J Biochem Tech (2019) Special Issue (2): 98-105
ISSN: 0974-2328

The Effect of Mobile-phone Assisted Training About urinary Catheterization on Learning Motivation, Knowledge, and Performance of Nursing Students at Rasht Shahid Beheshti Faculty Of Nursing and Midwifery in 2017

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Received: 26 September 2018 / Received in revised form: 14 March 2019, Accepted: 23 March 2019, Published online: 25 April 2019

Abstract

Introduction: Maintaining quality and safety in patient care is essential. Nurses, in order to provide high-quality care for patients, must have proficiency in clinical skills. Undoubtedly, technology creates many opportunities for the learning environment, resulting in significant educational interaction. **Objective:** To determine the effect of mobile phone education on urinary catheterization on learning motivation, knowledge and practice of nursing students of ShahidBeheshti Faculty of Nursing and Midwifery in Rasht in 2018. **Methods:** The present study was carried out using a semi-experimental method to determine the learning motivation, knowledge and practice of students in the field of urinary catheterization in ShahidBeheshti Faculty in Rasht city during the months of January and February.The samples included 48 first-term nursing and midwifery students. They were divided into two groups: intervention (n = 29) nursing and control (n = 19) midwifery students and participated in two sessions of 90-minute theory and practical training in the field of urinary catheterization. Intervention group was trained on how to access the video clip by mobile phone, which was observed twice a day.Learning motivation was measured by IMMS tool and awareness level with knowledge questionnaire and practice with standard clinical skills checklist. In order to compare the learning motivation, knowledge and practice of both intervention and control groups, Independent T test and Anova tests and Pearson coherency coefficient were used. Statistical analysis was performed using SPSS version 21. **Findings:** There was a significant difference between the mean scores of learning motivation ($p < 0.001$) and knowledge ($p = 0.001$) and performance ($p < 0.0001$) in both intervention and control groups. The mobile app installed increased motivation for learning and Knowledge and performance of students. **Conclusion:** Technology-based education can complement traditional education, and practical learning using a planned educational film may be effective in educating the younger generation.

Key words: Education, Student, Cell Phone, Knowledge, Practice, Learning Motivation

Introduction

Nursing encompasses extensive tasks and roles as the largest part of the professional force at the forefront of providing health care services, hence, it requires a considerable sense of responsibility, accuracy, and vigilance.Insufficient training of this group will certainly affect the quality and quantity of health services and, ultimately, the health of people and society. Therefore, the main mission of nursing education is to educate competent and qualified nurses who have the necessary knowledge and skills to provide quality care and also maintain and promote the health of society (Elahi and et al., 2012). Skillful provision of nursing services affects the quality of health

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care. The practical and clinical nature of nursing requires that training of clinical skills is planned in such a way that allows observation, imitation, supervised practice, and feedback for nursing students (Roghani and et al., 2006).

Satisfaction of admitted patientswith nursing services is an indicator of one's overall satisfaction with hospital services, suggesting the need for nursing skills (Khatooni and et al., 2014). It is essential to maintainthe quality and safety in patient care. Nurses need to have sufficient proficiency in clinical skills in order to provide patients with a high quality care. Learning clinical skills is not only a prerequisite for success in nursing professions,but is also essential to achieve critical thinking and deep interest in the profession and to improve patient care. At present, such problems as limited access to clinical experiences, dissatisfaction of some patients with care by students, and lack of clinical communication at the facultyresult in failure of nursing students to experience different skills (Lee and et al., 2016).

Acquisition of practical skills is often based on behavioral techniques exclusively focusing on trial and error, while teaching clinical skills should lead to learning to the extent of students' proficiency (Khatooni and et al., 2014). As definedby Dave (1970), learning of psycho-motor skills, which is considered an essential part of clinical skills, requires observation, accuracy, coordination, and habituation of doing skills (Roghani and et al., 2006).

Results of a research at 174 hospitals by U. Smith showed that 75% of novice nurses did not have essential qualifications for clinical practice (Hickey, 2010). Motevaselian and Farnia also stated that 90% of nursing students report their quality of clinical skills in relation to symptomsand poor to moderate personal hygiene regarding gastric catheterization and poor stitching. They further pointed out that students carry out the skill of urinary catheterization (7.24%) only under supervision and cannot performthe task alone. Although supervised skills are essential for the learning process, this level is considered to be apreliminary level for learning psycho-motor skills in the Dave classification. Therefore, to provide nursing careafter graduation, the student need toacquire higher levelsof skill after achieving the preliminary level (Roghani and et al., 2006).

