

The Effectiveness of E-Learning in Enhancing Neonatal Resuscitation Skills, Knowledge and Confidence of Undergraduate Nursing Students

Wafaa Elarousy^{1,2*}, Ebtesam Abdulshakoor¹, Ranya Bafail¹ and Makiah Shebaili¹

¹College of Nursing - Jeddah, King Saud Bin Abdulaziz University for Health Science, Saudi Arabia

²Faculty of Nursing, Alexandria University, Egypt

Abstract

Background: In recent decades, the use of information and communication technologies (ICT) for educational purposes has increased, and the spread of network technologies has caused e-learning practices to evolve significantly. E-learning is used increasingly in healthcare professionals' education. In higher education, audio and video productions prove effective in enhancing student-learning outcomes and increase student satisfaction.

Aim of the study: The purpose of the study is to investigate the effectiveness of e-learning in enhancing neonatal resuscitation skills, knowledge and confidence of undergraduate nursing students.

Material and methods: Forty undergraduate students who registered for Pediatric course from College of Nursing-Jeddah were recruited for the study. A single-blind Randomized Control Trial design was used. Nursing students of the control group allocated to the tradition method of demonstration and re-demonstration of neonatal resuscitation skills in nursing lab while the nursing students of the experimental have access to video about neonatal resuscitation in addition to the tradition method.

Results: The results of the current study revealed that the nursing students of the experimental group were more skillful and had more knowledge about neonatal resuscitation than the nursing students of the control group and the differences were not statistically significant. Moreover, it was found that the nursing students of the control group reported higher level of self-confidence than nursing students of the experimental group and the difference was not statistically significant.

Conclusion and recommendation: The results of current study revealed improvement in nursing students' skills, knowledge about neonatal resuscitation but the differences was not statistically significant. Further researches are necessary with increasing the number of students and video-viewing frequency may affect the learning outcomes.

Background

In recent decades, the use of information and communication technologies (ICT) for educational purposes has increased, and the spread of network technologies has caused e-learning practices to evolve significantly [1,2]. E-learning or online learning is used increasingly in healthcare professionals' education. There is no single agreed definition of e-learning, but it generally refers to internet based forms of learning, rather than face to face interaction and where traditional methods of learning are supported by online resources [3].

Sangra et al. [4] did a study to create an inclusive definition of e-learning that would be accepted by the majority of the scientific community and would also define the boundaries for future activity in this sector. In this context and after taking into consideration all experts' comments and arguments, a preliminary definition of e-learning was prepared. The preliminary definition was as follows: "E-learning is an approach to teaching and learning, representing all or part of the educational model applied, that is based on the use of electronic media and devices as tools for improving access to training, communication and interaction and that facilitates the adoption of new ways of understanding and developing learning".

In higher education, audio and video productions prove effective in enhancing student-learning outcomes and increase student satisfaction. Moreover, Apple Computer's iPod and iPad are becoming a part of healthcare professional education and patient-centered care. Educause Center for Applied Research (ECAR) studies (2005) revealed that the vast majority of the student respondents own at least one computer and a cell phone. These technologies are used on a daily basis for studying, social interaction, and entertainment. Students

are increasingly using a combination of cell phones, laptops and personal digital assistant (PDAs) and about 25% have wireless adaptors. Virtually all have access to the internet and the majority has broadband access. Furthermore, it was found that 64.1% of the students perceive that IT used in courses improves learning [5].

Virtual reality application is one of the interactive e-learning approaches which provide effective stimulating situations [6]. Researchers integrate it to other simulations and e-learning strategies on order to provide safe environments. Immersive of high-fidelity standardized virtual simulation allow the evaluators to evaluate the critical thinking, decision making in emergency situation, and skill performance which could enhance the nursing student abilities[7].

