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Designing a blended training program and its effects on clinical practice and clinical reasoning in midwifery students

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Abstract:

INTRODUCTION: Proper empowerment of medical students in encounter with the complexities of the clinical environment is one of the requirements for health services. In this regard, the development of problem-solving skills, critical thinking is essential for medical education. The purpose of this study was to investigate the effect of designing a blended training program on the practice and clinical reasoning of midwifery students.

MATERIALS AND METHODS: In a quasi-experimental study with control group, 41 undergraduate midwifery students were randomly assigned to two intervention and control groups by four blocking. In the first group, the 15-h workshop was held in the traditional teaching method and in the second group in the blended method, about three emergency aspects of midwifery. Data were collected and analyzed through objective structured clinical examination and clinical assessment evaluation before and after the educational intervention.

RESULTS: The mean and standard deviation of the age of participants were 23.54 ± 2.19 years. The mean score of clinical practice before the beginning of the study in the integrated training group was 16.68 ± 5.49 and at the end of the study was increased to 35.75 ± 4.54, which was significant between the two groups ($P = 0.035$). The clinical reasoning score was changed at the beginning of the study in the blended training group of 6.77 ± 3.57 and at the end of the intervention was 11.58 ± 2.83. There was no significant difference between the two groups ($P = 0.81$).

CONCLUSION: The results showed that the use of blended methods in comparison with conventional education can improve clinical practice, but the improvement of students' ability in clinical reasoning requires more effort.

Keywords:

Blended education, clinical practice, clinical reasoning, traditional education

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Introduction

The provision of health services will be possible when graduates are able to adapt themselves to the increasing spread of medical knowledge, to the complexities of the clinical environment, and to rapid technological changes,[1,2] and have the ability to deal with different situations in solving patients' problems.[3] In fact, to have a proper role in the medical profession, it is not enough to obtain sufficient scientific knowledge,[4] so medical education requires the reinforcement and development of skills such as problem-solving and critical thinking. It is necessary for the teaching environment to be designed in such a way that the theoretical training can be linked to real situations.[5] Teacher-centered and lecture as common methods of teaching in recent decades have been criticized by many scholars; because they are believed

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to impede the arousal and development of high levels of cognitive and intellectual processes in the learner.[6,7] The research has shown that the effect of lectures on increasing the level of clinical skills of learners is lower than new educational methods such as problem-solving [8,9] or group discussion method.[10,11] Efficacy, performance, and patient care and retentive learning[9,12] are lower.

Considering the students' interest in active teaching methods, because traditional methods of teaching become stagnant the active mind[13] and the efforts of the educational system to eliminate the gap between education and clinical education, changing the traditional educational programs and turning them into programs that can effectively increase decision-making power and clinical skills is proposed. So that, the learner is encouraged to engage more activity, which leads to improving the learners' ability and clinical performance.[14] On the other hand, to train clinical skills, it is necessary to use a combination of different teaching methods because in a class different people use different styles for learning. Therefore, choosing the appropriate teaching method is one of the effective factors in student progress and acquisition of professional skills.[15,16]

One of the suggested strategies for training clinical skills and eliminating the gap between education and clinical education is to change traditional educational programs such as lectures and turn them into programs that can actually increase decision-making power and clinical skills. Double proposes the use of a theory of teaching and consequently, the use of an educational method cannot be combined with learning, so it has been suggested to combine teaching methods.[14]

In addition to being an effective learning model, blended education, due to the use of various learning strategies to optimize learning outcomes, leads to increased responsibility, collective collaboration, internal motivation, increased self-efficacy, a sense of competence in learners, and reducing training costs.[17-19] On the one hand, it will pave the way to think critically and creatively, and leads to research, problem-solving, and information combinations.[18]

Some educational experts believe that the combination of new media and powerful teaching methods in the scenario could have the greatest impact on learner learning and by avoiding common educational problems, could design a more effective educational process.[20]

Simulation is another new teaching method that can be used in compilation training in a useful way, but it is used less often for different reasons. The simulation is a learning activity that follows the realities of the clinical environment to be able to devise a process for deciding on probabilistic issues in the real environment and developing critical thinking using techniques and tools such as role-playing, video, or mannequins. Interactive design.[21,22]

Midwifery students, like all medical graduates, enter the health-care system, and they need to have high clinical decision-making power. Evaluating their power of reasoning can lead to a better planning of the education system. As several studies have shown, medical graduates in clinical settings and such special situations have a low level of confidence in solving the problem, all of which emphasize the use of active teaching methods for lasting learning and strengthening problem-solving skills.[23-25]

It is clear that effective training and learning requires a serious and comprehensive consideration of all the key elements of the learning process. Moreover, the more elements the method presented in education can cover the more effective the training will be. Since previous studies have not investigated the impact of this educational method on clinical practice and clinical decision-making, therefore, the present study was conducted to investigate the effect of blended education on the practice and clinical decision-making of midwifery students.

