Journal of Midwifery & Reproductive Health

JMRH.mums.ac.ir

Effects of Web-based Training and Educational Simulation on Midwifery Students' Self-Confidence in Postpartum Hemorrhage Management

Masoumeh Kordi (MSc)[1], Farzaneh Rashidi Fakari (MSc)[2]*, Talaat Khadivzadeh (PhD)[1], Seyed Reza Mazloum (MSc)[3], Farideh Akhlaghi (PhD)[4], Mahmoud Tara (PhD)[5]

[1] Assistant Professor, Department of Midwifery, School of Nursing and Midwifery, Mashhad University of Medical Sciences, Mashhad, Iran
[2] MSc in Midwifery, Students Research Committee, Mashhad University of Medical Sciences, Mashhad, Iran
[3] Lecturer, Department of Medical Surgical Nursing, School of Nursing and Midwifery, Mashhad University of Medical Sciences, Mashhad, Iran
[4] Associate Professor, Department of Obstetrics and Gynaecology, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran
[5] Assistant Professor, Department of Medical Informatics, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

ARTICLE INFO

Article type:
Original article

Article History:
Received: 8-Apr-2014
Accepted: 10-Jun-2014

Key words:
Education
Postpartum Hemorrhage
Self-Confidence
Student

ABSTRACT

Background & aim: Self-confidence, as one of the key elements of clinical competence, plays an important role in one's actions and behaviours. Selection of proper instructional methods influences students' self-confidence. Therefore, this study aimed to compare the effects of web-based training and educational simulation on midwifery students' self-confidence in postpartum hemorrhage management.

Methods: This experimental study was conducted on 44 midwifery students of Mashhad School of Nursing and Midwifery, Mashhad, Iran, in 2013. The subjects were selected via convenience sampling. The web-based group was trained at the clinical skill laboratory of School of Nursing and Midwifery; both groups were taught the same educational content. Data were collected using a demographic questionnaire, visual analogue scale to evaluate students' self-assessment of their ability to manage postpartum hemorrhage and C-scale to measure students' self-confidence Descriptive analysis, independent t-test, paired t-test, and two-way ANOVA were performed, using SPSS version 11.5.

Results: Both groups showed a significant increase in self-confidence in postpartum hemorrhage management one month after the training (P=0.003 and P=0.030 in web-based and simulation groups, respectively). No significant difference was found between the two groups in terms of self-confidence in postpartum hemorrhage management.

Conclusion: Since the two groups showed no significance difference in self-confidence, web-based education, which is a more accessible method, could be applied as an alternative to the conventional method of simulation.

▶ *Please cite this paper as*:
Kordi M, Rashidi Fakari F, Khadivzadeh T, Mazloum SR, Akhlaghi F, Tara M. Effects of Web-based Training and Educational Simulation on Midwifery Students' Self-Confidence in Postpartum Hemorrhage Management. Journal of Midwifery and Reproductive Health. 2015; 3(1): 262-268. DOI: 10.22038/jmrh.2015.3247

Introduction

Midwifery is a profession requiring various clinical skills (1). Midwifery students, who are newly introduced to health care systems, should acquire these clinical skills (2, 3). Studies conducted on graduate students have shown that these students have no competence at workplace and encounter different stressors and tensions in clinical settings, which lead to high anxiety. Anxiety can encumber acquisition, reduce self-confidence, and lead to ineffective communication during the learning process. It could be also responsible for the feeling of inadequacy in performance and skill acquisition (4).

Self-confidence, as one of the key elements of clinical competence (5), is accompanied by continuous self-evaluation and self-judgment. It is a fine realistic feeling (6), which reflects one's belief in himself and his worthiness; it also

* *Corresponding author:* Farzaneh Rashidi Fakari, MSc in Midwifery, Students Research Committee, Mashhad University of Medical Sciences, Mashhad, Iran E-mail: RashidiF901@mums.ac.ir

significantly affects the quality of one's actions and behaviours.

Self-confidence empowers midwives, who are responsible for women's health care (7). McDermott et al. showed that only 58% of midwives have high self-confidence in managing postpartum complications (8). Postpartum hemorrhage, as one of the most prevalent complications after delivery, is a common cause of maternal mortality, worldwide (9). Around 25% of total maternal mortality and almost half of postpartum deaths are directly related to postpartum hemorrhage (10).