There are many advantages of e-learning. For learners, learning is self-paced and gives student a chance to speed up or slow down as necessary, convenient for students to access any time, any place, self directed allowing the students to choose content and tool. For

***Corresponding Author:** Dr. Wafaa Elarousy, College of Nursing - Jeddah, King Saud Bin Abdulaziz University for Health Science, Saudi Arabia; E-mail: arousywa@ngha.med.sa

Citation: Elarousy W, Abdulshakoor E, Bafail R, Shebaili M (2014) The Effectiveness of E-Learning in Enhancing Neonatal Resuscitation Skills, Knowledge and Confidence of Undergraduate Nursing Students. Int J Nurs Clin Pract 1: 102. doi: <http://dx.doi.org/10.15344/2394-4978/2014/102>

Copyright: © 2014 Elarousy et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

instructor, tutoring can be done at anytime and from anywhere, material can be updated and learners are able to see the change at once [1]. Also, it has an ease of access and ability to regain information [8]. Through e-learning well-organized and systemic information can be obtainable to a large number of trainees who demand them [9]. Moreover e-Learning shaping the identity of learner and helps the student to develop from being novice to qualified nurse. Seeing online video tapes of the staff professional nurse in how to deal with critical clinical situation will improve and develop nursing students self efficacy. E-learning can offer students more control over online interactions than in face to face teaching, which may encourage introverted students to engage more fully [3]. Furthermore, Findings of study done by Ayub N and Iqbal Sh [10] indicated that most of students expressed satisfaction with e-learning programs.

The disadvantages of E-learning include the exclusion of students who have little or no access to computers, or poor IT skills. In addition, E-learning cannot enable students to acquire such skills as social interaction, engagement with patients, reflection, listening and caring [11]. There are a lot of factors affecting the commitments and success of e-learning programs for nursing students. First key factor is computer literacy and skills. Second one is time and flexibility. It is essential motivation for nursing students to develop a study plan according to their time management. Last factor is accessibility and availability. Based on those factors students should attend computer course, receive intense preparations and continues support [12].

Evidence suggests that e-learning is more efficient because learners gain knowledge, skills, and attitudes faster than through traditional methods. E-learners have demonstrated increased retention rates and better utilization of content, resulting in better achievement of knowledge, skills, and attitudes [13]. A study by Hansen M. [14] to discover whether male and female urinary catheter insertion videos delivered via iPods increases students' skills competency and self-confidence levels. The study revealed that video iPods may be used to enhance nursing skills. However, the results of this pilot study do not suggest a significant change in competency or confidence levels in performing the clinical skills. Further investigation is necessary because increasing the number of participants, video-viewing time, and monitoring the length of time-on-learning may have a positive influence on future student affect and learning outcomes.

Between 5%–10% of all babies born need some degree of resuscitation, such as tactile stimulation or airway clearing or positioning and approximately 3%–6% require basic neonatal resuscitation, consisting of these simple initial steps and assisted ventilation. Delays in assisting the non-breathing newborn to establish ventilation may exacerbate hypoxia, increase the need for assisted ventilation, and contribute to neonatal morbidity and mortality [15]. Students nurse should be equipped with the necessary knowledge and skills to practice the basic skills of neonatal resuscitation.

Using of e-learning in clinical practice allows students the opportunity to enhance learning while away from the traditional setting. High quality nursing education materials delivered via student friendly devices as laptop, mobile and I pad can overcome concerns of time, and frequent use of nursing lab for more practice. Evidence of how effective educational material delivered to enhance undergraduate clinical practice through e-learning is lacking and empirical research is needed. So, this study will investigate the effectiveness of using of video through university e-mail in enhancing

neonatal resuscitation skills, knowledge and confidence of undergraduate nursing students.

Objectives of the Study

Aim of the study

The aim of the study was to investigate the effectiveness of e-learning in enhancing neonatal resuscitation skills, knowledge and confidence of undergraduate nursing students.

Specific objectives

Specific objectives of the study were to:

- Analyze how e-learning made an impact on neonatal resuscitation skills, knowledge and confidence levels of undergraduate nursing students.
- Examine the differences between undergraduate nursing students exposed to neonatal resuscitation in nursing lab only and those who had a combination of nursing lab and e-learning in relation to skills, knowledge and self-confidence.

