Original Research

The Effect Of New Training On Nursing Students' Learning

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Abstract:

Background: The two new educational models based on problem-solving and results-based are those in which the required performance in the therapeutic role is attained. This research was created to include these two strategies in nursing students' clinical learning.

Method: This study has a two-group design and is semi-experimental. Forty-three sixth-semester nursing students who completed an internship in the specialty department during the first semester of the academic year 2019-2020 were among the samples included in the study. The census approach was used to choose the samples. The variance of two groups in the clinical learning variable was compared using the Kolmogorov-Smirnov test, linear regression using the simultaneous method, and Levene's F test.

Results: In independent groups of nursing students receiving both problem-solving and outcome-based instruction, there was no discernible difference in the quantity of clinical learning ($P>0.05$). In the two training groups, the learning score variance was similar.

Conclusion: Accordingly, the research's findings indicated that both novel teaching approaches favorably impacting students in the cardiac special care department. Clinical professors can employ each of these approaches in the clinical education of nursing students, depending on the conditions and facilities available.

Keywords: Problem-based Education, Outcome-based Education, Nursing Students, Clinical Learning

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Introduction

The primary goal of nursing education is to provide competent and capable nurses with the knowledge and abilities needed to sustain and enhance societal health by providing high-quality nursing care (1).

One way for nursing students to achieve clinical credentials is through clinical education; however, researchers in the nation's nursing education area have indicated that the quality of clinical education is not very good and has some flaws (2). Salimi claims, for instance, that nursing students' clinical proficiency in special care departments is not at the acceptable level (5). According to Farnia's research, the majority of nursing students feel that their education has not provided them with the opportunity to acquire the skills required to work in nursing, particularly in specialized fields (3).

Due to the complexity of training in the clinical setting, few researchers have examined the teaching and learning in this context and how to improve it, despite the emphasis in many studies on the need to reassess the way clinical internships are conducted (4). Many clinical educators nowadays are seeking instructional strategies that may be utilized to impart clinical information and skills to students at the right level (5).

In various nations, a variety of teaching techniques are employed in medical education. Starting with teacher-centered approaches, this spectrum goes all the way to student-centered approaches. Teaching strategies are shifting toward student-centeredness and a focus on learning responsibility at the same time as curricula are changing (6). Problem-based learning (PBL) and outcome-based education are two of these fresh approaches to education (OBE). It covers the primary core of the PBL approach.

Because this technique is learner-centered and students feel accountable for their personal learning as well as the material they must acquire, learning becomes a long-term process (7). In outcome-based education (OBE), the primary emphasis is placed on the abilities and outcomes of student learning (8). The utilization of evaluations, chances, and classroom experiences should all give the essential support for students to attain their goals in this educational approach rather than rankings and tests.

These educational objectives involve students' fundamental and clinical knowledge, and instruction is provided in both of these areas in a way that will ultimately increase performance and knowledge integration (7).

The topic of student educational assessment is one of them, as well as one of the most significant and difficult ones in clinical education. One of a clinical professor's most significant responsibilities is evaluation. It is feasible to determine the benefits and drawbacks of education by conducting a thorough review. By enhancing the advantages and addressing the deficiencies, one may move closer to transforming and changing the educational system (9). Effective evaluation aids the instructor in analyzing his performance as well as the student's motivation. It can help people acquire their abilities more effectively if they combine it with feedback (10). The use of scenarios has shown to be one of the most effective ways to assess contemporary education for understanding how medical and paramedical students reason. The approach of developing scenarios has been used and accepted in several studies as a component of clinical students' final evaluation in the field of education (11). In their study, Patricia and Johanna found that scenarios are a reliable basis for evaluating students' clinical decision-making as well as their knowledge and clinical skills. The study took place in 2012 in Canada and used the scenario writing method in the final evaluation of physiotherapy students (11). Given that the subject of "Why is the theoretical information taught unable to

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produce the ability to solve the prospective and real problems of patients by nursing students at the bedside?" is often brought up in the area of nursing. Furthermore, current nursing students' expectations for clinical learning are not fully addressed by the widespread use of conventional (traditional) clinical teaching techniques. In light of the knowledge currently accessible, the significance of the topic, the numerous flaws in clinical education, the absence of modern educational techniques in the clinical instruction of nursing students, and the dearth of thorough and cogent research in this area, the researchers decided to create and put into practice a problem-solving and outcome-based education model to compare these two novel pedagogical approaches on the clinical learning of Jahrom University of Medical Sciences nursing students.

