various clinical assessment methods, evidence suggests that evaluating students' clinical skills requires accurate assessment of practical skills, and an effective step in improving its implementation can be taken by examining the views and experiences of members involved.^(13,14) From the viewpoint of students and professors, the clinical assessment, which is completed based on a general form and is relied on the instructor's personal opinion and without a specific framework lacks enough competence to assess the clinical performance of students. Therefore, there is a need to use a suitable clinical assessment method that more accurately evaluates clinical performance of students.⁽¹⁵⁾ Results of previous studies in nursing faculties of south states of the United States showed that 45%, 35%, 17%, and 3% of the faculties didn't adopt any reconsideration in their clinical assessment methods for 5, 10-11, 11-15, and more than 15 years, respectively.⁽¹⁶⁾ In recent years, there has been a serious interest in the revision of current clinical assessment methods and the use of active and student-oriented strategies that measure the skills and abilities of learners.⁽¹⁷⁾ Clinical assessment methods include several ones such as portfolio, written report of the student's performance, logbook, and observational methods, often associated with students' dissatisfaction.⁽⁷⁾ Another assessment method used in the clinical setting is the triple jump examination (TJE). TJE is an assessment method that evaluates the clinical problem-solving knowledge and skills of learners. This assessment method can be mainly used in problem-solving, learner-based, and self-learning curriculum.⁽¹⁸⁻²⁰⁾ Considering that problem-based learning and self-regulation play a special role in medical science education, TJE is used in these teaching methods to evaluate learners and the problem that is examined as the test content is often related to the patient's clinical condition or the health issues of the clients.⁽¹⁸⁻²²⁾ If educator administrators can carry out clinical assessment on learners using problem-oriented practices, then graduates will be well-qualified and expert professionals that is expected by

the community expects from medical science graduates.⁽²³⁾ Clinical nursing reasoning is one of the key features of professional clinical practice and one of the most important competencies required for safe patient care and proper and timely clinical decision-making.⁽²⁴⁾ Clinical reasoning is the logical process of collecting key information points, understanding patient problems and situations, planning and implementing, and evaluating interventions, and giving feedbacks during the learning process.⁽²³⁾ Clinical nursing reasoning can be defined by the cognitive process and the strategies used to understand information, identify, and diagnose patient problems. Clinical reasoning is a clinical way of thinking about clinical skills.^(25,26) Identifying relevant key points is the foundation of clinical reasoning and attempts should be made to help a nursing student understand how to obtain relevant key information. A nurse must be competent in many cases of clinical reasoning, such as psycho-motor skills and physical examinations.⁽²⁷⁾ Clinical reasoning also leads to proper nursing diagnoses, clinical decision-making, problem-solving, independent nursing interventions, and improved patient care quality.⁽²⁸⁾ Nurses with poor clinical reasoning will not succeed in identifying patients, diagnosing their conditions, and saving their lives.^(27,29) The theory-practice gap in nursing leads to a discrepancy between the material taught and practical skills (). Today, given the complex clinical conditions of and the use of advanced technologies, nurses should more than ever be able to analyse clinical situations and make proper and timely decisions to provide quality care (). To ensure that graduate nurses can meet these expectations, nursing professors should use effective methods for teaching and evaluating students' clinical reasoning skills.⁽³⁰⁾ Despite the high validity of the TJE test in evaluating clinical reasoning, it has not yet been used in the clinical assessment of nursing students. Therefore, considering the consequences of superficial reasoning and incorrect decisions on the patients' clinical conditions, we decided to carry out a study to determine the effect of TJE-based assessment on the clinical reasoning of nursing interns in 2017.

METHODS

The present study is a quasi-experimental study with two-group pre-test – post-test design. The study population consisted of nursing interns in Zabol Nursing and Midwifery Faculty. The census sampling method was used in this study. After obtaining permission from the Ethics Committee of Zabol University of Medical Sciences and observing the ethical codes approved, including informed participation in the study and confidentiality of personal information, all nursing interns were randomly assigned (toss a coin) to control (n=20) and experimental groups (n=20). The data collection tool was composed of two parts: demographic characteristics and the clinical reasoning questionnaire. In this study, the clinical reasoning of the two groups was assessed by scenarios designed based on the history of respiratory patients in two stages; namely, before and after the intervention. Accordingly, researcher-made clinical reasoning decision-making cards were used. Therefore, a clinical scenario related to the patient's clinical condition was prepared and related nursing diagnoses and care measures should be written by the student.

