Original Article

The effect of portfolio training and clinical evaluation method on the clinical competence of nursing students

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Abstract

Context: Nowadays, nurses in addition to acquiring knowledge should have sufficient clinical skills. One of the methods that have recently been taken into consideration in nursing students' clinical education is the method of portfolio.

Aims: The purpose of this study was to affect the portfolio training and clinical evaluation method on the clinical competence of nursing students.

Settings and Design: This semi-experimental study was carried out at the Faculty of Nursing and Midwifery of Qaen.

Material and Methods: The research population was all senior nursing students who were randomly divided into control groups and intervention to available sampling method. Education and clinical evaluation in the field of clinical competency in the internal and surgical departments were conducted in the intervention group of students with portfolio method and in the control group of students with conventional method from the viewpoint of professors and students.

Statistical Analysis Used: The data were analyzed by SPSS 24 and paired and independent *t*-test.

Results: According to the students' viewpoint in all aspects of clinical competence (except individual management) and clinical competency, the portfolio group had a higher mean, but there was no significant difference between the two groups ($P > 0.05$). However, according to the professor's view, there was a significant difference between the two groups in all aspects of clinical competency and total clinical competency.

Conclusions: Portfolio training and clinical evaluation can improve students' clinical competence. Therefore method can be used to create either motivation or interest to participate in learning and improve the level of clinical competence. Therefore, those interested and those in charge of educational affairs can benefit from this new educational method for the purpose of training and clinical evaluation of trainee students in the field.

Keywords: Clinical competency, Clinical Evaluation, Nursing Student, Portfolio, Training

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INTRODUCTION

Assessing the clinical competence of nursing students is important not only to ensure the safety of care but also to identify areas that need to be upgraded and to determine educational needs.[1] Evaluation of clinical performance is one of the important and sensitive components in the teaching and learning process; therefore, the category of evaluation in the fields of medical sciences is of special importance.[2] In this regard, clinical education provides an opportunity for the student to interact with their environment and their instructor to apply their theoretical knowledge to patient care in the field of practice.[3] Evaluating student learning is one of the most important elements of educational planning.[4] The limited results in the country indicate that clinical assessment is not appropriate for students.[5] In a study, Delaram *et al.* showed that 75% of nursing students believe that their teachers' clinical evaluation is not appropriate. 73.6% of students and 75.9% of professors found and disagreed with the conventional method of clinical evaluation, according to Imanipour's study, and it does not show the actual clinician of a student.[6] Nasiriani *et al.* reported that most nursing students believe that they have not been able to learn the skills necessary for employment in nursing, which indicates that the value of ideal clinical education in personal and professional development, as well as clinical nursing skills, is undeniable.[7]

In Carol research, based on the students' responses in year 6, the student-developed portfolio of guidelines in clinical skills was accepted and found useful. Other than being used as a tool for competency development, it also seems possible that the portfolio could be used as a tool for reflection in clinical skills, even in the early years.[8] Since learners of medical sciences must be students with the ability to learn self-regulation, meaningful learning, and a combination of theoretical and clinical learning, it is necessary to train them as rethinking learners, which requires the use of new teaching methods.[9,10]

There have been many innovations in the theory and practice of education in the last decade, and the teachings have shifted from a teacher-centered to student-centered approach.[11] In addition, encouraging learners to rethink, identifying learning needs by the learner, and encouraging them to learn more are other benefits of this cover-up. It should be noted that this method has disadvantages that require a lot of time to gather evidence and cause anxiety in learners.[12]

The process of preparing a job involves collecting, organizing, and analyzing the best evidence that it shows how much the learning objectives have been approached[13,14] and also indicates the success and progress of the individual.[15] In addition, the portfolio improves one's self-assessment ability and demonstrates their clinical competence.[16] Numerous studies have also shown that this method promotes learning.[17] In a study by Buckley *et al.*, which looked at the best evidence of portfolio's impact on undergraduate education in the UK, the study found that the level of compatibility and compatibility of the portfolio method with students' clinical experience was higher than the conventional method.[18]