Method

All nursing students in their sixth semester who had completed the special care internship unit made up the statistical population for this study. Forty-three persons made up the sample using the census approach. The undergraduate nursing students of Jahrom University of Medical Sciences Faculty of Nursing and Paramedicine who selected the special care internship unit were sampled using the census technique. All Jahrom University of Medical Sciences nursing students, including guest and transfer students, who took the special care internship course in the first semester of the 1998-1999 academic year and passed the theoretical and practical units required for this internship, were eligible to participate in the research as long as they did not work in positions related to nursing and did not fail to complete the internship unit in that semester. Reluctance to take the final test, absenteeism on the exam day, and resignation from the program due to missing more than one session during the internship were among the exclusion grounds. After the initial sample, the two groups were matched academically, which involved comparing the GPAs of each group's whole student career to make the groups homogenous and remove any intervening cases. The students were then provided with the information they needed to understand the research's goals and the information's confidentiality, and their agreement to participate in the study was gained. The fixed random block sampling approach was applied based on the research of Mahmoudi et al. The samples from the intervention groups were then supplied to a third party who was unaware of the study. In this way, the researchers created a two-part package and sorted all potential intervention groups depending on the number of samples. He chose the samples, which were then randomly divided into two test groups, three groups of seven people (a total of twenty-one people), based on the problem-solving method, and two groups of seven people and one group of eight people (a total of twenty-two people), who were trained using the result-based training method. The demographic information form was utilized to gather demographic data. The Procedural Direct Observational Checklist (DOPS Abilities) was employed to assess clinical skills. Following are five categories of significant accomplishments in the areas of education, significant cognitive and behavioral activities in the CCU department, and the activities of each area. These accomplishments include 1. Analyzing the cardiovascular system (in three dimensions: taking a history and performing a physical examination, and taking vital signs), 2- Drug administration (in three dimensions: giving the prescribed medicine, preparing the equipment for injecting intravenous fluids and injecting through the set serum or micro set) 3 equipment administration (in 5 dimensions: monitoring, electrocardiography, infusion pump, electroshock and pacemaker), 4- The ability to communicate with patients and educate them (in eight dimensions:

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communication, the confidentiality of patient information protection, cooperation with other members of the health team, adherence to disciplinary and administrative rules of the workplace, upholding patient safety and privacy, gaining the patient's trust, abiding by professional standards, and teaching the patient). All of the aforementioned instances were examined regarding ECG interpretation (in four dimensions: differentiating between normal and abnormal rhythms, identifying atrial and ventricular arrhythmias, detecting heart blockages, diagnosing angina pectoris and myocardial infarction).

The Mahmoudi and colleagues' cognitive domain of nursing students' reliability and validity questionnaire was used to assess students' cognitive abilities (8). The 30 questions on the cognitive survey questionnaire are rated on a 5-point Likert scale as follows: not assessable = 1, less than anticipated = 2, borderline = 3, within expected = 4, above expected = 5. If the student received 75% of the possible points in this order, they could complete the process without the examiner's supervision. The learner was required to be reviewed and supervised if they received 50 to 75 percent of the marks, and they needed to be continually and at all performance levels under the evaluation of the evaluator if they received less than 50 percent. The content validity technique, which used the opinions of five members of the university's academic staff, was used to assess the tools' validity. The simultaneous reliability approach, in which two members of the academic staff saw and assessed at least five students in each process at the same time, was used to assess the tool's dependability. The intra-cluster correlation test was then used to assess how well they agreed with one another, and the computed Kappa test result was 75%. A qualified teacher with experience in the use of problem-solving-based training techniques in the field of outcome-based trained both study groups. The specific cardiac care training course is five weeks long, with one day each week for each group. The topics that will be covered throughout these five days will be separated into five sections, and each week's instructional material will be the same for both groups. The dependent variable in this study is the clinical learning of nursing students in the cardiac critical care unit, and the independent variables are two clinical education methodologies, problem-solving-based education and outcome-based education. Since in this study, students in both educational methods should be familiar with and execute proper procedures in the special cardiac care department on subjects like knowing and working with the DC shock device, infusion pump, monitoring and ECG, pacemaker, knowing and using emergency medicine, determining the patient's heart rate from the ECG and distinguishing between normal and abnormal rhythms, detecting atrial and ventricular arrhythmias, diagnosing heart blocks, diagnosis of angina pectoris, myocardial infarction and care of cardiopulmonary hyperventilation patients. The teacher will provide the students with essential explanations about the training technique in the first session for both problem-solving-based and outcome-based training methods, as well as basic information about the educational themes in the CCU department.