A major challenge in teaching nursing students is to provide an effective training for educating skilled students who can effectively provide services in the clinical setting (Lin & Lin, 2016). Education theorists believe that traditional classrooms are no longer effective because oftime- and space dependency and cannot provide a real and proper context for learning (Shahbazian and et al., 2016). There is a need to use alternative methods due to the increasing number of students in medical science education, heavy curriculum, and difficulty of learning for students enclosed in the classroom (Sezer, 2016). Nursing professors have raised different strategies to achieve such a goal, one of which is the use of technology (e.g. educational films) in practical training, which is used as a training strategy (Khatooni and et al., 2016; Haraldseid & Aase, 2017).

There is no doubt that technology provides many opportunities for the learning environment resulting in significant educational interactions (Forbes, 2016; Button and et al., 2014). Application of training videos, photos and animations along with educational texts can equalize the visual, written and listening learning, and increase the interest in learning by learners. Thereby, each student progresses by one's own style and spends a different time to study rather than progression of the whole classaltogetherand identical acquisition of different qualifications (Khatooni and et al., 2014).

Motivation is one of the factors that influences learning. The teacher should motivate the learner towards different educational subjects. Motivation encourages the learners to participate in learning with more satisfaction. The younger generation perform most of activities by mobile phones that facilitate access to information and may createmore learning motivation (Lee and et al., 2016). It is, therefore, of paramount importance to teachpractical skills through the use of advanced technologies, including mobile phones, in the education of the younger generation (Lahti and et al., 2014).

While most studies have evaluated the effectiveness of video tutorials on the training and learning of nurses' clinical skills, researchers believe that further studies should be conducted using video films of different clinical skills through mobile phone in the future (Forbes, 2016). Limited studies have investigated learning motivation and its association with learning outcomes. The lack of a proper catheterization film concordant to the regional native culture could be considered a major challenge in teaching clinical skills (Lee and et al., 2016). This study, therefore,aimed to determine the effect of mobile-phoneassisted education about urinary catheterization on learning motivation, knowledge and performance of nursing and midwifery students at Shahid Beheshti Faculty of Nursing and Midwifery in Rasht.Our outcomesmayreduce the gap between thetheory and practice in clinical skills in case of increasing motivation, knowledge, and clinical skills of students.

Materials and Methods

The present interventional study was conducted through semi-experimental method,which was registered at the Iranian Clinical Trial Center with the code IRCT20080901001174N. A total of 54 first-semester students of nursing and midwifery (enrolled 2017-18) atRasht

Shahid Beheshti Faculty were selected by census method. Of these, six students discontinued and totally 48 students with experiences in clinical practice and no experiences in catheterization or its observation were divided into two groups oftraining intervention (29 nurses) and control group (19 midwives) without intervention.

Data gathering tools were demographic and IMMS questionnaires (motivational study of educational materials developed by Claire in 2010) to assess the motivation of learning, as well as a questionnaire for knowledge assessment and a standard checklist for clinical skills (Loorbach and eta., 2015).The demographic questionnaire included age, marital status, hours of mobile phone use, interest in the field of study, residence, and GPA of diploma. The IMMS toolfor learning motivation consists of four domains (attention, communication, self-confidence, and satisfaction) with a total of 36 questions based on a 5-point Likert scale (1-5as false = 1, slightly true = 2, relatively true = 3, mostly true = 4, and very true = 5).The questions were divided into 12 questions of attention domain (2,8,11,12,15,17,20,22,24,28,29,31), nine questions of communication domain (33,9,10,16,18,23,26,30 and, nine questions of self-esteem domain (3,4,7,13,19,25,34,35,1), and six questions of satisfaction domain (5,14,21,27,32,36) (Loorbach and eta., 2015). The scores range from 36 to 180with higher scores representing a higher level of learning motivation. The tool was first translated into Farsi and re-translated into English by one of the professors and then was adopted by another professor.Twelve faculty members from Shahid Beheshti Faculty of Nursing and Midwifery in Rashtverified the validity and reliability the tool, for which the CVR and CVI values were obtained as 88% and 94%, respectively. The level of knowledge was assessed by a questionnaire of 20 questions with a scale (true, false, and “I do not know”) extracted from the book of nursing principles and skills, with CVR and CVI levels of 96%and 98%, respectively. The scores rangedbetween 0 and 20 with higher scores showing a higher level of knowledge.

