

## The effect of Mobile-based and Lecture-Based training methods on Midwives' knowledge regarding Management of Pre-Eclampsia/ Eclampsia

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ARTICLE INFO	ABSTRACT
<p><i>Article type:</i> Original article</p>	<p><b>Background &amp; aim:</b> Preeclampsia is a serious pregnancy hypertensive disorder which is associated with high maternal and perinatal morbidity and mortality. One of the ways to reduce the risk of preeclampsia during pregnancy and childbirth is training midwives regarding its management. We aimed to compare the effects of mobile-based and lecture-based training methods on midwives' knowledge regarding management of pre-eclampsia/ eclampsia in 2017.</p> <p><b>Methods:</b> This experimental study was conducted on 70 midwives working in Lar, Iran, in 2017. The patients who met the inclusion criteria and provided informed consent were included in the study. The subjects were randomly assigned to two educational groups of lecture-based and mobile-based education. To measure knowledge a questionnaire was completed before the intervention, one week and one month after the intervention by the participants. To analyze the data, independent t-test for inter-group comparison and paired t-test for intra-group comparison were run in SPSS.</p> <p><b>Results:</b> No significant differences was seen between the two groups before the intervention, while one week and one month after the intervention, the knowledge scores were significantly different (P=0.001). The results of paired t-test in both groups showed significant changes at the end of the study. Results were significant in both groups, but according to the mean score of knowledge before and after the intervention, the mobile-based had a greater score than lecture-based training group.</p> <p><b>Conclusion:</b> Both mobile-based and lecture-based training methods increased the awareness of midwives regarding the management of preeclampsia and eclampsia, but the highest increase in knowledge was seen in mobile-based training group. Thus, the implementation of midwifery training programs using mobile applications can increase midwives' awareness concerning the management of midwifery emergency services.</p>
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### Introduction

Preeclampsia is a gestational disorder associated with simultaneous proteinuria and hypertension (1), which increases maternal and perinatal morbidity and mortality rates (2).

Pseudo- atherosclerosis changes in placental tissues, including oxidative and inflammatory events, seem to be a trigger for preeclampsia (3-6). Stenosis of the arteries, which results from

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arterial hypertension, leads to resistance to blood flow. Vasospasm also has destructive effects on the vasculature. These changes may damage endothelial cells, platelet deposition, and fibrinogen. The vascular changes associated with local hypoxia of adjacent tissues lead to bleeding, necrosis, and other organ disorders (2). This prevalent and dangerous pregnancy disorder occurs after 21 weeks of gestation with proteinuria, as well as systolic blood pressure equal to or greater than 141 mmHg and diastolic blood pressure equal to or greater than 11 mmHg. This disorder affects about 8-5% of pregnancies and is recognized as the third leading cause of death worldwide and the second most common cause of maternal death in Iran (7, 8). This disorder causes problems in the functioning of maternal brain and the cardiovascular, blood, endocrine, and metabolic systems, it also leads to changes in peripheral blood flow.

The most important threat to the fetus is the reduction in uterine and placental blood flow that leads to oligohydramnios, intrauterine growth retardation (IUGR), placental abruption, fetal distress, and ultimately, fetal death (9-10). One of the ways to reduce the risk of preeclampsia during pregnancy and childbirth is midwifery education (11). Education is referred to as any kind of pre-planned activity or strategy aimed at promoting learning in a comprehensive manner, and learning is to make relatively stable changes in the learner's potential behaviors, provided that this change occurs through experience (12). Learning is the goal and education is one of the means or methods to achieve this goal (13). Nowadays, traditional methods of teaching and learning have lost their effectiveness with the advent of new technologies and methods. Thus, educators need to look for new ways to promote awareness and enhance learning to keep pace with the changing environment around them. Third-wave civilization needs a low-cost, fast, reliable, and powerful tool to increase the awareness of the community (14).