On the other hand, student evaluation should be consistent with educational goals and evaluate student performance in relation to educational goals and to provide feedback to the student on a regular basis while at the university teaching and evaluation of students in the traditional way.[19] All the semesters are done equally in theory and internship and therefore do not match with the clinical experience of the students. Furthermore, in this method, the student at the end of the semester is only informed from the score of the final examination and does not find their strengths and weaknesses point.[20] Numerous studies have also suggested that, unlike the conventional teaching method, the portfolio has helped students develop self-awareness and learning independently, and they have achieved more success in the final examination.[21] Furthermore, in Zahraei's study, from the perspective of faculty members and students, the most effective in improving clinical education, individual characteristics of students and the least impact have been evaluated.[22]

From point of educational books, the lack of sufficient information in the field of their validity is considered as one of the weaknesses of the common method and they have introduced the portfolio method as an effective method in the field.[23] Although the need for review in clinical practice management has been emphasized in many studies, due to the complexity of training in the clinical environment, only limited research on training, learning, and evaluation in this environment and how to improve it have been condemned. Therefore, considering the results of different studies, further research is needed on how to use the covert approach in clinical education and evaluation of nursing students. The aim of this research was to affect the portfolio training and clinical evaluation method on the clinical competence of nursing students.

MATERIAL AND METHODS

This clinical trial study was an empirical study that aimed to determine the effect of education and clinical evaluation

in both conventional and portfolio methods on clinical competency of students and faculty members, point of views.

$$n = \frac{\left(Z_{1-\alpha/2} + Z_{1-\beta}\right)^2 \times \left(S_1^2 + S_2^2\right)}{\left(X_1 - X_2\right)^2}$$

Based on the above sampling formula and taking into account the test power (1-B) equal to 90% and 95% reliability, as well as the mean values and standard deviation from the study, the same number of samples was determined for each group of 27 people.

It was assumed that 10% of samples do not fill out the questionnaires. Thereby, the sample size for each group was 30 people (60 samples for both groups). We included 30 nursing students in the seventh semester and 30 nursing students in the eighth semester. Participants were randomly divided into two groups of common and routine according to the planning of the nursing and education group manager. Then, each group was divided into two groups of 15 individuals for internship and surgery. The 2-week 5-day (10-day) training period was equivalent to one training unit for each of the internal and surgical departments. Students were supervised and evaluated by two instructors: one instructor in the internal department and the other instructor in the surgical department who led the two working groups. There were two groups, but there was no significant ability between the two groups. Entry criteria included: tendency to participate in research, lack of work experience such as independent student internship, and participation in the first day of preexamination, and the most important criterion was the failure to complete the internship for some reason, including the absence of more than one day.

In the portfolio group, the internship course plan was presented to the students and the portfolio description booklet. According to the lesson plan and the educational goals of the traineeship unit, the students wrote their needs and goals in order of priority in theory and practical skills in terms of defining behaviors and ways to achieve them.

Then, the students then the initial report of the portfolio was delivered to the instructor by the students and they received the necessary feedbacks. In the second week of the internship they performed the relevant practical activities and wrote a work report using the help of the instructor, and they again received the necessary feedback. At the end, all the materials were delivered in a coherent format to the instructor for scoring and evaluation. In the conventional education group, after setting educational goals and assignments and presenting the topics to the students, a 1-h conference and group discussion was held. Students were also instructed by the instructor to provide nursing care and treatment methods in the ward, and finally, evaluation was done based on common forms of the faculty. At the end of nursing students' clinical competency training, a clinical competency questionnaire was administered to students by self-evaluation and then by an instructor. Data collection tools included demographic information questionnaires of the research units including questions about age, gender, marital status, shift work, interest in nursing, satisfaction with internship, marriage satisfaction, traineeship site, internal and surgical course score in the previous year, place of internship, and pre- and posttest score and validity and reliability of clinical competency questionnaire.[17] The validity of this tool was calculated by Content Mastery Method by several professors and specialists of this course and its reliability was calculated by internal consistency method using Cronbach's alpha correlation coefficient, which was 0.95.