The catheterization skill was evaluated by observation using a checklist of clinical skills including 36 items with a scale (excellent = 3, satisfactory = 2 and needing practice = 1) adoptedfrom the book of Clinical Nursing Techniques. The scores were in the range of 36-108 withscores of 36-60as needing practice, 60-84 as satisfactory, and 84-108as excellent. It should be noted that students with higher pointsare approved to have necessary skills (Karimi, 2006).

Students who presented informed consent to participate in this research and had no previous experience in clinical practice and catheterization practice or observation were included in the study. The unwillingness to participate in the study was considered as the exclusion criterion. At first, the students were provided with the course plan and course objectives and assured about the confidentiality of information. All nursing and midwifery students who agreed to participate in this study were homogeneously divided into two groups of control (midwifery students) and intervention (nursing students).They first filled out the sociodemographic questionnaire andthen participated in two90-minute sessions of theoretical and practical teaching based on nursing practice about the method of urinary catheterization, taught by a professor from the nursing faculty. Afterwards, the intervention group was trained on how to access and watchthe video clip by mobile phone twice a day for a week. Once a day, a text message was sent to remind them watching the video clip.This taskwas not applied in the control group. The catheterization training film included genital anatomy, necessary equipment for the instructor, the correct method of catheterization, and decatheterization in women. It was a 15-min filmobtainedfrom a reliable website(nursing skills) and the book ofnursing principles and techniques, which was translated and dubbed in Farsi and provided to the test group via a social network. The test group was asked not to pass the film to others. After a week, both the control and test groups completed the questionnaire related to the learning motivation and participated in a written test to assess their level of knowledge about the method of catheterization. Then, the researcherexamined each student through a checklist of clinical skills (including 36 items)in collaboration with the professor of the group.

Data were analyzed using descriptive and inferential statistics. In terms of knowledge and performance levels, mean scores of students in the final exam were calculated in two separate training methods. Normal distribution of variables was first verified to compare the main variables of the research in the two groupsbased on the Shapiro-Wilk test.The scores of attention, communication, self-confidence, satisfaction, learning motivation, and catheterization skillhad a normal distribution ($p > 0.05$), and scores of catheterization skill ($P = 0.001$) and knowledge in the control group did not follow a normal distribution ($p = 0.007$). Therefore, the variables with normal distributions in the intervention and control groups were comparedby independent t-test,ANOVA, and Pearson’scorrelation coefficient.Thevariables with no normal distributionwere examined by Mann-Whitney test and Spearman’s correlation coefficient.Statistical analysis was performed using SPSS 21 software.

Results

Analysis of findings by Chi-square test showed no significant differences between the two intervention and control groups in terms of sociodemographic characteristics including age, GPA of diploma, hours of mobile use, residence, marital status, and interest in the field of study. The agesof students in the intervention and control groups averaged 19.96 ± 1.5 and 19.26 ± 0.8, respectively (Table 1). Mean levels of knowledge in the intervention and control groups scored 12.86 ± 2 and 10.16 ± 3.3, respectively, which were significantly different ($p = 0.001$) according tothe inferential tests (Table 2).

Table 3 represents a comparison between mean scores of learning motivation (19.75 ± 125.55) and (16.79 ± 99.89) in the intervention and control groups, respectively, which were significantly different based the inferential tests ($p < 0.001$).

As shown in Table 3, mean score of catheterization skill in the intervention group (9.3 ± 8.88 with a median of 89) was significantlyhigher than that of control group (5.6 ± 3.77 with a median of 78) ($p <0.0001$).

The percentage of excellent proficiency in the intervention (86.2%) and in the control (5.10%) groupsreveals to be highly significant based on Chi-square test ($p <0.0001$) (Table 4).

Results of ANOVA showed significant effects of training on the scores of all variablesincluding knowledge ($p = 0.001$), attention ($p <0.0001$), communication ($p < 0.001$), self-confidence ($p = 0.001$), satisfaction ($p = 0.013$), learning motivation ($p = 0.001$), and catheterizationskill ($p = 0.001$), respectively, according to the effect size (partial eta squared) and the power strength (Table 5). Descriptive comparisons indicated the highest effects of training on the catheterization skillscore (Eta2 = 0.513) and communication score (Eta2 = 0.373) with power = 1 and power = 0.999, respectively.