Research questions

- Was there a statistical significant difference in neonatal resuscitation knowledge between undergraduate nursing students who exposed to neonatal resuscitation in nursing lab only and those who had a combination of nursing lab and e-learning?
- Was there a statistical significant difference in neonatal resuscitation skills between undergraduate nursing students who exposed to neonatal resuscitation in nursing lab only and those who had a combination of nursing lab and e-learning?
- Were there a statistical significant differences in the levels of confidence between undergraduate nursing students who exposed to neonatal resuscitation in nursing lab only and those who had a combination of nursing lab and e-learning?

Materials and Methods

Study setting

The study was conducted at King Saud Bin Abdul-Aziz University for Health Science-College of Nursing -Jeddah.

Study Subjects

The study included all students (40 students) who registered for Nursing Care of Children and Their Families course, during the second semester of academic year 2012-2013.

Inclusion criteria

- Registered students for Nursing Care and Child and Their Families course were eligible for the study.
- Students who were willing to participate in the study.

Exclusion criteria

Students who weren't willing to participate in the study.

Study design

A single-blind Randomized Control Trial design was used. Through this design: control, manipulation and randomization applied to test the effectiveness of an intervention [16]. The purpose of blinding was to reduce the risk of ascertainment and observation bias.

Sample size

Two sections with 40 students were included in the study.

Sampling technique

Probability sampling techniques, simple random sampling, was used. The randomization procedure gives the randomized controlled trial its strength. Random allocation means that all participants have the same chance of being assigned to each of the study groups [17].

Once the list of students was developed, the Principal investigator randomly allocated the odd number in the list to experimental and students with even number in the list allocated to the control.

The teaching assistants, who assessed the student's skills, didn't know the students who were allocated in the experimental group.

Tools

Data collection was done by using the following tools.

Tool I

Demographic data: it was developed by the researchers and includes: students' age, education level, stream, GPA.

Tool II

Neonatal resuscitation checklist: A 20steps checklist to test students skills of practice neonatal resuscitation following the neonatal resuscitation guidelines which developed by American Heart association in collaboration with American Academy of Pediatrics [18]. Every step in the checklist was evaluated on a scale of zero for not done, to one for done.

Tool III

Knowledge test was developed by the researchers and included MCQ questions to test the knowledge necessary for performing the procedure for both groups, control and experimental.

Tool IV

Student self-confidence: A 7-item students self-confidence developed by the researchers to assess self-confidence of control group with nursing lab experience only and experimental group with e-learning experience in addition to nursing lab experience. A 4likert scale was utilized (1= strongly disagree, 2=disagree, 3=agree and 4=strongly agree). Self-confidence is the belief in one's abilities to accomplish a goal or task (and is crucial to effective performance. Self-confidence underpins nurses' competence to carry out care effectively and is an important aspect of learning to be a nurse [19].

Data collection method

1. Student's nurse who registered to nursing care of children and their families' course allocated randomly to control or experimental group.
2. Demographic data (tool I) was distributed to control group as a hard copy and to experimental group through blackboard system.
3. Neonatal resuscitation skills was demonstrated by TA and re-demonstrated by students for both groups, control and experimental, following the steps in the checklist (tool II).

4. Experimental group had access to a video of neonatal resuscitation that sent it to their university e-mail in the second week of the semester with request to keep record about the frequency of watching the video.
5. Both groups, control and experimental, had knowledge test (tool III) to test their knowledge about neonatal resuscitation procedure in the third week of the semester.
6. Both groups control and experimental, had objective structured clinical exam for the purpose of the research in the Third week of the semester.
7. Both groups control and experimental, filled student self-confidence with the neonatal resuscitation (tool IV).

Reliability and validity

Reliability checked after data was collected for internal consistency. It was 0.720 for neonatal resuscitation skills and 0.742 for self-confidence using Cronbach's Alpha test.