In this study, the clinical competency of nursing students was a score that the respondents gave to 44-item questionnaires of clinical competency of nursing students. The questionnaire was completed by students and others by the instructor. The questionnaire is based on a five-point Likert scale (never – 1, rarely – 2, sometimes – 3, often – 4, and always – 5). The range of scores obtained from the questionnaire is between 44 and 220.

Rating between 44 and 73: The level of clinical competence of nursing students is low. Rating between 73 and 147: The clinical qualification of nursing students is moderate. Score above 147: The level of clinical competence of nursing students is high. This study was conducted by researchers in the internal medicine and surgery department of Qaen's Shohada Hospital after the approval of the ethics committee of Birjand University of Medical Sciences and obtaining a letter of introduction from Qaen's School of Nursing and Midwifery. Written consent was obtained from eligible participants in the study. At the end of data collection, data were entered into IBM SPSS Statistical version 23 software and analyzed by descriptive and inferential statistics including independent *t*-test, one-way analysis of variance, Chi-square, and Fisher's exact test at $P < 0.05$.

RESULTS

In this study, 60 nursing students participated in the control group (30 students) and the intervention group (30 students). The majority of participants were male (58.3%). Their mean age was 22.91 (SD = 1.38).

Results of primary tests with Chi-square and independent *t*-tests showed that there was not a significant difference between the two groups in terms of gender distribution ($P = 0.19$, df = 1, $\chi^2 = 1.71$), work shift ($P = 1$, df = 1, $\chi^2 = 0$), internship satisfaction ($P = 0.67$, Fisher's exact = 1.22), marriage satisfaction ($P = 0.47$, df = 1, $\chi^2 = 1/71$), and pretest score status ($P = 0.55$, df = 2, $\chi^2 = 1/16$). However, there was no statistically significant difference in occupational interest ($P = 0.46$, df = 2, $\chi^2 = 1.92$) and mean age ($P = 0.64$, df = 58, $t = 0.46$). There was a significant difference between the two groups in terms of marital status (P=0.004, df =1, $\chi^2 = 8.52$), accommodation (P= 0.02, df=1, $\chi^2 = 5.40$), internal course score status (P <0.001, df =2, χ^2 =21.21), Surgery course score (P=0.007, df =2, χ^2 =10), traineeship site (P=1, df=1, $\chi^2 = 0$), and post-test score status (P <0.001, df=2, $\chi^2 = 15.82$). Considering that the level of clinical competence of students in both groups was measured both by self-expression and by the instructor, it was revealed that based on self-expression, in all dimensions of clinical competence (except individual management) and overall clinical competence, people in the portfolio group had a higher mean score; however, there was no statistically significant difference between the means of these two groups (P>0.05) [Table 1]. The review of students' clinical competence by the instructor also showed that there is a significant difference between the two groups in both all dimensions of clinical competence and total clinical competence. Moreover, it was revealed that portfolio group had a higher mean score. (P <0.05) [Table 2].

The results showed that, from the students' point of view, there is no significant relationship between demographic characteristics of individuals such as gender, marital status, interest in the profession, satisfaction with the internship environment, marriage satisfaction, housing status, pretest scores, posttest scores, internal course score,surgical course score status and areas of clinical competence, total clinical competence (P> 0.05). However, in assessment of the relationship between work shift and traineeship site with scores of clinical competence and total clinical competence from the students' point of view, there was a significant relationship only in the domain of clinical competency care management, so that in relation to work shift, people in night shift had a higher average score in comparison to people in afternoon shift (P = 0/025). Furthermore, regarding the place of internship, students in surgery ward had a higher average score in this area than the students in internal ward (P = 0.040). It was revealed that, from the instructor's point of view, there is no significant relationship between demographic characteristics of individuals such as gender, shift, interest in the profession, satisfaction with the internship environment, marriage satisfaction, pretest scores, internship place and areas of clinical competence, total clinical competence (P>0.05). However, the relationship between marital status, housing status, posttest scores, internal lesson scores, and students' surgery course scores was significantly correlated with the score of clinical competency and their overall clinical competence from the instructor's point of view [Table 3].

DISCUSSION

This study aimed to affect the portfolio training and clinical evaluation method on the clinical competence of nursing students.

