Original Article

Effectiveness of virtual education on health care practitioners' self-efficacy in the neonatal unit

Maliheh Kadivar[1], Niama Seyedfatemi[2], Mitra Zolfaghari[3,4], Abbas Mehran[5], Tahereh Nikdel[6*]

[1] Department of Pediatrics, Children's Medical Center, Tehran University of Medical Sciences, Tehran, Iran
[2] Nursing Care Research Center, Iran University of Medical Sciences, Tehran, Iran
[3] Virtual School, Tehran University of Medical Sciences, Tehran, Iran
[4] Nursing and Midwifery Care Research Center, Tehran University of Medical Sciences, Tehran, Iran
[5] Department of Statistics, School of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, Iran
[6] Department of Neonatal Intensive Care Nursing, School of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, Iran

ARTICLE INFO

ABSTRACT

Background & Aim: Caregivers' education should be an active and dynamic process. Updated training programs are essential. This research was conducted to assess the effectiveness of virtual education on health care practitioners' self-efficacy in the neonatal unit.

Methods & Materials: In this quasi-experimental research, hospitals affiliated with Tehran University of Medical Sciences that had level one neonatal unit were divided into two intervention and control groups. Sampling was conducted based on the inclusion criteria from all the nurses and midwives who were employed at these units. The intervention group received two months of asynchronous virtual education using learning management system. The control group did not undergo any specific training program. Data of both groups were collected using demographic questionnaire and Schwarzer & Jerusalem' Generalized Self-Efficacy Scale (GSE10) at the first day of the study and two months after the start of the intervention in the form of pre-test and post-test and were statistically analyzed.

Results: Both of the intervention and control groups were similar regarding their demographic variables. Results showed that there was no significant difference between the mean score of self-efficacy of the two groups before the intervention (p=0.717); but there was a significant difference between the mean score of self-efficacy of two groups after the intervention (P <0.001). ANOVA test was used to eliminate the effect of pre-test score.

Conclusion: The results of this research demonstrated that virtual education programs are effective in increasing the health care practitioners' self-efficacy at level one neonate units. As a result, applying this method of education is recommended to managers and training planners.

Introduction

Patient care is a growing profession and professional caregivers are committed and responsible people who have passed special training to gain professional skills (1). In fact, nurses and midwives are a key element in health care teams who have the appropriate up-to-date scientific and practical ability to perform care at different preventive levels (2). However, in the nursing and midwifery profession just the ability to perform tasks is not enough, but the ability to combine knowledge, attitude, values and skills to provide professional services is also important (3). Meanwhile, neonate units, like other care facilities, require caregivers with high scientific and practical degrees who need valid protocols and guidelines to provide desirable services for neonates (4).

Before creating a regionalization system in neonate units and due to lack of professional human resources and necessary equipment to provide services for neonates, some of the grand hospitals, university hospitals, and

* Corresponding Author: Tahereh Nikdel, Postal Address: School of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, Iran. Email: tahereh.nikdel@yahoo.com

specialized pediatric hospitals were providing special services for neonates. After the success of these hospitals in decreasing neonatal mortality rate and complications of the prenatal period, efforts were started to regionalization the neonatal and maternal services, and special transfer system was created for fast transfer of neonates to more specialized centers. In this regard, to provide the best care at hospitals, many countries have applied the regionalization system for maternal and neonatal care at three levels of one, two and three (5). At the level one maternal and neonatal service, services for healthy infants of a birth weight of over 2000 to 2500 grams would be provided (6). In fact, level one would provide primary neonatal services for low-risk infants. It also provides services for preterm infants of 35-37 gestational age with no physiologic problems; at this level, neonates with a gestational age of fewer than 35 weeks would be first stabilized and then transferred to higher grades. At level two, services would be provided for pregnant women with moderate risk, neonates with gestational age of 32 weeks or more and a birth weight of 1500 grams or more and at level three, services would be provided for risky pregnancies and deliveries and neonates with gestational age of 28 week or more and birth weight of 1000 grams or more (7, 8).