Mobile technology is one of the cornerstones of information and communication technology that, like other communication technologies, has been introduced to the field of education. This communication tool has been able to change the traditional way of face-to-face training and

provide a new definition for education, time, and space, facilitate distance learning, and resolve many of the limitations and inefficiencies. Mobile education is a subset of e-learning that has been employed in organizations, institutions, and schools since the year 2000 (15).

On the other hand, the lecture method is the dominant form of education in educational centers and schools. The greatest advantage of this method is the ability to provide information to a large number of learners (16). Therefore, despite the emergence of new techniques and the spread of awareness, the teacher-orientation approach remains an important training method (17). Although new learning methods, source books, computers, and the Internet are available, lecture is the usual way of providing information since it is the safest and easiest way to learn, and it allows for greater control over the class (18). The benefits of lecture include cost-effectiveness, direct, regular, and logical presentation of content, enhanced speaking skill of in the teacher, and increased opportunity for students to take notes. However, since this method has some disadvantages such as passive learning, it is not suitable for teaching practical skills and enhancing mental skills. The lecture-based method does not take into account individual differences and the possibility of forgetting the newly learned materials (19).

Since preeclampsia is one of the most important health priorities, and midwifery education is one of the basic steps to increase the awareness of midwives, it seems that devising new educational strategies to improve midwifery awareness regarding the management of preeclampsia and eclampsia and its related problems is of great importance. In this study, we aimed to compare the effects of the two methods of mobile- and lecture-based education on the awareness of midwives working in maternity clinics regarding the management of preeclampsia and eclampsia in Lar, Iran, 2017.

## Materials and Methods

This was a semi-experimental study with a pretest-posttest design, which was carried out in Lar Hospitals after obtaining approval from the Ethics Committee of Lar University of Medical Sciences. Two hospitals were randomly selected (i.e., Amir al-Momenin and Imam Reza

hospitals) from three hospitals in Lar (i.e., Amir al-Momenin, Imam Reza, and Ali Asghar hospitals). The participants were chosen by using the simple random sampling method and then assigned to the two groups of mobile-based education and conventional education. Then, from each hospital, subjects were chosen according to the sample size. The standard sample size was calculated to be 64 (n=32 per group) using the following formula:

$$n = \left( \frac{Z_1 + Z_2}{d} \right)^2 \left( \frac{S_1^2 + S_2^2}{2} \right)$$

where,  $Z_1$  is 95% confidence factor (96.1),  $Z_2$  is 80% power factor (0.84),  $S$  denotes the estimate of standard deviation of awareness score in each group, and  $d$  is the minimum difference in the mean scores of awareness between the two groups (0.7s). Considering 10% probability of sample attrition, the final sample size was considered 35 per group.

The inclusion criteria were willingness to participate in the study, no adverse events during the past six months according to the participants' statements, midwifery degree, at least six months of working experience in a maternity or midwifery department, and use of an android mobile phone. The exclusion criteria included non-attendance at any of the stages of training or course examinations and occurrence of adverse events during the training course or periodic examinations.

The data collection instrument was a researcher-made (structured) two-section questionnaire. The first part contains items on demographic and personal information (including seven items on age, gender, education, duration of employment, work experience, weekly hours of work, and source of information on preeclampsia and eclampsia), and the second part included items evaluating the midwives' awareness regarding the management of preeclampsia and eclampsia. This part of the questionnaire was designed by reading reliable articles and scientific books. This part comprised of 30 true/false items.

The questionnaire was prepared based on the available resources in this field, and then it was given to five members of the faculty of nursing and midwifery and their suggestions were applied. The reliability of the

questionnaire was established by using the test-retest method. In the first step, a pilot study was performed among 20 midwives (10 subjects in the mobile-based group and 10 subjects in the lecture-based group) to determine the validity and reliability of the tool. The reliability of the questionnaire was confirmed ( $r=0.86$ ).