It has been shown that, from the educator's point of view, there is a significant difference between the areas of clinical competence such as care management, scientific competence, individual management, patient centeredness and scholarship, as well as general competence in the two groups under study. The dimensions mentioned were higher than the average group members as well as the overall competence of them, and people in the portfolio group had a higher average score in all dimensions than the conventional group. Valizadeh *et al*., in a study examining the impact of portfolio teaching and assessment on students' cognitive learning in clinical settings, also found that the study significantly enhanced the cognitive learning of nursing students, consistent with the results of this study.[17] Various studies have shown that the portfolio can be used as a tool for clinical education and evaluation of students. Furthermore, Tiwari and Tang in their study show that using the portfolio method in clinical education of students improves their clinical learning level.[24]

Table 1: Comparison of scores of clinical competence domains in the two groups under study from the students' perspective

The dimensions of clinical competence from the students' perspective	Study groups (mean±SD)		Test statistic (*t*)	*P*
	Conventional	Portfolio		
Care management	85.68±3.11	86.71±5.05	95.0	34.0
Academic qualification	85.10±3.77	85.20±6.05	85.0	93.0
Individual management	86.60±4.94	86.20±7.59	25.0	80.0
Patient centered	85.20±5.31	87.50±8.20	28.1	20.0
Scholarship	85.00±4.52	87.90±8.67	63.1	11.0
Total competence	203.40±3.77	204.90±6.75	06.1	29.0

SD: Standard deviation

Table 2: Comparison of scores of clinical competence domains in the two groups under study from the instructor's perspective

The dimensions of clinical competence from the students' perspective	Study groups		Test statistic (*t*)	*P*
	Conventional	Portfolio		
Care management	26.27 ±2.58	69.46 ±6.27	34.80	<0.001
Academic qualification	24.11 ±3.35	72.55 ±5.39	41.70	<0.001
Individual management	24.72 ±3.08	73.47 ±9.44	26.80	<0.001
Patient centered	23.95 ±4.36	73.12 ±7.89	29.80	<0.001
Scholarship	27.08 ±6.21	72.08 ±8.16	24.02	<0.001
Total competence	92.43 ±2.92	177.63 ±7.86	55.60	<0.001

SD: Standard deviation

Table 3: Comparison of mean total score and score of different domains of clinical competence with individual variables of research units from the trainer's point of view