Validity: threats to internal validity such as history, maturation and instrument was controlled to prevent their influence on the dependant variables as follows:

- **History:** The researchers confirmed that the students didn't expose to any information/training in neonatal resuscitation outside CON-J. Neonatal resuscitation procedure was selected because this is the first time to deal with this procedure.
- **Maturation:** The researchers did their best to prevent access of the video by students from control group by schedule the neonatal resuscitation on the second week of the semester and evaluate the neonatal resuscitation skills on the third week of the semester for the purpose of the study then the video was available for all students before summative evaluation.
- **Instrumentation:** Data collectors were trained to ensure the standardization of data collection method.

Ethical considerations

The researcher submitted the research proposal and questionnaire to the Research Committees of the CON-J for review and obtained a written permission to conduct the study.

All the respondents were fully informed about the research purpose and the nature of the study. All respondents were required to indicate their willingness to participate in the study by signing a consent form and their right to withdraw from the study at any time.

Confidentiality was ensured in this study. The questionnaire used for data collection was handled only by the research team.

Data management and statistical analysis

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. Qualitative data were described using number and percent. Quantitative data were described using mean and standard deviation for normally distributed data. Comparison between different groups regarding categorical variables was tested using Chi-square test. When more than 20% of the cells have expected count less than 5, correction for chi-square was conducted using Monte Carlo correction. For normally distributed data, comparison between two independent populations was done using independent t-test. Correlations between two quantitative variables were assessed using Pearson coefficient. Multivariate liner regression was assessed.

Significance test results are quoted as two-tailed probabilities. Significance of the obtained results was judged at the 5% level.

Results

Table 1 illustrates the demographic characteristics of nursing students. Their ages ranged from 20 to 29 with mean age of 24.55 (SD 2.64); 60% of them from stream II, 57.5% of them in academic level 4 and their GPA ranged from 2.08 to 4.34 with mean of 3.13 (SD 0.56). Students nurse who participated in the study neither had any knowledge nor attended any nursing activities about neonatal resuscitation.

	No.	%
Age		
20- 22	13	32.5
23 - 24	4	10.0
24- 26	13	32.5
>26	10	25.0
Min. - Max	20.0 - 29.0	
Mean ± SD.	24.55 ± 2.64	
Stream		
Stream I	16	40.0
Stream II	24	60.0
Academic Level		
4	23	57.5
6	3	7.5
7	14	35.0
GPA		
Min. - Max	2.08 - 4.34	
Mean ± SD.	3.13 ± 0.56	
Did you have any knowledge about neonatal resuscitation		
Yes	0	0.0
No	40	100.0

Table 1: Distribution of nursing students according to demographic data.

Table 2 presents distribution of nursing students according to neonatal resuscitation skills. It was found that the majority of nursing students were able to practice the neonatal resuscitation procedure.

Table 3 illustrates nursing student's knowledge about neonatal resuscitation. More than half of them decided the right action to resuscitate a neonate in a written scenario while the majority of them able to identify the duration of their action and the ratio of chest compression to ventilation (90% and 97% respectively). Three quarter of them answered the parameters used to reevaluate the neonate and 80% of them were able to decide the second action for resuscitation within the same scenario while only third of them answered the time needed to assess heart rate.

Nursing students self confidence with neonatal resuscitation procedure presented in table 4. It was found that all of participants

	Done		Not done	
	No.	%	No.	%
Places the baby on preheated radiant warmer	39	97.5	1	2.5
Positions the baby with neck slightly extended	40	100.0	0	0.0
Suctions mouth then nose	40	100.0	0	0.0
Dries amniotic fluid from body and head	39	97.5	1	2.5
Stimulates baby to breathe	39	97.5	1	2.5
Removes wet linen from contact with baby	39	97.5	1	2.5
Assess the baby's condition	38	95.0	2	5.0
Positions herself at the head or side of the baby	40	100.0	0	0.0
Positions the baby with neck slightly extended	39	97.5	1	2.5
Calls for assistance.	34	85.0	6	15.0
Positions the mask properly	40	100.0	0	0.0
Begins the ventilations at appropriate rate (40-60 breath/ minute)	33	82.5	7	17.5
Looks for chest movement.	39	97.5	1	2.5
If there is no chest movement: Checks for inadequate seal and head position, blocked airway and insufficient pressure.	36	90.0	4	10.0
Asks the assistant to report heart rate and breathe sound.	32	80.0	8	20.0
Assesses the baby's condition every 30 seconds.	37	92.5	3	7.5
Demonstrate chest compression. For the thumb method, places both thumbs side by side over the midsternum, with the hands encircling the chest and the fingers supporting the neonate's back.	40	100.0	0	0.0
For the two- finger method, place the tips of the middle finger and the ring or index finger over the midsternum in the midline while supporting the neonate's back with the other hand.	40	100	0	0.0
Coordinates ventilation and chest compression	39	97.5	1	2.5
Assesses the baby's condition every 30 seconds.	38	95.0	2	5.0