There are still debates about the prediction and diagnosis of postpartum hemorrhage. The related deaths have been associated with late diagnosis and improper management (11). Therefore, one of the most necessary skills of midwives is proper and urgent decision-making in emergency situations.

Ineffective clinical decision-making could lead to adverse health consequences. Clinical decision-making considerably affects health care outcomes and is related to education and self-confidence (12). Therefore, selection of proper instructional methods could be effective in increasing students' self-confidence (5).

Today, medical education needs to be reformed and fundamentally revised in terms of educational methods and processes. Through these reforms, schools can train students to gain self-confidence and competence for playing their professional roles (13). Over the last two decades, simulators and models have provided the opportunity for students to learn both communication skills and technical procedures in a safe environment, before being introduced to actual clinical settings (14, 15).

The advantages of simulation-based methods (such as use of simulation mannequins and standard patients) are anxiety reduction, increase in self-confidence, and skill acquisition (15). Application of integrated/blended approaches and multimedia can be effective, considering the large number of students, the scope of required skills, and the scarcity of learning opportunities.

One of the self-directed instructional methods is web-based education in which not only texts, but also educational tables, animations, and videos are presented altogether (16). This method could lead to increased decision-making capacity and critical thinking, which are crucial for the improvement of psychomotor skills (17). Web-based education by presenting synchronous texts, graphics, sounds, images, and movies, along with the simulation of real scenarios, can break physical boundaries and time limitations (18).

This mode of education increases the speed of learning and provides opportunities for using accessible sources, based on one's personal skills. Through the application of this method, learners can skip the subjects they are familiar with and move to new materials; in addition, in case they do not learn the given subject, they can refer to it at a proper time.

Implementation of web-based methods, similar to many other recently-introduced phenomena, is accompanied by various limitations, particularly in developing countries. For instance, lack of face-to-face interactions between the instructors and learners may negatively influence the success rate of students in the educational courses (19, 20). Although web-based education has become increasingly widespread, our knowledge about this learning experience is still limited.

Previous research has indicated that cyberspace could both positively and negatively affect one's efficiency and achievement. It is necessary to be assured about the learning progress and effectiveness of training (21). In this regard, Valizadeh et al. (2013) conducted a study to determine the effect of simulation-based education on the self-confidence of MSc students of nursing in pediatric intravenous catheterization; as the results indicated, simulation could increase the self-confidence of these students (22). In addition, Curran et al. (2006) showed that continuous web-based education might increase physicians' self-confidence (7).

Therefore, the current study was conducted to compare the effects of web-based training and educational simulation on midwifery students' self-confidence in postpartum hemorrhage management.

Materials and Methods

This experimental study was conducted on midwifery students of Mashhad University of Medical Sciences. The approval of the university ethics committee was obtained and ethical considerations were respected throughout the study.

By using a pilot study and mean comparison formula, the sample size was estimated to be 20 subjects per group. Considering the 10% dropout rate, 22 students were enrolled in each group. The population consisted of BSc and MSc students of Mashhad School of Nursing and Midwifery, who met the inclusion criteria.

The inclusion criteria were as follows: 1) willingness to participate in the study; 2) passing the theoretical course of "abnormal pregnancies and childbirths", based on the course plan of Mashhad School of Nursing and Midwifery (this course is presented in 5th and 7th semesters for BSc students and in 1st and 7th semesters for MSc students); 3) no stressful events such as the death of first-grade relatives; 4) serious family conflicts; and 5) no financial problems in the past three months.

The exclusion criteria were as follows: 1) using the website less than 30 minutes; 2) lack of participation in the educational sessions; and 3) not completing the C-scale before and after the intervention.

Students, who met the inclusion criteria, were stratified based on their educational semester and were randomly assigned to two groups. The students were assigned to either web-based or simulation group, using the table of random numbers. If the random number fell in the range of 0-4, the first subject was allocated to the web-based group and the second to the simulation group; if the random number was between 5 and 9, the first person was assigned to the simulation group and the second to the web-based group.