	Mean ± SD		Results of Mann-Whitney and Independent T Tests
	Experimental Group	Control Group	
Age	22/45±2/35	22/40±2/50	P=0/330 Z= 0/974
Total average	15/89±1/37	15/73±1/25	P=0/698 df=38 t=0/391

Table 1. Mean ± SD of Age and Total Average of Nursing Students Studied in Experimental and Control Groups

Variable	Experimental		Control		Chi-Square Test	
	Number	%	Number	%		
Gender	Male	9	45	8	40	P=0/749 df=1 X ² =0/102
	Female	11	55	12	60	
Having interest in nursing	Yes	16	80	17	85	P=0/677 df=1 X ² =0/173
	No	4	20	3	15	

Table 2. Frequency Distribution of Nursing Students Studied by Gender and Interest in Nursing in Experimental and Control Groups

Clinical Decision Making (Score)	Experimental		Control		The Results of Independent T-Test
	Mean ± SD	No.	Mean ± SD	No.	
Before the intervention	12/97±1/09	20	12±1/24	20	P=0/71, df =38, T=0.29
After the intervention	14/57±1/35	20	12/50±1/20	20	P<0/001, df=38, T=5.13
The result of paired T-test	P<0/001 df=19 t=7/032		P=0/001 df=19 t=3/82		

Table 3. Mean ± SD of Nursing Student's Clinical Reasoning Score in Two Groups Before and After Intervention

	Experimental Group	Control Group	T-Test Statistic		
			P	df	t
Changes in the mean score of clinical reasoning	1/60 ±1/01	0/57 ±0/51	p<0/001	38	4/01

Table 4. Difference in The Mean Scores of Nursing Student's Clinical Reasoning after Intervention in the Experimental and Control Groups

Satisfaction with the Assessment Method	Number	Percentage
Low	2	10
Moderate	5	25
High	13	65
Total	20	100

Table 5. Frequency Distribution of Nursing Students Studied Based on Their Satisfaction with JTE-Based Assessment Method in The Experimental Group

The purpose of designing such scenarios was not solely to identify the diagnosis of the defined patient, but the students were asked to answer the questions presented at the end of each scenario according to the signs and symptoms presented in the scenarios and to raise nursing diagnosis and measures. Clinical scenarios were developed based on common respiratory symptoms, including pneumonia, tuberculosis, and emphysema. According to the educational objectives, important points were given to the students in both groups regarding the care of patients with respiratory diseases during the internship. In both groups before starting internship in the internal respiratory wards,

Clinical reasoning was evaluated using the mentioned scenarios and, the assessment was carried out in the experimental and control groups using TJE and routine methods, respectively after the completion of such internship. The intervention method in the experimental group was that clinical scenarios were provided to the students without any questions for 5 minutes and then were taken back from them in the first stage. In the second stage, they were given an opportunity to carry out independent library studies for 20

minutes. Then in the third stage, the same scenarios and questions related to each scenario were again provided to the students, and 45 minutes were allocated to them to analyse the clinical situations and answer the questions. The total score range was between 0-20. Clinical reasoning questionnaire was developed by nursing faculty instructors based on nursing internal respiratory surgery books and its validity was confirmed by 10 faculty members and respiratory specialists. Cronbach's alpha method was used to determine the reliability of the questionnaire and its reliability was confirmed with $\alpha = 0.87$. Data analysis was carried out using SPSS ver. 23. The Shapiro-Wilk test was used to determine the normal distribution of quantitative variables and descriptive statistics (mean, standard deviation, and frequency distribution) were used to describe demographic characteristics. In order to compare the mean score of clinical reasoning before and after intervention, paired t-test was used, and independent t-test and chi square test were used were also used to make inter-group comparison. The significance level was considered as $P<0.05$.

RESULTS

The total number of research subjects was 40 individuals who were randomly assigned to two groups of experimental and control. The mean age of the students in the experimental and control groups was 22.45 ± 2.35 and 22.40 ± 2.50 years, respectively. The mean of the total average of students in the experimental and control groups was also 15.89 ± 1.37 and 15.73 ± 1.25 , respectively. It should be noted that there is no statistically significant difference between the two groups in terms of demographic variables (Tables 1 and 2).

The results of the present study showed that the pre-intervention mean score of the students' clinical reasoning did not differ significantly between the two groups ($P= 0.71$) and the results of the paired t-test also revealed that post-intervention mean score of the students' clinical reasoning was statistically significant in both groups ($P<0.001$) (Table 3). In order to compare the effect of two methods of evaluating clinical reasoning, i.e. JTE and routine methods, the difference between the mean score of clinical reasoning was used in pre-test and post-test stages, so that the difference between the mean clinical reasoning scores in both pre-test and post-stages was higher in the experimental group than the control group, and was statistically significant (Table 4).

According to Table 5, 65% of the students of the experimental group had high satisfaction with this method and believed that the application of this method was innovative and excellent and an effective learning and assessment method. A total of 25% of the participants also expressed moderate satisfaction, and only 10% of students reported low satisfaction.