Materials and Methods

In a semi-experimental study with pre- and post-control group, 41 undergraduate midwifery students of the 8th semester of Islamic Azad University of Jahrom, Iran, were entered into this study by census method. The inclusion criteria included: Being a resident of Jahrom, studying at the 8th semester of midwifery and exclusion criteria included: Participating in midwifery emergency training courses and being reluctant to cooperate after the study began.

In the preparatory phase, due to the importance of three main issues in midwifery emergencies, including hypertension disorders in pregnancy and postpartum hemorrhage, and dystocia were selected as training subjects.

Before the intervention, necessary information including demographic information (age and total average), the ability of clinical reasoning (with eight questions in the scenario format) and clinical practice (five clinical skills) by objective structured clinical examination (OSCE) test was gathered. Then, students were randomly divided into intervention and control groups using quadruple blocking. In the control group, teaching materials were taught in three sessions with lecture and focus on

clinical and clinical points. In the intervention group, the educational materials were designed according to the lesson plan and were taught in a 15-h training course using a film screening, a group discussion of real scenarios, simple simulation using mannequins and four clinical decision-making questions for each topic using the algorithm using problem-solving method. The scenarios were taken from the actual deaths of mothers in Bushehr Province, who died due to three issues related to workshops,[26] which, in terms of the content and formal validity, after the application of experts' opinions, was approved by five faculty members of the midwifery group and three gynecologists.

How to hold the objective structured clinical exam test

The Coordinating Committee was established since 2 months ago. The time and place of the test were announced at the right time. Eighteen stations were proposed to hold the OSCE test. Nine midwifery instructors and faculty members were introduced as test assessors. In two stations, the standard patient should be used as a client (a 3-h training session was conducted 1 week before the test was conducted by the researcher). At each station, one or more of the developed objectives were evaluated. Between the stations, experts in education section were called for to guide and answer the learner's questions. In order to evaluate, in addition to the direct observation of the evaluator stationed at each station, a special scoring sheet was used for each station. To measure the students' real skill and professional decision-making, attempt was made to design questions as realistic as possible so that actual observable behavior could be measured. The stations were designed and determined so that each station was held independently and no station was the prerequisite for the next station. In general, for this test, eight stations asking for clinical reasoning (station 3, 4, 5, 6 and 17, 12, 13, 11, 10), five clinical skill stations (stations 1, 2, 8, 9, 18, 16, and 15), and two rest stations (stations 7 and 14) were also considered. The total expected duration of the test was 70 min and 15 min for switching between stations. In general, the test time was 85 min for each group.

The required explanations were provided by the education director before the beginning of the test. At 3 stations, 3, 18, and 10 (each containing two questions), SC questions were presented in three sections of the patient's assessment, diagnosis and treatment, and the range of grades was from 2− to 2+. Each score form for each station had the main indexes of skill that were extracted from the textbooks of the midwifery and graded according to the shoulds and shouldn'ts of doing the procedure. The overall score was 100. The minimum score for success on the test was 80 and above. To standardize the test, the modified Anguff method was used, so that at first, 12 midwifery and gynecologists identified the minimum score (minimum score: 80); then, for each item in the checklist, they determined the incidence of admission with a minimum score. In the final step, the score of each check item was determined based on the mean of the reviewed judgments, the station's score, and the OSCE passing score.

Reliability and validity

The content of each station was confirmed by 10 faculty members of the faculty of medicine and the faculty members of the department of midwifery, according to the content validity and content validity. One month before the test, a group of 12 midwifery students of the seventh semester was selected to conduct a pretest to estimate the time needed for each station and to determine the difficulty and clean-up test. Moreover, in cases where the necessary changes were needed in the evaluation checklists, modifications were implemented during a meeting with the faculty members of the gynecology and midwifery group. To evaluate the reliability of the test, the reliability method between observers for functional skills stations was used and for the reliability of SC stations, the reliability method between the scribes was used. Finally, the internal stability of the whole test was calculated.

At the final step, for posttest, an OSCE test was conducted for both groups after 2 weeks of training.