Initially, the midwives were invited to participate in the study. Then, the midwives who were asked to participate in the research attended a meeting (in each hospital separately). The researcher obtained informed consent from the midwives who were willing to participate after providing an introduction and a brief description of the goals of the study. The participants were informed that they could withdraw from the study at any stage. At the next stage, the participants completed the questionnaire.

The participants in the lecture-based group were asked to attend a training session, which was arranged according to the midwives' working shift on two different days. One day before the initiation of the course a reminder was sent via text message. In the mobile-based group, on the other hand, the researcher met the participants according to their working shift and installed the educational software on their phones, and they were asked to use the four-hour program during a one-week period, and they were asked to inform the researcher if any problems occurred while using the software.

Training started one day after the pre-test. In both groups, educational content was identical and according to the national guidelines for the provision of midwifery and maternity services in maternity hospitals. The content consisted of definitions of preeclampsia and eclampsia. In the conventional training group, lecture materials were presented through PowerPoint and video tutorials during 4 hours (two 2-hour sessions, from 8 am to 12 pm). In the mobile-based training group, the application (4-hour program consisting of educational materials, with explanations of the content presented by a speaker in the form of video) contained the same educational materials provided to the lecture method. The participants in this group could use the program at any time before the post-test. Post-test was carried out 1 week and 1 month after the end of the training sessions. Pre-

test and post-test results were compared between the two groups. The collected data were analyzed by SPSS, version 22. The normality of the data was confirmed by Kolmogorov-Smirnov test. Further, independent *t*-test and paired *t*-test were run for inter- and intra-group comparisons, respectively. *P*-value less than 0.05 was considered statistically significant.

## Results

Seventy midwives participated in the study. At the beginning of the study, the two groups were matched in terms of demographic

characteristics. None of the participants was excluded from the study. According to the descriptive statistics, most of the participants (30 midwives; 81.71%) had Bachelor's degree and higher. Chi-square test showed that educational level was significantly different between the two groups ( $\chi^2=0.85$ ;  $P=0.05$ ). The mean ages of the participants in the e-learning conventional education groups were  $35.04\pm 1.06$  and  $33.23\pm 2.01$  years, respectively. Other demographic and occupational characteristics are presented in Table 1.

**Table 1.** Means of age, years of work experience in the field of midwifery, and hours of work per week

Variables	The study group		P-value
	Mobile-based learning group	Lecture group	
	Mean±standard deviation	Mean±standard deviation	
Age (year)	35.04 ±1.06	33.23 ±2.01	0.2*
Midwifery work experience (year)	9.4±4.52	8.3±3.86	0.13*
Work experience in maternity hospital (year)	8.2±3.65	8.3±4.02	0.68*
Hours of work per week	49.4±5.41	48.2±6.73	0.57*

\*Mann-Whitney U test; \* $P\leq 0.05$

The results of this study showed that the pre-training awareness score in the e-learning group was  $13.58\pm 2.42$ , and it was  $13.88\pm 2.40$  in

the conventional education group (lecture). Independent *t*-test did not show a significant difference between the two groups ( $P=0.61$ ).

**Table 2.** Comparison of midwives' awareness regarding preeclampsia and eclampsia before the intervention and one week and one month post-intervention

Variable	Group		P-value
	Mobile-based learning group N=35	Lecture group N=35	
	Mean±standard deviation	Mean±standard deviation	
Awareness			
Pre-intervention	13.58±2.42	13.88±2.40	0.61
One week after the intervention	21.85±2.82	18.80±4.57	0.001
One month after the intervention	20.62±2.61	17.14±3.49	0.001
The average difference between one week after the intervention and pre-intervention	8.32±2.76	5/29±4.94	0.002
The average difference between one month after the intervention and before the intervention	7.05±2.71	3.23±4.17	0.001
Paired <i>t</i> -test results (comparison of before the intervention and one month post-intervention)	0.001	0.001	

\* $P\leq 0.05$

However, independent *t*-test reflected a significant difference between the two groups one week and one month after the intervention; as a result, e-learning had a significant positive effect on the awareness of midwives regarding the management of preeclampsia and eclampsia. Also, the mean scores before and one week after

training ( $P=0.002$ ) and the mean scores before and one month after training ( $P=0.001$ ) were significantly different between the two groups. In addition, the results of paired *t*-test were significant in both groups before and one month after the intervention ( $P=0.001$ ). Although in both educational methods the awareness score

increased significantly, but this increase was greater in the e-learning group than in the conventional education group (Table 2).