Therefore, to increase the capability and improve the quality of provided services, eh scientific and practical knowledge of caregivers must be up-to-date (9). Caregivers need training to update their knowledge and skills. On the other hand, due to their busy work schedule, they do not have time for in-person and regular training (10). Advancements in information technology have provided important opportunities for caregivers in the field of correct management of information and increasing their professional knowledge

(11). But it is recommended to change the educational approach from traditional methods toward using electronic resources and virtual education (12). Virtual education is a wide range of processes and actions such as web-based training, computer-based training, virtual classes and cooperation, participation and interaction of learners in these classes and includes provision of the content through internet, intranet, extranet, satellite release, video and audio tapes, satellite broadcast, interactive television, compact discs (13).

In case of appropriate development of educational content and its appropriate evaluation, virtual education is a successful and efficient system. In fact, in computer-based education, the individual is independent and is more motivated for learning (14) and provides a good possibility for expansion of scientific content and increasing the depth of learning (15). Multimedia educational content such as movies, images and animations along with educational texts would balance visual, written and auditory learning and increase learners' interest in learning. In fact, the philosophy of individual learning is based on creating the necessary conditions for individuals commensurate with their talents (16). Various studies have been conducted about the effect of different types of education (electronic, traditional or combination) on self-efficacy, knowledge, skills and satisfaction of nursing students and instructors. But no studies have yet been conducted to evaluate non-simultaneous virtual education and its effect on self-efficacy of caregivers, especially nurses and midwives, in neonate units of Iranian hospitals. Chiu and Tsai (2014) in a study that evaluated the role of social factors and internet self-efficacy in web-based education for nurses revealed that web-based education would increase learners' self-efficacy (17). According to Bandura, self-

efficacy is individual's perception and belief about their ability to effectively and suitably perform their duties or special tasks (18). Self-efficacy is an important factor for successful completion of performance and its necessary essential skills. Effective performance requires having skills and also believing in one's ability for performing those skills (19). Increased self-efficacy would lead to success and gaining knowledge and skills in different paths (20). Self-efficacy along with clinical skills would give the caregiver a sense of sufficiency. This sense of sufficiency would make them creative in helping the patients and help them make more efficient decisions (21). In fact, self-efficacy is the mediator between having knowledge and putting that knowledge in practice (22).

Considering the educational needs, fast growth of educational methods and knowledge, and the professional growth of caregivers, the researchers decided to conduct a study to evaluate the effect of performing virtual education program on the self-efficacy of caregivers working at level one neonate units.

Methods

This quasi-experimental pre-test post-test study was conducted on two groups. Study population were nurses and midwives working at level one neonate units of hospitals affiliated with Tehran University of Medical Sciences and the participants were selected from the nurses and midwives working at level one neonate units of six selected hospitals (Baharloo, Shariati, Arash, Ziaeian, Vali-e-Asr, women's comprehensive center) who had the inclusion criteria. The inclusion criteria were having at least six months of working experience before the study at neonate units, having the necessary skills for working with computer and internet with a ICDL degree,

access to internet, having a bachelor's or master's degree of nursing or midwifery, and willingness to participate in the study. The exclusion criteria were change in the unit of the selected participants for both groups and not using the website for the intervention group (logging into the website less than 8 times during the two-month period of the intervention).

Assuming that p0 = 0.05 (the ratio of the appropriate self-efficacy for level-one caregivers), and expecting that this value would be increased to p1 = 0.9 after the training and also α = 0.05 (95% confidence interval) and β = 0.05 (95% test power), using the formula for the difference between two proportions, the number of samples was calculated to be 34 or each group, which was increased to 40 for each group after accounting for the sample loss. Eventually, a total of 80 nurses and midwives were evaluated in the intervention and the control groups.

$$N = \frac{2(z1-\frac{\alpha}{2}+z1-\beta)^2 \ pq}{(p0-p1)^2}$$

The level one neonate units of six selected hospitals of the Tehran University of Medical Sciences were randomly (by drawing) allocated into two groups of intervention and control; in a way that three hospitals (Baharloo, Shariati and Arash) were assigned to the intervention group and three hospitals (Ziaeian Vali-e-Asr and women's comprehensive center) were assigned to the control group. To prevent data pollution and contact between the groups, samples were selected from separate hospitals. Then all of the nurses and midwives working at level one neonate units who had the inclusion criteria were enrolled in the study by convenient method (48 samples in the neonate units of the hospitals of the control group and 46 in the neonate units of the hospitals of the intervention group).