In the problem-solving-based teaching approach, which is inclusive, students are given pre-planned scenarios after the first session, and one student is chosen from each group to serve as the group leader. The lecturer will explain the scenario text to the students and introduce them to some useful study materials. The situation will be studied and information gathered by the students for one week. Before presenting the next scenario in the second session, the students will report their progress and the findings of their research to the group supervisor and the appropriate teacher. The group supervisor will then deliver the overall

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conclusion in the conference room of the hospital. If there are any errors in the students' reports after their presentation, the professor will quickly go over the pertinent material with the students, and after each class, the professor will give the students a fresh scenario to study for the coming week. Students will be evaluated after each course (rotation) utilizing the scenario writing approach and a key features test (KF).

This exam uses the scenario writing approach and contains a question (a scenario, which is typically an unfinished novel) to evaluate clinical abilities. The student must select a specific number of possibilities, often 3 of the most accurate answers, to receive all possible points for this test, which typically has 12 options. The respondent will receive a minus point for each extra choice beyond the predetermined number of alternatives. Two examples will be shown for each of the five basic subjects that will be covered in this internship course. According to the goals of the training, which are based on the chapter of the educational curriculum, and also on the opinions of several trainers who were involved in the training of students in the CCU department, the expected achievements of the training in special cardiac care are determined in the outcome-based training method. Also, along with their thoughts and ideas about the internship of students in this department, they are requested to describe the significant and essential repercussions for the work of nurses in the CCU department. Following a review of the educational curriculum and a summary of these opinions, the following five categories of significant accomplishments in the field of significant cognitive and behavioral activities in the CCU department were identified, along with the associated activities for each category: 1- Studying the cardiovascular system (in three dimensions: taking a history and performing a physical examination and taking vital signs), 2- Drug management (in three dimensions: giving the prescribed medicine, preparing the equipment for injecting intravenous fluids and injecting through the set serum or micro set), 3- Equipment administration (in 5 dimensions: monitoring, electrocardiography, infusion pump, electroshock and pacemaker) 4. Patient education and communication abilities (in 8 dimensions: establishing communication, protecting the confidential information of the patient, cooperating with other members of the health team, adhering to the disciplinary and administrative principles of the work environment, maintaining the safety and privacy of the patient, the ability to gain the trust of the patient, complying with professional principles and providing training to the patient), 5- ECG interpretation (in four dimensions: distinguishing between normal and abnormal rhythms, detecting atrial and ventricular arrhythmias, detecting heart blocks, detecting angina pectoris and myocardial infarction).

Following the commencement of the course, the instructor will be informed of the necessity to follow the prescribed program, and in the final stage, which occurs after each course (rotation), students will be evaluated using the scenario writing technique and the key feature test (KF). Each of the clinical abilities is tested by one question on this exam, which is a scenario that is typically an unfinished tale. The student must select a specific number, often 3 of the most accurate answers from the test's possibilities, to receive the complete score. The exam typically has 12 options. The amount of available choices is known, and the respondent will receive a minus point for each extra option (19). Two examples will be shown for each of the five basic subjects that will be covered in this internship course. After the special cardiac care internship, the researcher (the special cardiac care internship trainer) will evaluate both groups using the same evaluation method (scenario writing), and the scores of both groups will be compared.

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Students will therefore be assessed by the scenario writing technique utilizing the KF exam after each course (rotation), in the conference hall of Ostad Motahari and Peimanieh hospitals, in both problem-solving-based and outcome-based educational approaches. There are twenty marks on this test. Moreover, all groups will take the final exam for the internship section at the end of the semester, following Jahrom Nursing and Paramedical College's regulations. For the special cardiac care internship, four out of a possible twenty points will be awarded. The influence of the scenario writing assessment technique on students' memory will then be assessed using the KF exam by comparing each student's end-of-internship score with his score on the scenario writing test.