Table 1- Frequency distribution of qualitative variables (sociodemographic characteristics)

		Intervention group		Control group		Total		
		No.	Frequency (%)	No.	Frequency (%)	No.	Frequency (%)	Sig.
Marital status	Single	27	93·1	19	100	46	95·8	0·242
	Married	2	6·9	0	0	2	4·2	
	Total	29	100	19	100	48	100	
Residence	Abode	15	51·7	6	31·6	21	43·8	0·169
	Dormitory	14	48·3	13	68·4	27	56·3	
	Total	29	100	19	100	48	100	
Are you interested in your major?	No	2	6·9	2	10·5	4	8·3	0·656
	Yes	27	93·1	17	89·5	44	91·7	
	Total	29	100	19	100	48	10	

Table 2- Frequency distribution of quantitative variables (sociodemographic characteristics)

		No.	Mean	SD	Sig.
Age	Intervention	29	19·9655	1·56941	0·079
	Control	19	19·2632	0·80568	
GPA of diploma	Intervention	29	19·1072	0·75664	0·831
	Control	18	19·1583	0·85572	
Daily hours of mobile phone use	Intervention	29	6.·0690	2·54854	0·215
	Control	17	4·9412	3·50839	

Table 3- Comparison (mean ± standard deviation) of learning motivation and its dimensions, knowledge and practice in the intervention and control groups

Score	Intervention group			Control group			
	Mean	SD	Median	Mean	SD	Median	Sig.
Attention	41·66	7·77	40	34	5·10	3	0·0001
Communication	32·03	4·84	32	24·42	5·06	24	0·0001
Self-confidence	33	4·49	33	26·53	5·93	26	0·0001
Satisfaction	18·86	5·88	19	14·95	3·69	15	0·0007
Learning motivation	125·55	19·76	121	99·89	16·79	100	0·0001
Knowledge	12·86	2	13	10·16	3·30	10	0·001
Performance	88·8267	3·99168	89	78·2632	6·53063	78	0·0001

Table 4- Status of catheterization skill in the intervention and control groups

		Status of catheterization skill		Total	Sig.
		Satisfactory	Excellent		
Intervention group	No.	4	25	29	0·0001
	%	13·8	86·2	100	
Control group	No.	17	2	19	
	%	89·5	10·5	100	
Total	No.	21	27	48	
	%	43·8	56·3	10	

Table 5- Effects of training on all studied variables

Score of dependent variables	F-statistic	Sig.	Effect size	Test power
Knowledge	12·538	0·001	0·214	0·934
Attention	14·336	0·0001	0·238	0·960
Communication	27·387	0·0001	0·373	0·999
Self-confidence	18·492	0·0001	0·287	0·988
Satisfaction	6·675	0·013	0·127	0·715
Learning motivation	21·710	0·0001	0·321	0·995
Catheterization skill	48·552	0·0001	0·513	1

Discussion

The aim of this study was to determine the effect of mobile-phoneassistedtrainingabouturinary catheterization on learning motivation, knowledge, and performance of nursing students at Shahid Beheshti Faculty of Nursing and Midwifery in Rasht. The two groups of intervention and control were homogeneous with no significant differences in marital status, residence, interest in the field of study, age, GPA of diploma, and 24-h use of mobile phones ($p > 0.05$). In the present study, the training significantly affectedthe scores of all studied variables*viz*. knowledge, attention, communication, self-confidence, satisfaction, learning motivation, and catheterization skill, withcatheterization skill and communication scores, respectively, indicating the highest impacts oftraining based on descriptive comparisons. The motivation of intervention group was significantly higher than that ofthe control subjects.Most of the findings in the present study is in close agreement with those of previous studies on the effectiveness of mobile phone applications implying increased learning motivation and social interaction of students (Hartigan and et al., 2010; Bauman, 2016).