After collecting data and entering data into SPSS package 16.0 software, (version 16, IBM Company Armonk, NY, USA) quantitative data were checked for normality. Independent *t*-test was used to compare the mean of quantitative variables in two groups. Furthermore, Mann–Whitney test was used to compare the qualitative rank variable. To compare before and after quantitative measurements, the paired *t*-test was used. Descriptive statistical tests were used to analyze the demographic data. All statistical tests were performed with a confidence interval of 95% and a significant level of <0.05.

Ethical considerations

All stages of the study were reported to the participants, and the confidentiality of information and the voluntary nature of participating in this study were explained. A written consent form was obtained from the research samples. Considering the ethical importance of the knowledge and awareness of the individuals involved in the study, after completing the study of the methods used in blended training, traditional education was used for the volunteers of the group. Research project the present study was approved by the Ethics Committee of the Shiraz University of Medical Sciences with the code of ethics IR. SUMS. REC.1396.19.

Results

In a semi-experimental study with pre- and post-control group, 41 midwifery students at the Islamic Azad University of Jahrom participated in the study after obtaining the criteria for inclusion. Thirty-seven of them continued their cooperation until the end of the study. Twenty-one in the intervention group with combined training and 20 in the intervention group participated in the traditional education. The samples with mean and standard deviation were 23.54 ± 2.19 years old. The mean age in the intervention group was 23.19 ± 1.69 years, and in the traditional education group, it was 23.94 ± 2.65 years. The trend of the volunteering process was shown in the study [Figure 1].

The frequency distribution of demographic characteristics in traditional education groups and compilation training before the intervention was shown using descriptive statistical methods [Table 1]. According to the independent *t*-test, there was a significant difference in the mean age and mean of participants in the two groups of education. There was no traditional training and compilation ($P < 0.05$) [Table 1].

There was no significant difference in the mean score of clinical practice, clinical reason, and total score of the units ($P > 0.05$) in the baseline situation before the intervention. There was no significant difference between the two groups in the consolidation training and traditional education [Table 2].

Independent *t*-test showed a significant difference between the two groups in terms of clinical practice ($P = 0.035$) and total score of the test ($P = 0.016$), but there was a significant difference in the clinical point of view between the two groups after the intervention not seen ($P = 0.81$).

Table 3 shows the mean scores of clinical practice areas, clinical reasoning, and total score of the students before and 2 weeks after the intervention in each group. There was a significant difference in mean score in each group before and after the intervention ($P < 0.05$) using paired *t*-test in clinical practice areas, clinical reasoning, and total score of the test.

Discussion

In analyzing the data obtained from the present study, demographic variables such as age and mean score that could somehow affect practice scores and clinical reasoning were compared. Since there is no significant statistical difference in the results of this comparison, it can be more asserted that the significant difference in the results can be more strongly due to the intervention in our study. However, controlling all the variables that can misdirect the results of any research lies beyond the researcher's responsibility. On the other hand, the participants in this study had the same level of education, so the effect of this variable on the results was the same.

The mean score of clinical practice, clinical reasoning and total score of the test were also assessed between the intervention and control groups at the baseline level in terms of the difference in the statistical significance so that any bias in the results could be reduced.

In the present study, the results showed that due to the significant difference in the mean score of clinical practice after intervention, the values of this variable increased, and a significant difference was observed between the two groups.

In the intervention group, the mean scores of clinical practice after the intervention increased 19.07 compared to before the intervention, while in the control group, this increase was 18.13, which showed a significant difference in the clinical score in the intervention group. Although clinical practice in the control group was also increasing, blended training has had a more meaningful effect on clinical practice of students. Bahri *et al*. also achieved the same results after applying blended training in a continuing education midwifery workshop. In the same study, the stability test also showed a significant difference in the blended training group.[27]

Liu *et al*. also confirmed the positive effects of applying various educational methods to increase the level of comprehension of learners.[28] Different studies have considered the use of blended training method effective in increasing the level of learning and the ability of learners to have effective clinical skills. Similar to the results of this study, Elisabeth *et al*.[29] and Badiyepeymaie Jahromi *et al*.[30] Bahri *et al*.[27] considered designing educational programs by using different educational techniques when planning and writing a lesson plan to have a greater impact on learning and higher retention. Meanwhile, more satisfaction of trainees trained with this method has been mentioned.