At the beginning of the study, each group consisted of 22 students. However, during the study, three students from the web-based group and one student from the simulation group were excluded due to absence from the post-test.

The researcher introduced himself to the students and briefly explained the research objectives. If the students were willing to participate in the study, they were asked to complete the forms of sample selection, demographic data, and self-assessment, measured by a visual analogue scale (consisting of one statement, graded by a 5-point Likert scale). The minimum and maximum scores were 0 (poor self-assessment) and 100 (excellent self-assessment), respectively. The informed consents were obtained through interview.

Afterwards, the C-scale was used to measure self-confidence. This scale was developed by Susan Erin Grundy in 1993 for testing self-confidence in psychomotor skills (23) and consisted of 5 statements on a 5-point scale (1: indicating lack of self-confidence, 5: indicating the highest self-confidence). The minimum and maximum scores were 5 (low self-confidence) and 25 (high self-confidence), respectively. The validity of this scale was confirmed via content validity and its reliability was affirmed using Cronbach's alpha (α= 0.70).

Educational contents, which were based on the national guidelines, were similar for both groups. In the simulation group, the study subjects were introduced verbally, using PowerPoint presentations and an educational movie at the skill laboratory (45 minutes). Then, the researcher illustrated how to estimate the volume of blood loss and trained the students in third-phase management, uterine atony management, and uterine distortion after delivery on a mannequin (the session lasted 4 hours). In the web-based group, a one-hour session (related to postpartum hemorrhage management) was held by the researcher about using the website.

All students were given usernames and passwords, and the website was accessible to students for one month. After one month, the usernames and passwords were expired, and the students' access was blocked. During this time, both groups were in contact with the researcher via E-mail or face-to-face interactions.

Before starting the educational session, the researcher and a cameraman captured a video on the following subjects: different volumes of blood loss, steps of active management during the third stage of delivery, uterine atony management, and techniques of bimanual massage after delivery (performed on a mannequin in the lab).

The researcher recorded his voice and explained the different steps of management. The soundtrack was added to the movie, and the video was uploaded to the educational website. Immediately after one month (expiration of students' access to the website), both groups were evaluated via C-scale. Descriptive analysis, Fisher's exact test, Mann-Whitney, and Friedman test were performed, using SPSS version 11.5.

Results

The mean age of the subjects was 23.94±4.89 years in the web-based group and 24.09±4.16 years in the simulation group. The mean work experience was 4.75±5.28 years in the web-based group and 2.40±1.66 years in the simulation group. Statistical tests including Fisher's exact test and Mann-Whitney showed no significant difference between the groups in terms of age, clinical experience, mean work experience, place of residence, or interest in midwifery (Table 1).

Table 1. Student's age, clinical experience, mean work experience, place of residence, and interest in midwifery in the web-based and simulation groups

Variables	Web-based (n=19)	Simulation (n=21)	P-value
Age (mean±SD)	23.94±4.89	24.09±4.16	0.918[a]
Clinical experience			
Yes (No. [%])	12(50.0)	12(50.0)	0.393[b]
No (No. [%])	2(35.7)	9(64.3)	
Mean work experience (mean±SD)	4.75±5.28	2.40±1.66	0.286[a]
Place of residence			
Dormitory resident (No. [%])	6(35.3)	11(64.7)	
Mashhad resident (native) (No. [%])	11(61.1)	7(38.9)	0.299[b]
Mashhad resident (non-native) (No. [%])	2(50.0)	2(50.0)	
Interest in midwifery			
Very high (No. [%])	4(66.7)	2(33.3)	
High (No. [%])	11(55.0)	9(45.0)	
Average (No. [%])	4(36.4)	7(63.6)	0.374[b]
Low (No. [%])	0(0.0)	1(100.0)	
Very low (No. [%])	0(0.0)	2(100.0)	

a: Mann-Whitney b: Fisher's exact test

Table 2. Mean and standard deviation of self-confidence in postpartum hemorrhage management before the intervention, one week after the intervention, and one month after the intervention

Groups	Web-based		Simulation		Mann-Whitney
Variables Self-confidence	Mean±SD	N	Mean±SD	N	
Before the intervention	15.21± 4.47	19	12.26±5.53	21	0.102
One week after the intervention	17.35± 4.04	19	14.93±4.3	21	0.123
One month after the intervention	18.28± 3.6	19	16.00±4.5	21	0.234
Friedman results	$\chi2$=11.730 df=2 P=0.003		$\chi2$= 8.333 df=2 P=0.016		