Data were gathered using demographic questionnaire and Schwarzer & Jerusalem's Generalized Self-Efficacy Scale (GSE10):

• The demographic questionnaire was contained of three sections of personal characteristics, working history and educational information (the educational level and major, participating in neonates' educational courses and the educational method).

• To evaluate the participants' level of self-efficacy, Schwarzer & Jerusalem's Generalized Self-Efficacy Scale (GSE10) was used. This questionnaire contains 10 4-choice items and each item indicates reaching a steady state of success. The choices ranged from not correct (1 score) to completely correct (4 scores). The total score ranges from 10 to 40 and higher scores indicates higher self-efficacy. Schwarzer & Jerusalem (1995) reported that the Generalized Self-Efficacy Scale (GSE-10) was valid to be used in 23 countries. Rajabi (2006) in their study approved the reliability of this tool with a Cronbach's α of 0.82 for the entire questionnaire. Rajabi stated that due to the shortness and objectiveness of the items, this tool is appropriate for being used in clinical and field studies (23, 24).

The educational intervention was conducted through the Learning Management System of the virtual faculty of Tehran University of Medical Sciences (namad.tums.ac.ir). This system is an earning management system which provides synchronous and asynchronous educational courses and the electronic content could be provided for the learners with different formats (25). This system also allows the learners to cooperate, participate and interact with other learners (26). First the electronic content of the level one neonate discussions based on the newest scientific articles and the instructions of World Health Organization, American Academy of Pediatrics and Iranian Ministry of Health

was developed (27,28,29,30). Ten pediatric professors approved the validity of the electronic content. The developed content was designed in the format of visual (clip, film and flash), audio (podcast) and written multimedia and loaded on the Virtual Namad System. The possibility to discuss and exchange opinions with other learners and the teacher synchronously and asynchronously through the discussion section of the system and communicating through the messaging section were other benefits of this system. This way, the learners were able to access the resources any time anywhere and continue their learning using the homework and interactive tests. In the intervention group, each week, a topic from the selected headlines was provided on the system as the electronic content in the resources section. The load of the selected content was appropriate for the two-month period of the study and had an average of 6 hours per week. Furthermore, each month, a practical exercise was provided on the system based on the educated topics. Each test included 20 4-choice questions and the learners were participating in the test at a specific time and answering the questions. After each test, the score was recorded on the system and was observed by the learner and the teacher.

The study was started for both groups at the same time by conducting the pre-test (completing the personal characteristics and self-efficacy questionnaires). After taking written informed consent, the participants of the intervention group received username and password and were able to log into their personal page in the system. They received virtual education through the system for two months asynchronously. Two months after completing the pre-test questionnaires (right after completing the virtual education course), the generalized self-efficacy scale was distributed among both groups again and their post-test self-efficacy level was

evaluated. After the end of the educational course, the electronic contents were given to the participants of the control group too, to regard the ethical issues.

Necessary permission was obtained from the ethics committee of the Tehran University of Medical Sciences by No. IR.TUMS.REC.1394.1211 and the study were registered in the Iranian Registry for Clinical Trials by No. IRCT 2016011225974N1. A recommendation letter was obtained from the research deputy of Tehran University of Medical Sciences and necessary coordination was conducted with nursing management and the authorities of the selected wards of the hospitals and all of the ethical issues were regarded.

To categorize and summarize the results, descriptive statistical tests including absolute and relative frequency distribution table, mean and standard deviation and to reach the goals of the study, inferential statistics and Chi square test, Fishers exact test, paired t-test and independent t-test were used. Data were analyzed using SPSS 23.