Hojjah in his study has shown that the use of blended training, in comparison with the traditional teaching method in mental health education, can change the attitude of students toward patients admitted in this department and increase the willingness of nurses to work in this department.[31] In the present study, students participating in the combined training group, after improving their clinical practice after the intervention, verbally acknowledged that the fear of technical errors in some procedures was considered an obstacle to

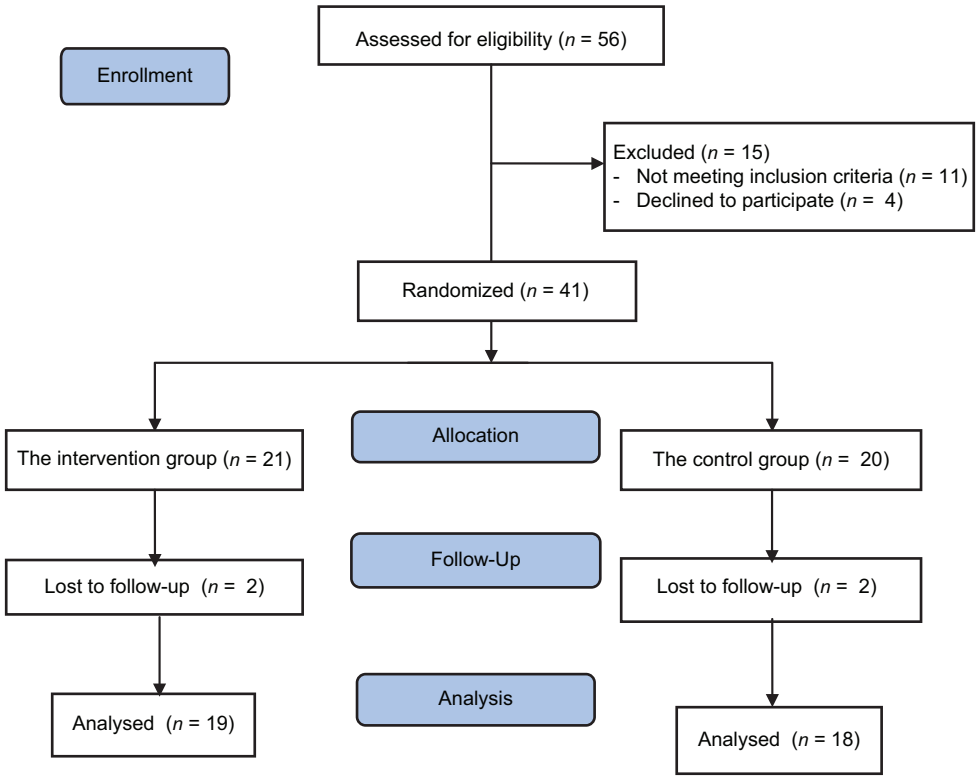

Figure 1: The flow of participants in the study

Table 1: Descriptive statistics and comparison of demographic characteristics of examined examples in two groups

Group	Traditional education		Blended education		*t*	*P*
	Mean±SD	Frequency	Mean±SD	Frequency		
Age (year)	23.94±2.65	18*	23.19±1.69	21	1.076	0.144
Mean(score)	17.35±1.10	18*	16.84±1.00	21	1.492	0.720

*Missing. SD=Standard deviation

Table 2: Comparison of the mean of test scores in the two groups of blended training and traditional education before and after the intervention

Group	Mean±SD		*t*	*P*
	Traditional education	Blended education		
Clinical practice (score)	14.75±5.14	16.68±5.49	−1.158	0.127
Clinical reasoning	7.55±2.68	6.77±3.57	0.786	0.218
Total score of the test	22.30±6.39	23.45±8.06	−0.503	0.309

SD=Standard deviation

their proper functioning. These fears and anxieties have diminished due to the application of different educational methods.

Hojjati *et al.* stated that when we can improve nurses' attitudes toward patients by using blended training, they take care of patients with a better, more informed and compassionate approach.[32]

Golmohammadi and Dashti also demonstrated that the use of blended teaching in teaching anatomy lessons could provide more effective learning in the theoretical and practical part of anatomy course in students.[15] It seems that the reason for this is to take advantage of different learning methods (audible, visual, and tactile) in education that has been able to create more effective learning.

In the present study, the results showed that due to the difference in the mean score of clinical reasoning after the intervention, the values of this variable increased, but no significant difference was observed between the two groups.

In the intervention group, the mean score of clinical reasoning after intervention increased 4.81 compared to before the intervention and in the control group, it increased by 2.51 points, indicating no significant difference in the clinical reasoning score between the two groups of intervention and control. Although clinical reasoning in both groups of intervention was also increasing, there was no significant difference between the two groups.