Table 3. Mean and standard deviation of self-assessment in postpartum hemorrhage management before the intervention, one week after the intervention, and one month after the intervention in the two groups

Groups	Web-based		Simulation		Mann-Whitney
Variables Self-assessment	Mean±SD	N	Mean±SD	N	
Before the intervention	67.22± 20.63	19	55.00± 9.70	21	0.186
One week after the intervention	81.10± 19.96	19	64.61± 15.60	21	0.071
One month after the intervention	85.10± 17.32	19	58.84± 11.39	21	0.002
Friedman test results	$\chi2$=10.320 df=2 P=0.006		$\chi2$= 5.707 df=2 P=0.058		

Both groups showed a significant increase in self-confidence in postpartum hemorrhage management before the intervention, one week after the intervention, and one month after the

intervention (P<0.05). Web-based and simulation groups were not significantly different in mean self-confidence score before the intervention, one week after the intervention, or one month after the intervention (P>0.05) (Table 2).

Comparison of the mean scores of self-assessment in postpartum hemorrhage management showed that the two groups were not significantly different before the intervention (P=0.186). However, the mean self-assessment score in postpartum hemorrhage management one month after the intervention was significantly higher in the web-based group, compared to the simulation group (P=0.002) (Table 3).

Discussion

As to the findings, midwifery students' self-confidence in postpartum hemorrhage management increased after the intervention; however, no significant difference was found between the simulation and web-based groups.

Training can decrease students' anxiety and stress in facing actual emergency situations. Training of practical skills such as labor management and the related processes leads to increased mental preparedness and consequently, increases the students' ability for proper implementation of these clinical skills (13). Moreover, application of student-centered instructional methods such as web-based training and educational simulation, in which students play an important role in their own learning, could considerably increase students' self-confidence and skills (15).

Birch et al. (2007) conducted a study to compare the effects of simulation, lecture, and a combination of simulation and lecture on postpartum hemorrhage management. The results showed higher self-confidence in the simulation group, compared to others (24). Moreover, Holmstrom et al. (2011) conducted a study on 113 medical students to determine the effect of simulation on self-confidence in performing natural childbirth. As to the results, simulation significantly increased the subjects' self-confidence (25).

Simulation provides an environment similar to real-life situations. Students can practice their skills on mannequins and models, without having any stress or anxiety. This method of learning prepares the students and consequently, increases their self-confidence in confronting real-life situations (15).

A study by Blum et al. (2010) on 53 BSc nursing students showed an overall improvement in self-confidence and competence during the semester, although simulation did not significantly enhance these attributes(26). Curran et al. (2006) showed that continuing web-based education increases physicians' self-confidence (7). In addition, the results of a study by Hansen et al. showed that education with mobile phones (Ipods) increases the clinical competence and self-confidence of students for urinary catheterization (27). The results were in agreement with those of the present study, i.e., web-based education increased students' self-confidence.

Moreover, in web-based education, students were able to access the educational content wherever they were and whenever they pleased, based on their own personal talents. The students actively participated in their training, which led to an increasing feeling of self-reliance, self-efficacy, and self-confidence (13, 16).

In medical sciences, a student plays a very important role in recognizing his/her own strengths and weaknesses. Self-assessment can be effective in developing students' abilities (28). In self-assessment, the student is a direct source of information about his/her own practical skills and knowledge; in fact, no one else can have such a clear view of one's abilities (29).

When students evaluate their work as positive, they are prepared to aim higher and do their best, while assessing their own performance. In fact, self-evaluation and following a purpose can increase students' self-confidence (28). In the present study, considering the continuous access of students to educational contents in the web-based group, the students had more time to practice, repeat, and assess themselves regarding the educational subjects.