Results

According to the results of the study, participants of both groups were similar regarding all of their demographic characteristics (Table 1). The mean and standard deviation of the self-efficacy scores of the control and intervention groups before the intervention were 26.93 ± 3.149 and 26.62 ± 4.302; these scores after the intervention were 27.08 ± 3.139 and 35.95 ± 3.257. No significant difference existed between both groups' mean scores of self-efficacy before the intervention ($p = 0.717$); but the difference between the mean scores of both groups after the intervention was significant ($p < 0.001$)(Tables 2). It must be noted that after eliminating the effect of pre-test as the covariance in the ANCOVA test, results were not changed and the data were approved.

Discussion

Considering the advancements in medical sciences and the increasing growth of virtual environments in the field of education, the need for learning through up-to-date methods, is an essential need for gaining

Table 1. Frequency distribution of the demographic characteristics of the participants of the intervention and the control groups

Variable		Control (n = 40)		Intervention (n = 39)		P value
		N	%	N	%	
Age	Under 30	21	52.5	21	53.9	0.72[*]
	30-40	12	30	11	28.2	
	40-50	5	12.5	7	17.9	
	Over 50	2	5	0	0	
Marital status	Single	16	40	12	30.8	0.39[**]
	Married	24	60	27	69.2	
Educational level	Bachelor's degree	34	85	38	97.4	0.1[***]
	Master's degree	6	15	1	2.6	
Educational major	Nursing	23	57.5	25	64.1	0.54[**]
	Midwifery	17	42.5	14	35.9	
History of working at neonates' units	Less than 1 year	11	27.5	5	12.8	0.08[**]
	1-5 years	14	35	22	56.4	
	5-10 years	7	17.5	9	23.1	
	More than 10 years	8	20	3	7.7	
Participating in neonates' educational courses	Yes	32	80	31	79.5	0.95[**]
	No	8	20	8	20.5	
The educational methods	In-person	31[****]	96.9	27	87.1	0.08[***]

15

Virtual	1	3.1	0	0
Both	0	0	4	12.9

*Independent sample t-test, **Pearson Chi-square, ***Fisher's exact test
****Eight participants of each group were not participated in neonates' educational courses

Table 2. Absolute and relative frequency distribution of participants' self-efficacy in the intervention and the control groups before and after the intervention

Groups	Before Mean ± SD	After Mean ± SD	P value[*]
Control	26.93 ± 3.149	27.08 ± 3.139	0.083
Intervention	26.62 ± 4.302	35.95 ± 3.257	0.001
P value[**]	0.717	0.001	

*paired sample t-test, **independent sample t-test

skills or clinical capacities among the care providers of the health team.

In the present study the effect of virtual education program on the self-efficacy of caregivers at level-one neonate units at the end of the intervention was evaluated. According to the results, the level of self-efficacy before the intervention among the caregivers was low. Similar to the present study, other studies have also shown that the self-efficacy score of caregivers, including nurses, is always estimated to be in lower levels and this could negatively affect other aspects of their personality and work (31, 32). Increased self-efficacy is associated with improved performance and nursing skills (33). High levels of self-efficacy would lead to accepting challenging goals. Therefore, self-efficacy is effective on job satisfaction, role play and performance and would create positive relation between expectations and successful access to that situation. In fact, self-efficacy has a positive effect on professional improvement of nurses and clinical caregivers (34). So, the need for education and performing an integrated system in educational program to improve the level of self-efficacy among caregivers for neonates seems necessary. Results of the present study showed that after the interventional virtual education, the level of self-efficacy was increased in the intervention group compared to the control group and their difference was statistically significant. According to this result, the research assumption was approved and it could be said that performing virtual education program could improve the level of self-efficacy among caregivers for neonates. Results of a study by Bolton (2011) which evaluated "the effects of an online education program on self -efficacy and knowledge of the clinical teacher role" showed that online educating could increase the self-efficacy and knowledge of clinical professors (p < 0.001) (35). Interaction with learners, follow-up and motivation were some of the factors which made online educating effective in the study of Bolton. In the present study, although non-online method was used for educating, the effort was to regard this matter and the learners were interacted with through the system repeatedly and their process was followed up.