DISCUSSION

The aim of this study was to determine the effect of JTE-based assessment of the clinical reasoning of nursing interns. Based on the findings of this study, the mean clinical reasoning score in the experimental group which was evaluated using the JTE method improved from 12.97 ± 1.09 to 14.57 ± 1.35 . In both groups, the clinical reasoning mean score increased after intervention and was statistically significant, but the mean change in the mean score of clinical reasoning in the experimental group was greater than that in the control group,

showing 2.5 times higher change in the experimental group than the control group, which was statistically significant. Since there was no study similar to the present study, we compared the results of this study with similar studies that examined the impact of portfolio and Mini-CEX-Dops-Osce methods on clinical skills, as JTE test, as the methods mentioned above, is part of the new assessment methods. On the other hand, nurses' clinical reasoning can be considered as a cognitive process and strategies for understanding patients' information, identifying and diagnosing their problems, as well as a clinical way of thinking about clinical skills,^(25,26) therefore, the result of the present study can be compared with studies on other clinical skills. Consistent with the results of the present study, Habibi showed that the mean of final assessment scores in the experimental group (DOPS and Mini-CEX methods) was significantly higher than that of the control group (routine method) and the two methods of Dops and Mini- Cex Has promoted the clinical skills of nursing students.⁽³¹⁾ Salehi et al. conducted a study to determine the effect of peer education on the clinical skills of nursing students (interns and apprentice). In this semi-experimental study, 71 nursing interns and 84 apprentices were randomly divided into intervention and control groups. The results of this study showed that the mean \pm SD of nursing interns' clinical skills in the intervention and control groups was 39.18 ± 0.68 and 32.3 ± 23.77 , respectively. The mean \pm SD of nursing apprentice's clinical skills in the intervention and control groups was also 36.9 ± 2.45 and 32.73 ± 4.40 , respectively.⁽³²⁾ Therefore, the use of this new educational method has been effective in improving the clinical performance of nursing students, which is consistent with the results of the present study. Consistent with the present study, Hekmatpou conducted a study entitled "the effect of portfolio method on the accuracy of clinical assessment of nursing interns" in Arak University of Medical Sciences. In this study, students were evaluated by a instructor and based on the nursing college's routine assessment sheet after the first two weeks of internship in the internal ward and management, and by a researcher-fellow, based on a portfolio assessment sheet in the last two weeks. The results showed a three-score difference between the average scores given by the instructors to the students in the internship in the management field using the routine method (19.4) and the average scores given by portfolio method (16.5) as well as a three-score difference between the average scores given by the instructor to the student interns the internal ward using the routine method. (19.11) and mean scores given by the portfolio method (16.3). On the other hand, there was a significant difference between the mean scores obtained using portfolio and routine methods in terms of students' viewpoints on effective clinical learning of the field internship in the internal and management wards.⁽³³⁾ The score obtained from assessment methods such as portfolio and TJE methods is more realistic than traditional ones, because it is based on written evidence; it also enhances learners' satisfaction. Sadeghi & Shahabi Nejad evaluated nursing students using the OSCE method and reported that the total score of students' performance in the procedures examined was 132.38 ± 19.17 and the total score of knowledge of 18.23 ± 3.71 out of 32 and the students' knowledge and performance were at the moderate level, which is consistent with the present study.⁽³⁴⁾ The results of this study, consistent

with the present study, showed that clinical assessment of students based on a reliable and objective method can lead to the movement of educational programs towards new methods to improve the quality of education. In the present study, 65% of interns had a high degree of satisfaction with this assessment method and 25% of expressed moderate satisfaction, which is recommended this method more frequently considering the importance of new assessment methods, as, in the study of Hekmatpou, more than 80% of students fully agreed with effective portfolio learning during internship at the internal field and nursing management.⁽³³⁾ So, it is possible to create satisfaction in students by proper diagnosis of students' clinical skills using objective methods of clinical assessment as compared to other conventional ones. It is worth mentioning that in the present study, only 10% of the students had a low degree of satisfaction with this method and attributed such low satisfaction to lack of familiarity with this method, and the failure to implement such method in a routine manner, the time limit of the study, and the similarity of the symptoms of the respiratory disease. Consistent with the results of the present study, Bolourchi et al. in a study aimed at comparing the satisfaction of nursing students with two methods of the objective structured clinical examination (OSCE) and practical tests in clinical assessment, stated that the highest satisfaction was obtained in the cognitive, emotional, and psychomotor domains using OSCE method.⁽³⁵⁾ TJE method has the same advantages as accuracy, validity and reliability, objectivity, non-interference of the instructor's luck and taste in the assessment process, therefore, it is recommended to use this method to assess the essential clinical skills of students such as clinical reasoning.

CONCLUSIONS

According to the results of this study, TJE, which is a method for assessment of learners' knowledge and skills in solving clinical problems and can be used in self-learning and problem-based curriculum more frequently, can be effective on the development of clinical reasoning of nursing students. In fact, clinical reasoning is a logical process for collecting key information points, understanding the patient's clinical problems and situations, planning and implementing, and evaluating interventions, and providing feedbacks. The majority of students of the experimental group was satisfied with this assessment method and also believed that the application of such method was innovative and excellent and an effective method of learning and assessment. Therefore, it is suggested that education administrators use problem-based clinical methods so that qualified nursing graduates can be nurtured in the clinical assessment of learners.

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