Mc Donald et al. showed that educational simulation does not instantaneously improve students' self-assessment of surgical skills (29). In this regard, results of a study by Erfanian et al. showed that students' average score, related to the assessment of their abilities to perform genital system examination, was higher than that observed in the control group (30). This incompatibility with the results of the present

study may be due to the fact that in Erfanian's study, after completing the simulation-based sessions, students practiced their practical skills in a virtual environment under researchers' supervision. Therefore, in addition to self-assessment, students were evaluated by their professors and were given feedback, which could lead to skill development.

This study was the first one to compare the effects of two recently-introduced instructional methods for improving self-confidence; this could be considered the strength of this study. However, non-simultaneous communication between the researcher and students in web-based education is a limitation of this study. It is recommended that future studies provide web-based training with long-term follow-up of students' self-confidence.

Conclusion

As to the results, web-based training and educational simulation increased students' self-confidence in postpartum hemorrhage management, as no significant difference was found in self-confidence between the two groups. Considering the effect of repetition on students' positive self-assessment and the importance of positive assessment in students' self-confidence, it is proposed that web-based training, as an accessible method, be applied as an alternative to educational simulation in order to develop students' self-confidence and self-assessment. However, it seems that the proper application of either of the methods (web-based or simulation training) could lead to the promotion of students' self-confidence.

Acknowledgement

The present study was extracted from an MSc thesis proposal, approved by the vice president for research at Mashhad University of Medical Sciences (MUMS) (code: 911206) (RCT code: IRCT2012102910661N2). The authors appreciate the vice president for research (of MUMS) for the financial support and Aminreza Amini , Dr. Emran Askari and Dr. Maryam Naseri for their valuable support.

Conflict of Interest

The authors declare no conflicts of interest.

References

1. Salimi T, Khodayarian M, Rajabioun H, Alimandegari Z, Anticchi M, Javadi S, et al. Survey on viewpoints of nursing and midwifery students and their clinical instructors at Faculty of Nursing and Midwifery of Shahid Sadoughi University of Medical Sciences towards clinical education during 2009-2011. Journal of Medical Education and Development. 2012; 7(3):67-78.
2. Bellack JP, Graber D, O'Neil EH, Musham C. Curriculum Trends In Nurse-Midwifery Education: Views of Program Directors. Journal of Nurse-Midwifery. 1998; 43(5):341-350.
3. Bellad M, Laxmi B, Goudar SS. Standardized visual estimation of blood loss during vaginal delivery with its correlation hematocrit changes A Descriptive Study. Journal of South Asian Federation of Obstetrics and Gynecology. 2009;1(1):29-34.
4. Yazdani F, Soleimani B. Relationship between test anxiety and Academic Performance among Midwives Students. Journal of Health Systems Research. 2012; 7(6):1178-1187.
5. Amini A, Hassanzadeh Salmasi S, Shaghaghi A, Safaii N, Sedaghat K. The Effect of Clinical Skills Training on Medical Students Clinical Competencies in the Management of Vaginal Delivery. Iranian Journal of Medical Education. 2005; 5(1):7-12.
6. Omidi A, Akbari H, Jaddy-Arani T. Efficacy of educational workshop on self-esteem of students at Kashan University of medical sciences. Feyz Journal of Kashan University of Medical Sciences. 2011; 15(2).
7. Curran V, Lockyer J, Sargeant J, Fleet L. Evaluation of learning outcomes in Web-based continuing medical education. Academic Medicine. 2006; 81(10):S30-S34.
8. McDermott J, Beck D, Buffington ST, Annas J, Supratikto G, Prenggono D, et al. Two Models of In-Service Training to Improve Midwifery Skills: How Well do They Work? Journal of Midwifery & Women's Health. 2001; 46(4):217-225.
9. Tara F, Davoodi R, Saghafi N, Mirteymori M, Gholshakhanei H, Soltanifar A, et al. Management of Post-Partum Hemorrhage (Clinical Guideline). The Iranian Journal of Obstetrics, Gynecology and Infertility. 2013; 16(62):11-17.
10. Rath WH. Postpartum hemorrhage –update on problems of definitions and diagnosis. Acta Obstetricia et Gynecologica Scandinavica. 2011; 90(5): 421-428.
11. Abbas pour Z, Zarshenas M. Survey of Lochia Pattern and some of Factors affect on Its Period Length in Women after Delivery. Guilan University of Medical Sciences. 2007; 16(61):96-100.