Table 2: Distribution of nursing students according to neonatal resuscitation skills.

Ability of nursing students to answer the following questions after reading a written scenario about neonate needs resuscitation	No.	%
Student nurse ability to decide right action to resuscitate the neonate in the written scenario		
Right decision	22	55.0
Wrong decision	18	45.0
Nursing students ability to identify the duration of their action		
Right duration	36	90.0
Wrong duration	4	10.0
Nursing students knowledge about the parameters used to re-evaluate this neonate		
Right parameters	30	75.0
Wrong parameters	10	25.0
Student nurse ability to decide right action to resuscitate the neonate in the written scenario		
Right decision	32	80.0
Wrong decision	8	20.0
Nursing students knowledge of chest compression to ventilation ratio		
Right ratio	39	97.5
Wrong ratio	1	2.5
Nursing students knowledge of the time needed to assess heart rate		
Right time	14	35.0
Wrong time	26	65.0

Table 3: Nursing student's knowledge about neonatal resuscitation.

either agreed or strongly agreed regarding their ability to do the initial evaluation of the neonate, perform initial steps, and demonstrate chest compression by thumb method technique. Furthermore, the majority of them either agreed or strongly agreed regarding their ability to evaluate the neonate, perform positive pressure ventilation (PPV) and demonstrate chest compression by two finger techniques (97.5%, 95% and 95% respectively).

Table 5 presents distribution of experimental group according to using e-learning. It was found that 75% of nursing students in the experimental group watched the movie about neonatal resuscitation; more than half of them watched the movie three times and more and three quarter of them reported that watching the movie improved their neonatal resuscitation knowledge, skills, and self confidence.

Comparison between experimental and control group according to their demographic characteristics illustrated in table 6. No statistical significant differences were found between experimental and control group in relation to their stream and GPA while the mean age of control group was higher than the mean age of experimental group and the difference was statistically significant. The results of the current study revealed the nursing students of experimental group were more skillful and had more knowledge about neonatal resuscitation than the nursing students of the control group and the differences were not statistically significant. As regards the self confidence of the control group was higher the self confidence of experimental group and the

difference was not statistically significant as presented in table 7.

	Disagree		Strongly disagree		Agree		Strongly	
	No.	%	No.	%	No.	%	No.	%
I am confident in my ability to do initial evaluation of the newborn	0	0.0	0	0.0	22	55.0	18	45.0
I am confident in my ability to perform initial steps of the newborn.	0	0.0	0	0.0	26	65.0	14	35.0
I am confident in my ability to evaluate the parameters needed to take a right decision to resuscitate the newborn.	0	0.0	1	2.5	16	40.0	23	57.5
I am confident in my ability to take a right decision to resuscitate the newborn.	3	7.5	1	2.5	23	57.5	13	32.5
I am confident in my ability to perform positive pressure ventilation (PPV) effectively to resuscitate the newborn.	1	2.5	1	2.5	14	35.0	24	60.0
I am confident in my ability to demonstrate chest compression by (thumb method) technique.	0	0.0	0	0.0	14	35.0	26	65.0
I am confident in my ability to demonstrate chest compression by (two- finger method) technique.	1	2.5	1	2.5	14	35.0	24	60.0
Overall, I am confident with my ability to practice neonatal resuscitation.	0	0.0	3	7.5	18	45.0	19	47.5

Table 4: Distribution of nursing students according to neonatal resuscitation skills.