## Discussion

The findings of this study indicated that both lecture- and mobile-based education influenced the knowledge of midwives regarding the management of eclampsia and preeclampsia. However, mobile-based education had a significantly greater impact on the midwives' awareness relative to the conventional method. In line with our findings, Sadeghi et al. (2015) in a study of 40 nurses comparing the effects of two methods of e-learning and lecture education on nurses' awareness found that the two groups were not significantly different after the intervention, while the scores before and after education in both groups were significantly different, and e-learning was more effective than lecture (20).

Khatouni et al. (2008) compared the effects of two methods of e-learning and traditional education on nurses' awareness about avian influenza among 140 nurses, it was concluded that both on-line and traditional teaching methods could promote nurses' knowledge (21). Hadidi et al. (2016) performed a semi-experimental study comparing the impact of two educational methods (e-learning and workshop) on midwives' knowledge and attitude toward e-learning. In that study, midwives were randomly divided into two groups of e-learning and workshop training. A questionnaire was used to evaluate the knowledge and attitude of the two groups. Their results showed no significant difference in knowledge scores between the two groups before the intervention, while there was a significant difference in post-test scores between the two groups. In fact, e-learning was more effective than workshop training (22).

Nassiri et al. (1393) studied 40 nursing students of Bushehr University of Medical Sciences in a semi-experimental study entitled as "Comparing the Effect of Two Methods of Teaching and E-learning on Nursing Students' Knowledge and Attitude toward Ectopic Treatment". The students were randomly divided into two groups of control (lecture) and intervention (e-learning). The results showed a significant increase in knowledge and

attitude of both groups after intervention, and none of the training groups was superior to the other (23). Their results were contrary to the results of this study.

Also, in congruence with the findings of this study, Kumer et al. (2007) indicated that the use of mobile in learning brings about positive and desirable results (16). In fact, it can be emphasized that educational software, due to availability at any time and place, can increase individuals' motivation to use it.

The development of educational systems based on mobile e-learning is now an indispensable necessity in the face of new developments. Access and control of information and communication technologies such as mobile phones in order to take advantage of it in community strategic planning in education is one of the basic components of the power and capabilities of the educational system.

On the other hand, given the increasing speed of knowledge generation and the development of communications media such as mobile phones, providing a platform for the use of this technology to train health and medical personnel to help improve the quality of teaching and learning, considered important. Therefore, it is necessary to identify the role of new technologies in the educational system, prepare authorities and staff to use them in training courses, and provide a suitable cultural context for their proper use in the context of education. Therefore, it is suggested to encourage a positive attitude toward mobile learning and its effective role in educational programs and training quality. On the other hand, we need to familiarize health personnel with the culture of using mobile as a training strategy and provide learners with the necessary information to use it. It is possible to seek help from experts to design and produce educational content that match the current technologies and to emphasize the reform of the structure and direction of the country's education system in accordance with the new requirements of science and technology. Mobile training functions demonstrate the fact that the world today is striving to use the educational system to meet the needs of the present age.

One of the limitations of this study is the lack of joint communication between the research units and the researcher and considering only two educational methods. Thus, it is suggested that further studies be conducted using other training methods.

## Conclusion

The results of this study showed that both conventional and e-learning methods increased the awareness of midwives regarding preeclampsia and eclampsia, but e-learning was more effective than the conventional method. Accordingly, the implementation of midwifery training programs using mobile applications can increase midwives' awareness regarding the management of midwifery emergency services.

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## Conflicts of interest

The authors declare no conflicts of interest.

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