12. Ramezani M, Kermanshahi S. A survey of the quality of clinical education in nursing. Jahrom Medical Journal. 2011; 9(11):9-12.
13. Sharemi H, Asgari F. A training course on basic gynecological clinical skills and its effect on medical student's performance in Guilan University of Medical Sciences. Iranian Journal of Medical Education. 2011; 11(2):111-119.
14. Gaba DM. The future vision of simulation in health care. Qual Saf Health Care 2004; 13(suppl1): i2-i10.
15. Erfanian F, Khadivzadeh T, Khadem N, Khajedelooie M. The Effect of Teaching by Role Playing on Students' Counseling and Screening Skills toward IUD Clients. Iranian Journal of Medical Education. 2009; 8(2):275-284.
16. Healy DG, Fleming FJ, Gilhooley D, Felle P, Wood AE, Gorey T, et al. Electronic learning can facilitate student performance in undergraduate surgical education: a prospective observational study. BMC Medical Education. 2005; 5(1):23.
17. Gerdprasert S, Pruksacheva T, Panijpan B, Ruenwongsa P. Development of a web-based learning medium on mechanism of labour for nursing students. Nurse Education Today. 2010; 30(5):464-469.
18. Dabbaghi Gale T, Elmizadeh K, Moradi S, Rashvand Melli E. Comparison of Intravenous Oxytocin and Oral Misoprostol in Reduction of Postpartum Hemorrhage. Zanjan University of Medical Science Journal. 2012; 20 (81) :1-8
19. Khatoni A, Dehghan Nayery N, Ahmady F, Haghani H. Comparison the effect of Web-based Education and Traditional Education on Nurses Knowledge about Bird Flu in Continuing Education. Iranian Journal of Medical Education. 2012; 11(2):140-148.
20. Dadgostarnia M, Vafamehr V. Comparing the Effectiveness of Two Educational Approaches of "Electronic Learning and Training in Small Groups" and "Training Only in Small Groups" in Teaching Physical Examination. Iranian Journal of Medical Education. 2010; 10(1):11-7.
21. Zarif Sanaee N. assessing the criteria for the quality and effectiveness of e-Learning in higher education. Magazine of E-learning Distribution In academy (MEDIA). 2011;1(3):24-32.
22. Valizadeh L, Amini A, Fathi-Azar E, Ghiasvandian S, Akbarzadeh B. The Effect of Simulation Teaching on Baccalaureate Nursing Students'Self-confidence Related to Peripheral Venous Catheterization in Children: A Randomized Trial. Journal of Caring Sciences. 2013; 2(2):157-164.
23. Grundy SE. The confidence scale: development and psychometric characteristics. Nurse Educator. 1993; 18(1):6-9.
24. Birch L, Jones N, Doyle P, Green P, McLaughlin A, Champney C, et al. Obstetric skills drills: evaluation of teaching methods. Nurse Education Today. 2007; 27(8):915-922.
25. Holmström SW, Downes K, Mayer JC, Learman LA. Simulation training in an obstetric clerkship: A randomized controlled trial. Obstetrics & Gynecology. 2011; 118(3):649-654.
26. Blum CA, Borglund S, Parcells D. High-fidelity nursing simulation: impact on student selfconfidence and clinical competence.International Journal of Nursing Education .Scholarship. 2010; 7:1.
27. Hansen M, Oosthuizen G, Windsor J, Doherty I, Greig S, McHardy K, et al. Enhancement of medical interns' levels of clinical skills competence and self-confidence levels via video iPods: pilot randomized controlled trial. Journal of Medical Internet Research. 2011; 13(1):32-41.
28. Delaram M, Tootoonchi M. Comparing self-and Teacher-Assessmentin Obstetric clerkship Course for Midwifery Students of Shahrekord University of Medical Sciences. Iranian Journal of Medical Education. 2010; 9(3):231-238.
29. MacDonald J, Williams RG, Rogers DA. Selfassessment in simulation-based surgical skills training. The American journal of surgery. 2003; 185(4): 319–322.
30. Erfanian F, Khadivzadeh T. Effects of simulation based and traditional education on midwifery students' skill in pelvic examinations. The Horizon of Medical Sciences. 2008; 14(2):61-69.