Dimensions of clinical competence variables	Care management		Academic qualification		Individual management		Patient centered		Scholarship		Total competence	
	Mean±SD	*P*	Mean±SD	*P*	Mean±SD	*P*	Mean±SD	*P*	Mean±SD	*P*	Mean±SD	*P*
Gender												
Man	51.30±3.74	0.16	51.38±4.28	0.26	53.69±4.48	0.10	53.03±4.34	0.10	53.75±4.10	0.10	141.68±7.39	0.16
Woman	43.05±4.40		44.06±4.78		42.66±4.61		42.25±4.91		43.75±4.46		125.72±8.37	
Marital status												
Single	3.22±42.84	0.003	3.46±41.96	0.001	3.59±42.99	0.002	3.69±42.61	0.002	3.39±43.60	0.001	6.16±124.43	0.001
Married	4.78±61.67		5.39±65.83		5.72±65.88		5.40±64.84		4.87±66.01		9.24±164.18	
Turnover												
Night	4.13±48.23	0.90	4.72±48.16	0.95	4.40±48.05	0.75	4.61±48.95	0.90	4.30±49.58	1	7.98±135.00	0.99
Afternoon	4.07±47.50		4.41±48.50		4.97±50.13		4.80±48.12		4.46±49.58		7.98±135.06	
Interest in the profession												
Mild	7.29±40.58	0.52	7.98±39.66	0.48	8.05±40.00	0.46	6.85±40.00	0.50	7.09±41.87	0.50	120/10±13/79	0.49
Moderate	5.47±48.61		5.97±50.00		5.98±50.00		6.09±48.89		5.98±49.26		10.46±136.76	
Severe	49.68±3.86		4.35±50.10		4.55±51.38		4.70±50.94		4.16±52.08		7.61±138.66	
Internship environment workplace												
Mild	7.96±42.15	0.70	8.41±41.48	0.63	8.53±41.66	0.62	7.43±41.66	0.65	7.70±45.13	0.82	14.80±123.44	0.66
Moderate	4.89±49.63		5.59±51.00		5.70±51.66		6.04±51.25		5.56±50.93		9.82±139.10	
Severe	4.05±48.37		4.49±48.60		4.66±49.59		4.65±48.79		4.06±50.00		7.82±135.77	
Marriage satisfaction												
Yes	9.30±45.58	0.039	12.9±51.66	0.13	12.7±50.69	0.11	11.6±48.95	0.08	11.2±52.08	0.10	20.5±136.33	0.08
No	2.12±71.33		74.33±7.93		2.84±75.00		2.36±74.27		16.25±74.37		8.90±180.90	
Accommodation status												
Dorm	3.94±42.26	0.043	4.28±40.86	0.015	4.52±43.06	0.026	4.06±42.13	0.044	4.44±41.33	0.005	7.67±122.70	0.022
Home	3.97±53.85		4.40±56.32		4.48±56.60		4.52±55.38		3.63±58.40		7.55±148.20	
Pretest scores												
Poor	4.37±48.77	0.67	5.05±50.13	0.58	5.12±49.13	0.43	5.15±49.47	0.47	4.66±51.30	0.34	8.64±137.16	0.55
Moderate	4.61±44.97		5.08±44.37		5.18±45.13		4.98±44.27		4.79±44.53		±128.257.20	
Good	7.01±51.83		7.43±52.63		7.80±56.94		8.35±55.20		7.53±56.25		13.30±144.33	
Posttest scores												
Poor	2.59±29.30	<0.001	3.82±28.21	<0.001	2.82±26.87	<0.001	3.03±25.44	<0.001	3.89±29.46	<0.001	5.64±98.07	<0.001
Moderate	5.21±47.79		5.69±48.00		6.01±49.16		5.48±49.68		5.04±50.62		9.94±135.10	
Good	3.98±7.91		4.39±59.42		4.40±61.05		4.72±60.09		4.41±59.61		7.67±154.84	
Internal lesson scores												
Poor	3.62±31.32	<0.001	3.46±29.33	<0.001	2.92±28.33	<0.001	3.49±28.43	<0.001	2.93±31.87	<0.001	6.08±101.35	<0.001
Moderate	5.31±50.09		6.23±50.83		6.87±52.86		6.29±52.34		6.04±51.17		10.8±139.81	
Good	5.88±60.17		4.32±62.50		4.21±63.88		4.52±62.76		4.37±63.28		7.44±159.91	
Surgical lesson scores												
Poor	5.29±40.78	0.005	6.33±39.77	0.003	6.67±40.82	0.003	6.21±40.00	0.004	6.41±42.08	0.003	10.93±120.53	0.003
Moderate	4.75±40.12		5.04±39.60		4.89±39.88		5.01±39.08		4.59±40.77		8.79±119.47	
Good	4.01±59.06		4.36±61.31		4.68±62.33		4.85±61.71		4.20±61.97		7.70±157.70	
Place of training												
Internal unit	4.11±47.45	0.88	4.63±48.38	0.98	4.95±50.27	0.72	4.50±49.16	0.85	4.21±51.87	0.46	7.98±135.53	0.93
Surgical unit	4.09±48.28		4.51±48.27		4.42±47.91		4.90±47.91		4.50±47.29		7.98±134.53	

SD: Standard deviation

Numerous studies have also believed that nursing students have somehow been able to play a role in enhancing their cognitive learning in the clinical setting.[17,24] It was consistent with the results of the Mofrad and Karami

study on the learning rate and ability of nursing students to self-evaluate in the portfolio method. However, it is more common than the usual method.[25] However, in Zahraei's research, students mentioned the greatest impact on improving the clinical education of individual student characteristics and considered the least impact in the field of evaluation.[22]

However, in a study, Latifi *et al*. Showed that clinical evaluation by portfolio method was less than the usual method to increase the ability of critical thinking in nursing students.[26]