The Pearson correlation coefficients between neonatal resuscitation knowledge, skills and self confidence and nursing students' age and GPA were calculated (Table 8). The correlation was not statistically significant for neonatal resuscitation skills, knowledge or self confidence and nursing students' age and grade point average (GPA).

Comparison between Stream I and Stream II of experimental group according to their neonatal resuscitation Skills, Knowledge and Self-Confidence presented in table 9. It was found that nursing students of stream II were more skillful than nursing students of stream I while

nursing students of stream I were more knowledgeable than stream II but the differences were not statistically significant. Furthermore, the nursing students of stream II self-confidence reported more self-confidence than nursing students of stream I and the difference was statistically significant.

	No.	%
Did You watch the movie	n=20	
Yes	15	75.0
No	5	25.0
How many times did you watch the movie	n=15	
Once	4	26.7
Twice	3	20.0
Three or more	8	53.3
Did you think that watching video about NR improved your neonatal resuscitation knowledge, practice and confidence	n=15	
No	1	6.7
Yes	13	86.7
Not sure	1	6.7

Table 5: Distribution of experimental group according to using e-learning about neonatal resuscitation.

	Control (n = 25)		Experimental (n = 15)			
	No.	%	No.	%		
Age						
Min. - Max.	20.0 - 29.0		21.0 - 27.0		t = 2.096*	0.043
Mean ± SD	25.20 ± 2.68		23.47 ± 2.26			
Stream						
Stream I	8	32.0	8	53.3	χ ² = 1.778	0.182
Stream II	17	68.0	7	46.7		
GPA						
Min. - Max.	2.08 - 4.22		2.45 - 4.34		t = 0.368	0.715
Mean ± SD	3.15 ± 0.56		3.08 ± 0.58			

Table 6: Comparison between experimental and control groups according to their demographic characteristics.
p: p value for comparing between didn't receive and received e-learning
χ²: Chi square test /MC: Monte Carlo test / t: Student t-test / *: Statistically significant at p ≤ 0.05

Discussion

E-learning has several advantages, including the ability to access materials at any time in almost any place, which also permits interactive web seminars and conferences with participants who may be located far away from one another [20]. Web-based technologies are increasingly being used to create modes of online learning for nurses [21]. a systemic review done by Rowe M et al. [22] about the role of blended learning (both electronic and face-to-face) in the clinical education of healthcare students concluded that blended learning has potential to enhance the development of a range of clinical competencies among healthcare students. These new formats need to be investigated whether they are superior to traditional teaching methods. So, the aim of the current study is to investigate

	E-learning		t	P
	Control (n = 25)	Experimental (n = 15)		
	Mean ± SD	Mean ± SD		
Skills				
Average score	0.95 ± 0.10	0.96 ± 0.09		
Total score	18.96 ± 1.90	19.13 ± 1.73	0.288	0.775
% score	94.80 ± 9.52	95.67 ± 8.63		
Knowledge				
Average score	0.69 ± 0.15	0.78 ± 0.14		
Total score	4.12 ± 0.93	4.67 ± 0.82	1.885	0.067
% score	68.67 ± 15.46	77.78 ± 13.61		
Self-Confidence				
Average score	3.49 ± 0.36	3.35 ± 0.51		
Total score	27.88 ± 2.89	26.80 ± 4.07	0.980	0.333
% score	82.83 ± 12.05	78.33 ± 16.98		

Table 7: Comparison between experimental and control groups according to their neonatal resuscitation knowledge, skills and self confidence. r: Pearson coefficient

	Age	GPA	
Practice skill	r	0.476	0.199
	p	0.073	0.478
Knowledge	r	-0.412	0.050
	p	0.127	0.859
Confidence	r	0.375	-0.018
	p	0.169	0.950