The professor planned at least two scenarios in each field where the evaluation was to be conducted, and the student, after looking over the options that had been prepared in advance, selected three of the options that were closest to the question posed in the scenario and were evaluated. This method of scenario writing evaluation was used to assess the student's clinical learning. Subject matter experts assessed the scenarios' validity, and Cronbach's alpha and retesting were used to establish the scenarios' dependability. The results of the scenario writing evaluation that was conducted after the internship was then compared between two groups of students. Each student received a score for the scenario writing test of 20 points, which was classified into four levels: outstanding level (a score of 15-20), good level (a score of 10-15), ordinary level (a score of 5–10), and low level (a score of 0–5). Additionally, the clinical learning of the students was evaluated by comparing their assessment scores gained utilizing the scenario writing approach with the scores from the written examination that was regularly given to all interns after the semester.

Application of project findings

Taking into account that the main benefit of utilizing new educational approaches is the practicality of education and avoiding the transfer of purely theoretical knowledge, on the one hand, and a more accurate diagnosis of educational needs and increasing the efficiency of education, on the other hand. Therefore, it is advised that nursing education officials increase the efficiency and effectiveness of clinical education courses by utilizing all of the educational models that have the greatest benefits for clinical education and by organizing, formulating, and adjusting the nursing curriculum under contemporary educational methods. Besides, it allows students to benefit from this educational model by utilizing the results of the most recent research while providing appropriate learning environments. Additionally, it develops the necessary coherence in clinical nursing education programs by designing and implementing monitoring programs on educational implementation patterns. Additionally, by completing this task, the level of facilitation of the planned teaching process for professors and clinical trainers has been prepared, making it possible to take a preliminary step toward raising the caliber of clinical education currently provided and nursing services to be provided in the future. Also, it is recommended that comparable research be done on college students at two other hospitals, on students in other departments outside the special care department, or on students in other medical science departments.

Results

The study's findings demonstrated that one of the distribution matching test's most often used applications is the data normality test. For this, the Kolmogorov-Smirnov test was appropriate. Regarding each of the test's presumptions, it

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was agreed that the result shown in Table 1 served this goal.

As shown, the data were accepted at the confidence level of 0.05 and with a 95% probability of normality because they passed the Smirnov-Kolmogorov normality test and because the significance level in the investigated hypotheses is larger than 0.05. Univariate regression was employed concurrently to examine this hypothesis and find out how the problem-solving-based teaching technique affected the clinical learning of nursing students.

According to the findings in Table 2, the variable of the teaching technique based on problem-solving cannot predict the variable of clinical learning, and this teaching method does not have an impact on clinical learning at a significant level (P = 0.152). Univariate regression was used concurrently to examine the impact of outcome-based teaching methodology on nursing students' clinical learning.

Table 3's findings showed that the clinical learning variable could not be predicted by the outcome-based teaching technique variable, despite its significant level (P = 0.892). The t-test comparison test was utilized for independent groups under problem-solving-based and outcome-based training to examine the impact of the two strategies on the clinical learning of nursing students.

As shown, the variation of clinical learning scores in the two groups under problem-solving and outcome-based training is the same, according to Levin's F test, which had a value of 2.965 and a significance level of 0.213 (P>0.05). As a result, the t-test was utilized to compare the averages under the presumption of equal variances.

As can be seen in the above table, the t-test with a value of 1.306 and a significance threshold of 0.200 revealed that there is no statistically significant difference between the two independent groups when it comes to problem-solving and outcome-based training. As a result, there was no significant difference between the amount of clinical learning that occurred in separate groups using the problem-solving and outcome-based training approaches, and the clinical learning of nursing students was not significantly affected by any of these approaches.