Results of a study by Hosseini et al (2015), about "comparing the effects of web-based teaching and cognitive and metacognitive learning strategies on nursing students' academic achievement and self-efficacy" showed a significant difference between the mean scores of post-test and follow-up of the control and the intervention groups for both of the academic achievements and self-efficacy variables (p < 0.05). Results showed that both of the proposed educational methods, unlike the common educational method, were able to improve students' academic achievements and self-efficacy (36). Also, a study that was

conducted by Smith et al (2011) about "instructional multimedia: an investigation of student and instructor attitudes and student study behavior" on physiotherapy students, showed that instructional multimedia will increase the level of self-efficacy, processing and self-direction in the students compared to in-person training (37). In the study of Hosseini two educational methods were used but one of the positive points of this study was using defined educational content and follow-up by the teacher in web-based methods; this matter was also mentioned in the study of Smith. In the present study, also, defined categorized content with multimedia format was used to create motivation among the learners, so that they would use the educational content step by step. Du et al (2013) in a systematic review that was titled "web-based distance learning for nurse education: a systematic review" resulted that using virtual education methods would lead to gaining and improving knowledge, skills, satisfaction and self-efficacy in nursing practice (38). Poddar et al (2010) in their study about "evaluating the effect of web-based nutrition education on self-efficacy and self-regulation skills of students" also revealed a similar result that web-based training and intervention would increase students' self-efficacy (p = 0.049) (39). The study of McMullan et al (2011) on "the effect of an interactive e-drug calculations package on nursing students' drug calculation ability and self-efficacy" also revealed that educating drug calculations in nursing using web-based method, compared to the traditional method, would increase the knowledge, performance and self-efficacy of nursing skills (p = 0.022) (40). Results of all the mentioned studies, despite using different virtual methods including online, non-online, web-based and educational training and different tools for the students, indicated the positive effect of educational

intervention on self-efficacy, which is similar to the results of the present study for the healthcare team. Although the caregivers are busier than the students and do not have sufficient amount of time for self-direction studying, but they embraced this educational method and it seems that providing the appropriate ground by explaining the goals of the study and motivating the learners, using modern and various educational content, step by step educating and giving more opportunities for learning, repeated interactions with the learner and creating discussion environments and providing self-evaluation situations for the learners were some of the reasons for effectiveness of this study. Considering the limited number of related studies, it is necessary to conduct more studies with sufficient sample size so that the results could be generalized from classrooms to clinical environments.

Limitations of the present study were lack of cooperation and follow-up by the learners due to lack of sufficient time, interest or motivation for participation in the study, and also not having easy access to high-speed internet that could have affected the results of the study; but could not be controlled by the researcher. However, during period of the study, it was attempted to make more interactions with the learners to encourage them for using the system and educational content and make it possible for them to use internet-connected computer at the workplace easily. For creating motivation, the support of educational authorities to give motivational permissions such as providing a certificate and educational points, was attracted.

Therefore, for future studies, it is recommended to evaluate the effect of virtual training for other caregivers working at different health units or increase the duration of the study more than two months with more flexibility, so that it would become possible for caregivers to use the

educational contents since they have a busy schedule.

According to the results of the present study, it is recommended to the managers and planners of the educational programs to consider virtual education due to its easy usage and benefits including 24/7 access to the educational resources, covering different kinds of learning based on the learners' preferences, easy access to audio, visual and written resources at any desired time and improving caregivers' self-efficacy in line with the educational programs of neonates' caregivers and other health teams. Using this educational method, if using appropriate educational strategies as a replacement or a supplement for the traditional educational method, could be a proper approach for retraining and improvement of the education and consequently, the self-efficacy of the care provider team.

Acknowledgments

Conflict of Interest

The authors declare that they have no conflicts of interest.

References

1.   Khezerloo S, SalehMoghaddam A, Mazloom S. Assessment of nurses professional roles in hospitals affiliated to Mashhad University of Medical Sciences. Hakim Res J. 2012;15:346-51 [In Persian].

2.   Heidari A, Mazloom SR, Ildarabadi E. Nursing's position in health care delivery system in Iran. IJNR.2012;7(25):37-44 [In Persian].