Table 3: Comparison of the mean of test scores in the two groups of blended training and traditional education before and after the intervention

Variable	Group(time)	Mean±SD		*t*	*P*
		Before intervention	After intervention		
Clinical practice (score)	Traditional education	14.75±5.14	32.88±4.83	−1.867	0.035
	Blended education	16.68±5.49	35.75±4.54		
Clinical reasoning	Traditional education	7.55±2.68	10.06±3.64	−1.425	0.81
	Blended education	6.77±3.57	11.58±2.83		
Total score of the test	Traditional education	22.30±6.39	42.93±5.51	−2.215	0.016
	Blended education	23.45±8.06	42.93±6.55		

SD=Standard deviation

In a semi-experimental study by Sadeghnejad and colleagues on emergency medical students, after the pretest, three clinical education workshops were trained in two methods of simulation on mannequins and conceptual maps. Mean and standard deviation of clinical decision-making scores in both groups of simulations and conceptual maps were significant. There was no significant difference between the mean scores of posttest with pretest in the concept map group compared to the clinical simulation group.[33] This indicates that despite the awareness of the importance of clinical decision making in the fields of medical sciences to provide better services and to provide patients with health, this section has been less focused on theoretical and practical training and should not focus on this topic only in the research section of education, so upgrading this ability should be an integral part of educational goals. Adib Hajbagheri, in his qualitative study entitled "Clinical Decision Making: A Way to Professionalize Nursing," points to several important and effective factors in improving the level of clinical decision-making in nursing: organizational culture and structure, self-confidence, having professional competency, support and nursing education, among which the authorities' attention was attracted to decision making by nurses and its importance and removing the existing barriers to expand this issue were the most important variables in the form of organizational culture and structure. In another part, the combination of theoretical knowledge and clinical skills along with patients can be profoundly successful in caregivers, which, in turn, can enhance judgmental or clinical reasoning.[34]

Given the fact that the volunteers in this study were in their eighth semester and had completed all theoretical and practical units, they were expected to have a good decision-making level on the most prevalent and highly emergency topics taught in this study. The weaknesses and inability of the volunteers indicate that teachers are not paying attention to this important aspect in medical science education. On the other hand, the assessment of clinical decision making should be part of the end-of-term tests, to prioritize the importance of the subject and empowerment of learners is clearer for educators and learners all the more. In Adib Haj Bagheri's study, this issue was approved by nurses that the medical education department does not prepare students for decision making. Most of the training provided is theoretical, and there are no educational areas for clinical decision making.[34] In the study of Sharif *et al*., This issue was confirmed by nursing students. Education by effective educators and in an appropriate clinical setting with the advancement of effective knowledge can prepare students for clinical decision-making, but what is said by the students is the weakness of the provided training. Moreover, instructors are inefficient, and therefore there are no educational areas for clinical decision-making.[35] In other words, an effective decision involves the blended of knowledge and skill and the close relationship with the patient for a profound understanding of the condition.[36] In the definitions of blended training, strengthening critical thinking has been mentioned as a goal,[37] and this issue has been recognized as the main element in decision making. Karami and Zarae Zavaraki in their study showed that the use of blended training would be able to increase critical thinking and happiness in the students of 8th grade.[38] Therefore, it seems that one of the ways to increase the ability to make decisions and clinical rationale is to use blended training in the theoretical and practical training of medical students so that they can strengthen their critical thinking ability by making them more powerful in clinical decision-making.

As it was shown in the review of the results of this study, the use of blended training can improve clinical practice. However, in the case of clinical reasoning, the research team felt more attention and more extensive studies in the field of discovering the causes of learning disabilities and weaknesses in this case were necessary.

Of the positive features of this study are to assess the clinical practice along with clinical reasoning in the student population. As it was shown by the results of this study, students are weak in the field of clinical reasoning and decision making, they need to be rehabilitated and strengthened.

Of the limitations of this study was the lack of anxiety test in the two groups. It would also have been better to redefine the length of training provided.

Conclusion

The results of the study showed that the intervention with compilation training improves clinical practice in comparison with traditional education. Although there was no significant difference between the two groups in terms of clinical reasoning, the total score of the test was increased in the combined students compared to the traditional education group, and there was a significant difference.

It is hoped that the use of blended method as one of the new educational methods in the field of medical education will be expanded.

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Conflicts of interest

There are no conflicts of interest.

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