Table 8: Correlation coefficient values for the relationship between neonatal resuscitation knowledge, skills and self confidence and nursing students age and GPA (n = 15)

	Experimental		t (p)
	Stream I (n = 8)	Stream II (n = 7)	
	Mean ± SD	Mean ± SD	
Skills			
Average score	0.92 ± 0.11	1.0 ± 0.0	
Total score	18.38 ± 2.13	20.0 ± 0.0	2.154
% score	91.88 ± 10.67	100.0 ± 0.0	(0.068)
Knowledge			
Average score	0.81 ± 0.14	0.74 ± 0.13	
Total score	4.88 ± 0.83	4.43 ± 0.79	1.061
% score	81.25 ± 13.91	73.81 ± 13.11	(0.308)
Self-Confidence			
Average score	3.11 ± 0.51	3.63 ± 0.37	
Total score	24.88 ± 4.09	29.0 ± 2.94	2.211*
% score	70.31 ± 17.03	87.50 ± 12.27	(0.046)

Table 9: Comparison between Stream I and Stream II of experimental group according to their Skill, Knowledge about neonatal resuscitation and Self-Confidence.
p: p value for Student t-test for comparing between stream I and II
*: Statistically significant at p ≤ 0.05

the effectiveness of e-learning in enhancing neonatal resuscitation skills, knowledge and confidence of undergraduate nursing students as their effect needs to be assessed in nurse education.

The results of the current study revealed that nursing students of experimental group were more skillful and had more knowledge about neonatal resuscitation than the nursing students of the control group but the differences were not statistically significant. This is may attributed to the limited time of exposure to the video as the researchers did their best to prevent access of the video by students from control group by schedule the neonatal resuscitation on the second week of the semester and evaluate the neonatal resuscitation skills on the third week of the semester for the purpose of the study then the video was available for all students before summative evaluation. On the other hand, Makhdoom N et al. [23] found that Blended learning (both electronic and face-to-face) was statistically significantly better than traditional learning in all types of examination: written, objective structured clinical and case scenarios in studying family medicine. In addition, Moor S et al. [24] studied the progress of an interactive online educational resource to develop the knowledge, skills and confidence of healthcare professionals working with people affected by mesothelioma and concluded that the online educational resources had positive impact on nurse's skill, confidence and knowledge. Also, a study done by Sung YH, et al. [25] showed a significantly higher level of knowledge of medication and satisfaction with the comprehensiveness of their medication learning, but the self-efficacy of medication administration, medication-administration ability among participants experimental, blended group from that in the control group. Furthermore, the results of study done by Silva C et al. [20] concluded that students who participated in online discussion accompanying with face to face activities (blended learning) had significantly greater posttest scores than those who only participated in classes.

As regards the self-confidence of the control group was higher than the self confidence of experimental group and the difference was not statistically significant. This is unexpected and attributed to that 25% of the experimental group was from stream II and did not watch the video and moved to control group. Stream II programme is for university graduates who wish to join nursing as a second career. Some of them worked for a while before joining the college. This is evidence by comparison between Stream I and Stream II of experimental group according to their Self-Confidence and found that nursing students of stream II reported more self-confidence than nursing students of stream I and the difference was statistically significant.

Conclusion and Recommendation

The results of current study revealed improvement in nursing students' skills, knowledge about neonatal resuscitation but the differences was not statistically significant. Further researches are necessary with increasing the number of students and video-viewing frequency may affect the learning outcomes.

Limitation of the study

Small number of nursing students, therefore, the results could not be generalized.

Acknowledgment

We would like to extend sincere appreciation to the nursing students who participated in the study.