A study of Azadi *et al*., which was conducted as a study of the effect of education training and evaluation in the field of community health nursing by portfolio on the satisfaction of nursing students of Ilam University of Medical Sciences, showed that the average of all previous semesters in the two portfolio and conventional groups did not differ significantly.[27] Also, Hekmatpour's study entitled "The effect of portfolio evaluation on the accuracy of clinical evaluation of internship students in nursing at Arak University of Medical Sciences showed that there were no significant differences between the two groups in the self-assessment of students in both the conventional and portfolio of clinical competence in this study".[28] Kariman *et al*. showed in their own study that clinical evaluation by portfolio method increases students' participation in the learning process. It also was revealed that applying the principles and concepts of theory in clinical education increases their learning compared to the group with routine training the results of this study are contrary to the results of the present study.[29] This may be because in our self-assessment study, it may be perceived in the conventional group that responding to the questionnaire may affect their final score, or that the conventional group may have self-predicted. However, both the groups were required to explain this before the study. Hakimzadeh *et al*. also reported this issue in their study.[30] It should be noted that the difference in the facilities of educational and clinical environments and the performance of clinical educators and their relationship with students can be effective in the difference in the results of studies.

In assessment of the relationship between shift work and trainee placement with the score of clinical competence and total clinical competence from the students' point of view, there was a significant relationship only in the domain of clinical competency care management. Furthermore, Toubaei and Sahraeian showed that the day workers had a higher mean score than nighttime workers in this area.[31] Nighttime work in comparing the evening or the morning can lead to fatigue and depersonalization in nurses. Furthermore, regarding the place of internship, surgeons had a higher average score in the field of care management than the interns. Mosavianasl *et al*., in a study, showed that nurses in the internal ward had less personal performance than nurses in the surgical ward, which is consistent with the results of the present study.[32] Investigating the relationship between students' demographic characteristics such as gender, shift, interest in the profession, satisfaction with the internship, marriage satisfaction (excluding care management), pretest scores, and student placement with scores of clinical competency and their portfolio clinical competence was not significantly correlated from the instructor's point of view. In Latifi *et al*.'s study, there was no significant relationship between gender and nursing students' evaluation scores with critical thinking skills evaluated by the employer, which is consistent with the present study.[27] Asadi and *et al*.found that there is no significant relationship between interest in the work profession and the level of satisfaction of nursing students in both the portfolio and conventional groups. The results are consistent with ours.[33] The relationship between marital status, housing status, posttest scores, internal course scores, and students' surgery course scores was significantly correlated with the score of clinical competency and their overall clinical competence from the instructor's point of view. In a study, Baba Mohammadi *et al*. found a positive and significant relationship between the average score of students half a year ago and the critical thinking skills test that enables nurses to deal with patient problems, reasoning, and judgment, which is consistent with the present results.[34] However, contrary to the results of our study, Abutalebi *et al*. did not find a significant relationship between marital status and clinical education evaluation,[35] which may be due to the different structures of these two studies.

CONCLUSIONS

The results of the present study showed that students who had been trained in clinical practice and clinical evaluation in regard to portfolio methods had higher scores in all fields of clinical competence and overall clinical competence than the conventional method, which indicates its importance, considering that the existing issues in the evaluation of the portfolio in a holistic way with the educational goals motivate and interest the student to participate in learning. Improving the level of their clinical competence can benefit from new educational methods such as portfolio. Therefore, educational stakeholders and beneficiaries can benefit from this new educational method to train and evaluate clinical students in the field.

Application of findings

Training and evaluation as a portfolio is more effective than the usual method on the clinical competence of nursing students. Therefore, it is suggested to use modern methods of student-centered teaching, including the portfolio method, to improve the level of scientific competence of nursing students.

Limitations

It was difficult to get students' satisfaction to do a 10-day course, and many students said that it was too much.

Conflicts of interest

There are no conflicts of interest.

Authors' contribution

All authors contributed equally to the writing of the scientific proposal, data collection, and manuscript drafting. The final manuscript was reviewed and approved by all the authors.

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