3.   Fesharaki M, Islami M, Moghimian M, Azarbarzin M. The effect of lecture in comparison with lecture and problem based learning on nursing student's self-efficacy in Najafabad Islamic Azad University. Iranian Journal of Medical Education. 2010;10(3): 262-268 [In Persian].

4.   Melnyk BM, Fineout-Overholt E. Evidence-based practice in nursing & healthcare: guide to best practice.2th.Lippincott Williams & Wilkins.2011.

5.   Rochefort C, Lamothe L. Forcing the system: Aconfiguration analysis of a regionalized neonatal- perinatal health network. Health Care Manage Rev. 2011;36(3): 241 - 251.

6.   Heydarzadeh M, et al. Healthy newborn care service package. Neonatal Health Department. Ideh Pardazan Fan va Honar. 2011;P:15&20.

7.   Committee on fetus and newborn. Levels of Neonatal Care. American Academy of Pediatric.Available at: https://www.aap.org. Accessed 2016; 587-594

8.   Haslam B, Dreyzehner J. Tennessee perinatal care system, Guidelines for regionalization, hospital care levels, staffing and facilities.7thEd.Tennessee Department of Health, Division of Family Health and Wellness;2014.P:5-35.

9.   Goudarzi Z, Tefagh M, Monjamed Z, Memari A, Kamali P. The effect of continuing education of neonatal intensive care nursing on knowledge and the practice of the nurses working in the children's hospitals. Journal of hayat. 2004;10(1):25-31 [In Persian].

10.   Yuksekdag Bb. The Importance of distance education in nursing. International Women Online Journal of Distance Education. 2015;4(1).

11.   Richardson J, Ice P. Investigating students' level of critical thinking across

instructional strategies in online discussions. The Internet and Higher Education. 2010;13(1):52-59.

12. Nourian A, Nourian A, Ebnahmadi A, Akbarzadeh Bagheban A, Khoshnevisan M H. Comparison of E-learning and Traditional Classroom Instruction ofDental Public Health for Dental Students of Shahid Beheshti Dental School during 2010-2011. J Dent Sch.2012;30(3):174-183[In Persian].

13. Rabiei M, Mohebi Amin S, Haji-Khawajelu SR. Internal quality assessment of the curriculum of virtual learning courses in Ferdowsi University of Mashhad. Horizons of Medical Education Development. 2010;4(1) [In Persian].

14. Khoshsima S, et al. Comparison of nurses learning level by multimedia and web - based methods in teaching nursing care of chemical accidents .Quarterly of Education Strategies in Medical Sciences. 2013; 6(3):129-134[In Persian].

15. Varzeshnejad M, Haghani F, Hashemi Jahromi M. Electronic learning and nursing education. Education and Ethics in Nursing. 2015;3(2) [In Persian].

16. Khatooni M, Alimoradi Z, Samiei-Seiboni F, Shafiei Z, Atashi V. The impact of an educational software designed about fundamental of nursing skills on nursing students' learning of practical skills. Journal of Clinical Nursing and Midwifery. 2014; 3 (1) :9-16[In Persian].

17. Chiu Y-L, Tsai C-C. The Roles of social factor and internet self-efficacy in nurses' web-based continuing learning. Nurse education today. 2014;34(3):446-450

18. Bandura A. Health promotion by socio cognitive means health education behavior. Journal of Health Education & Behavior.2004; 31(2): 143-164.

19. Hosseini M, Azimzadeh E. Correlation between self-efficacy and nurses' conflict management strategies. JHPM. 2013; 2 (4) :16-23[In Persian].

20. Tsai C-C, Chuang S-C, Liang J-C, Tsai M-J. Self-efficacy in internet-based learning environments: A literature review. Educational Technology & Society.2011; 14(4):222-240.

21. Hassani P, Cheraghi F, Yaghmaei F. Self-efficacy and Self-regulated Learning in Clinical Performance of Nursing Students: A Qualitative Research. Iranian Journal of Medical Education. 2008; 8 (1) :33-42[In Persian].

22. Habibzadeh H, Khajeali N, Khalkhali H R, Mohammadpour Y. Effect of Evidence-Based Education on Nursing Students' Self-Efficacy. Strides Dev Med Educ. 2015; 11 (4) :500-507[In Persian].