References

1. Ayub N, Iqbal SH (2011) Student Satisfaction with e-Learning achieved in Pakistan. *Asian JDE* 9: 26-31.
2. Abdelaziz M, Kamel S, Karam O, Abdelrahman A, (2011) Evaluation of e-learning program versus traditional lecture instruction for undergraduate nursing students in a faculty of nursing. *Teach Learn Nurs* 6: 50-58.
3. Beauchesne M, Dutilleul C, Wright N (2010) Virtual Clinical Education: Going the full Distance in Nursing Education. *Simulation Based Learning & Educational Issues, Newborn and Infant Nursing Reviews* 11: 43-48.
4. Bradley E (2006) Nurse Prescribing: A comparison between nurses undertaking e-learning and conventional courses. 1-11.
5. Bradley E, Burgess J, Ring M, Nolan P (2006) Nurse prescribing: A comparison between nurses undertaking e-learning and conventional courses.
6. Caruso BJ, Kvakik BR (2005) Students and information technology, 2005: convenience, connection, control and learning.
7. Campbella M, Gibson W, Halla A, Richardsc D, Callerya P (2008) Online vs. face-to-face discussion in a web-based research methods course for postgraduate nursing students: A quasi-experimental study. *Int J Nurs Stud* 45: 750-759
8. Chesser-Smyth PA, Long T (2013) Understanding the influences on self-confidence among first-year undergraduate nursing students in Ireland. *J Adv Nurs* 69: 145-157.
9. Gabriela I (2007) A Crum of E-learning Advantages and Disadvantages. *Informatica Economica* 42.
10. Hansen M (2012) Are nursing students' clinical skills competency and self-confidence levels improved via video iPods? A randomized controlled pilot study. *J Nurs Educ Pract* 1.
11. Ruiz JG, Mintzer MJ, Leipzig RM (2006) The Impact of E-Learning in Medical Education. *Acad Med* 81: 207-212.
12. Kilmon C, Brown L, Ghosh S, Mikitiuk A (2010) Immersive virtual reality simulations in nursing education. *Nurs Educ Perspect* 31: 314-317.
13. Kattwinkel J, editor. *Textbook of Neonatal Resuscitation*. 6th edn. Elk Grove Village: American Academy of Pediatrics and American Heart Association; 2011.
14. McKenzie K, Murray A (2010) E-learning benefits nurse education and helps shape students' professional identity. *Nursing Times* 106: 17-19.
15. McVeigh H (2008) Factors influencing the utilization of e-learning in post-registration nursing students. *Nurse Education Today* 29: 91-99.
16. Moor S, Hunt P, Darlison L, Russell D, Gledhill D, et al. (2012) Improving Nurses' Skills through E-Learning. *Cancer Nurs Pract* 11: 14-19.
17. Makhdoom N, Khoshhal KH, Algaidi S, Heissam KH, Zolaly M (2013) Blended learning' as an effective teaching and learning strategy in clinical medicine: a comparative cross-sectional university-based study. *J Taibah Uni Med Sci* 8: 12-17.
18. Sangrà A, Vlachopoulos D, Cabrera N (2012) Building an Inclusive Definition of E-Learning: An Approach to the Conceptual Framework. *IRRODL* 13.
19. Stolberg H, Norman G, Trop I (2004) Randomized Controlled Trials *American J Roentg* 183: 1539-1544.
20. Silva C, Souza M, Filho R, Medeiros M, Criado P (2011) E-learning program for medical student in dermatology. *Clinics* 66: 619-622.
21. Sung YH, Kwon IG, Ryu E (2008) Blended learning on medication administration for new nurses: Integration of e-learning and face-to-face instruction in classroom. *Nurse Educ Today* 28: 943-952.
22. Radović-Marković, M (2010) Advantages and Disadvantages of E-Learning In Comparison To Traditional Forms of Learning. *Annals of the University of Petrošani, Economics* 10: 289-298.
23. Rowe M, Frantz J, Bozalek V (2012) The role of blended learning in the clinical education of healthcare students: A systematic review. *Medical Teacher* 34: 216-221.
24. Wall S, Lee A, Niermeyer, English M, Keenan W, Carlo W, et al. (2009) Neonatal Resuscitation in Low-resource Settings: What, Who, and How to overcome Challenges to Scale up? *Int J Gynaecol Obstet* 107: S47-S64.
25. Wood G, Haber J (2010) *Nursing Research, Methods and critical appraisal for evidence – based practice*. 7th ed., Mosby 179-181.