Discussion and Conclusion

The current study was carried out to compare new teaching techniques based on problem-solving and outcome-based. Teaching is one of the major instruments of learning that may be facilitated by adopting new teaching methods. The results of the current study demonstrated how innovative educational approaches had improved student attitudes, knowledge, and learning. The averages of the two learning groups in the two groups did not significantly differ. This conclusion may be explained by the fact that learners are frequently engaged in higher levels of a cognitive domain when learning takes place in active teaching techniques, where learning is more stable and steady. This result is consistent with the findings of several studies. For instance, the study by Farozesh et al., which compared the effects of two lecture methods and problem-solving techniques on students' learning, revealed that the higher level of knowledge in the problem-based educational group was confirmed by the findings (14). This highlights one of the findings of the ongoing study showing that problem-solving-based learning is an effective learning strategy. The findings of Asadi's study comparing the effects of two educational approaches on students' learning also revealed that the average semester grades in the problem-solving-based education group were worse than those in the evidence-based approach (15). The experimental character of the study's style of education and the problem-solving approach's greater effectiveness in that form of education may be the cause of the

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inconsistent findings. The problem-solving approach has advanced more than conventional learning techniques, which has been proven in earlier research and has been able to enhance students' learning across a range of subject areas. In their investigation of the impact of outcome-based education on nursing students' clinical competence, Mohammadpour et al. found that outcome-based education was successful in enhancing students' cognitive and behavioral abilities (1). According to the findings of this study, the result-based educational model has a stronger impact on nursing students' development of clinical and cognitive abilities than the traditional clinical education technique does. This finding is consistent with one of the findings of the current study. Additionally, research by Tiffen et al. in America found that students' understanding of physical examination rose considerably in the student-centered group compared to the professor-centered group, and this conclusion is congruent with the current study (16).

The mean score before and after instruction in both problem-solving and lecture-based teaching methods was different and significant, according to Namnabati and his colleagues, and the usual method was more productive than the problem-solving-based method in advancing these students' academic performance (17). The nature of the courses can be used to explain why it differs from the current research. The study by Namnabati et al. investigated the students' perspectives on the theoretical courses in which they chose not to enroll. The current study was undertaken in the area of clinical courses, and as increased student engagement fosters learning and boosts motivation in actual clinical settings, this in and of itself can also boost motivation. According to Ahadian, inclusive learning is not a simple method, and it requires work in the fields of writing appropriate course topics, educational and consulting services, appropriate assignments and tests, and providing feedback for learners. Modern educational approaches place more emphasis on inclusive active roles than traditional teaching (18).

The quantity of learning in independent groups using problem-solving and outcome-based training was explored in this study, and it was shown that the two approaches were not statistically different from one another. In addition, since both approaches may be planned and used to teach nursing students in clinical settings, this offers a framework from which the instructor can derive the maximum value when planning teaching sessions and learning activities. Additionally, the gap between nursing theory and clinical practice is removed through new teaching techniques, which improves students' knowledge and abilities. Thus, nursing education instructors may include one of the two problem-solving or outcome-based teaching philosophies into their clinical training program and so accomplish their educational objectives by utilizing innovative pedagogical approaches.

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Tables

Table 1. Comparing the students' clinical learning using the Kolmogorov Smirnov test

	Variables / **Indices**	**Outcome-based teaching**	**Problem-solving based training**	**Clinical learning**
Normal parameters	Mean	22.8462	15.63333	14.2808
	SD	2.08426	1.10548	3.07207
critical intensity	Absolute value	0.291	0.076	0.174
	Positive	0.291	0.076	0.126
	Negative	-0.188	-0.066	-0.174
	Kolmogorov Smirnov	1.818	0.473	1.086
	Significance level	0.503	0.979	0.189

Table 2. Linear regression test using the simultaneous method

dF	**F**	**R^2**	**P (Sig)**	**t**	**β**	**B**	**predictor variables**	**Criterion variable**
1	2.239	0.111	0.000	3.828		1.433	Fixed coefficient	Clinical learning
			0.152	26.256	0.333	0.096	Problem solving-based training	

Table 3. Linear regression test using the simultaneous method

dF	**F**	**R^2**	**P (Sig)**	**t**	**β**	**B**	**predictor variables**	**Criterion variable**
1	0.019	0.033	0.000	10.209		1.57	Fixed coefficient	Clinical learning
			0.892	0.138	0.33	0.015	Outcome-based training	

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Table 4. Levene's F test to compare the variance of two groups in the variable of clinical learning

F value	Significance level
2.965	0.213

Table 5. Comparing the results of the mean groups under problem-solving and outcome-based training in the variable of clinical learning

	Mean groups		t-value	Significance level
	Problem solving-based training	Outcome-based training		
Clinical learning	13.62	14.90	1.306	0.200

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