23. Schwarzer R, Jerusalem M. Generalized Self-Efficacy Scale. In J. Weinman, S. Wright & M. Johnston. Measures in health psychology: A user's portfolio. Causal and control beliefs. Windsor, UK: NFER-NELSON. 1995;35-7. Available online at http://userpage.fu-berlin.de/~health/self/selfeff_public.htm.

24. Rajabi GH. Validity and reliability of Generalized Self-Efficacy Scale in psychology students of the Faculty of Education and Psychology of Shahid Chamran University of Ahvaz and Marvdasht Azad University. Journal of New Thoughts on Education. 2006;2(1&2):111-122.

25. Available at: http://namad.tums.ac.ir/Cms.aspx.

26. Mirzaei A, Shabani Nia F.Review of e-learning modern systems. Interdisciplinary Journal of Virtual Learning in Medical Sciences. 2013;4(2):62-74.

27. Verklan T, Walden M. Core curriculum for neonatal intensive care nursing.4th Ed. Elsevier Health Sciences St.Louis; USA; 2014.

28. Cloherty JP, Eichenwald EC, Stark AR. Manual of Neonatal Care.7th Ed. Wolters Kluwer, Lippincott Williams & Wilkins; USA; 2012.

29. Gleason CA, Juul SE. Avery's Diseases of the Newborn.9th Ed. Elsevier Health Sciences; Philadelphia; USA; 2011.

30. Kattwinkel J, Perlman JM, Aziz K, Colby C, Fairchild K, Gallagher J, et al. Part 15: neonatal resuscitation. Circulation. 2010;122(18 suppl 3):S909-S19.

31. Ravanipour M, Ahmadian A, Yazdanpanah A, Soltanian A R. Assessing the relationship between self-efficacy and clinical decision-making in hospital nurse. Scientific Journal of Hamadan Nursing & Midwifery Faculty. 2015; 23 (4) :77-86.

32. Roh YS, Lee WS, Chung HS, Park YM.The effects of simulation-based resuscitation training on nurses' self-efficacy and satisfaction. Nurse Educ Today. 2013 Feb;33(2):123-128.

33. Purfarzad Z, Vanaki Z, Ghamari Zare Z, Farmahini Farahani M, Ghorbani M. Assessment charge nurses' managerial self-efficacy. Quarterly Journal of Nursing Management. 2014;2(4):8-16.

34. Mclaughlin K,Moutray M, Muldoon OT. The role of personality and self-efficacy in the slection and retention of successful nursing students: A Longitudinal Study. Journal of Advanced Nursing. 2008;61(2):211-221.

35. Bolton KM. Effects of an online education program on self-efficacy and knowledge of the clinical teacher role: a study with nursing clinical instructors. Ontario: Queen's University (Canada); 2012.

36. Hosseini T, Torabi S S, Shayan N, Ismaeel Poor M, Ashoori J. Comparing the effects of web-based teaching and cognitive and metacognitive learning strategies on nursing students' academic achievement and self-efficacy, Islamic Azad University, Pishva Branch. Interdisciplinary Journal of Virtual Learning in Medical Sciences. 2015;6(2):1-10[In Persian].

37. Smith AR, Cavanaugh C, Moore WA.Instructional multimedia: an investigation of student and instructor attitudes and student study behavior.BMC Med Educ.2011;11(38):1-13.

38. Du S, Liu Z, Liu S, Yin H, Xu G, Zhang H, et al. Web-based distance learning for nurse education: a systematic review. International nursing review. 2013;60(2):167-177.

39. Poddar KH, Hosig KW, Anderson ES, Nickols-Richardson SM, Duncan SE. Web-based nutrition education intervention improves self-efficacy and self-regulation related to increased dairy intake in college students. Journal of the American Dietetic Association. 2010;110(11):1723-1727.

40. McMullan M, Jones R, Lea S. The effect of an interactive e-drug calculations package on nursing students' drug calculation ability and self-efficacy. international journal of medical informatics. 2011;80(6):421-430.