Keshavarz et al. observed that e-learning could nurture creative thinking, high motivation, self-confidence, better questioning, ability to work with information, improvements in communicational and social skills, critical thinking, and independent learning leading to progress in learning, whichisin agreement with our findings (Keshavarz and et al., 2013). In a study by Lee et al., amobile-phone installed application increased the learning motivation of nursing students. The ability to view and watch the clip successively led to reduced anxiety and increased self-confidence of students in intervention group (Lee and et al., 2016). Kamcheonli et al. investigated the effect of mobile phoneapplications on learning motivation and social interactionsand found that students actively employed mobile applications for complementary study materials, as well as for participating in classroom activities and clinical evaluationswith a great learning motivation (Li and et al., 2018). This finding is not surprising because the participants in the study were young people who use mobile phones as part of their everyday life, and their interest in using their smartphones can be a motivator for learning.

Lahti et al. observed no statistically significant difference in the study of satisfaction between conventional learning and e-learning (Lahti and et al., 2014). In the study of Holland et al., online filmsregarding drug administration in intervention group was more satisfactory than the control (Holland and et al., 2013).

In this study, the group of mobile-phone aided trainingpresented higher levels of knowledge with significant differences between the scores of traditional and mobile education groups,which were different from some studies.

Vichit Vechpaysal reported thatknowledge level scores of subjects in the traditional training group were higher than those of computer-based training.After three weeks, however,the test was re-performedand the scores of two other groups showed no significant differences,suggesting the fact that courses trained through traditional teaching are forgotten earlier (Vichitvejpaisal and et al., 2001).

In a study by Lahti et al., there were no statistically significant differences in the field of knowledge promotion in both e-learning and traditional e-learning groups (Lahti and et al., 2014).

Matt Cockeyon et al. presented evidencecontrary to the outcomes of our study (McCutcheon and et al., 2015). Most of other studies demonstrated no significant differences between learners' points in two traditional training and e-learning methods (Ni, 2013; Al-Qahtani & Higgins, 2013).

In a study by Forbes et al., e-learning influenced learning through film and multimedia, which is in line with this study (Forbes and et al., 2016). In a study by Lee et al., a mobile-installedapplication helped increase knowledge in nursing students (Lee and et al., 2016); this maybe because the application does not undergointerruptions in the Internet connection being always available. Their findings also showed that intervention group presented a significantly higher performance, as wasalso reported by most studies.

Forbes et al. studied the use of video clips to support the teaching and learning of nursing students' clinical skills.The use of films could increasingly boost the quality of clinical skills, but the author's recommendedmore research on the use of quality films in this area (Forbes and et al., 2016). In the study of Holland et al., online films regarding drug administration in intervention group were more satisfactory than the control (Holland and et al., 2013). O'Donovan et al. applied inexpensive tablets containing educational videos, which was associated with an increase in the physical examination skills of medical students, hence, the authors suggested to use and replace smartphones containing clinical skills videos in new training methods in cases where there are financial constraints and restrictions on Internet access (O'Donovan and et al., 2016).

In the study of Lee et al., an application installed on the mobile phone increased the learning motivation of nursing students (Lee and et al., 2016). The use of electronic tools increased the clinical skills of nursing students in a research by Haraldseys and Aase (Haraldseid & Aase, 2017).

Some studies have reported different results. In the study of Lahti et al., there were no statistically significant differences in clinical skills between two groups of traditional learning and e-learning (Lahti and et al., 2014). No significant differences were detected between two groups of mobile phone training and traditional method examined for the effectiveness of mobile phone intervention in improving student competence, self-sufficiency and quality of the clinical environment, however, significant differenceswere recordedafter five weeks of training (Strandell-Laine and et al., 2018). It was a one-weekinterventional study, which seemed to be a proper time to change the skills of students. Recently, mobile educationalapplicationshave been applied as part of learner-based training, and the results have shown that such applications can enhance the clinical knowledge and skills of medical students (O'Connor & Andrews, 2016; Clapper, 2013).

Conclusion

In line with the results of present study, previous studies have revealed that the knowledge and skills of students are significantly increased in terms of mobile application efficacy (Thukral and et al., 2014; Von and et al., 2012). In addition, the convenience handling of mobile phones improves the performance of health care providers (Low and et al., 2011). Further studies should investigatethe motivation of individuals before inclusion in the study in order to understand the effect of mobile-based learning on the outcomes of teaching and motivation.

Nowadays, mobile-phone mediated education method can be responsive to the needs of students due to the change in generations,the need for flexibility in teaching method, and the flexibility of the method. In this study, the limited number of research samples and the lack of sufficient co-operation among students due to study engagementsas well as running the trial in a single environment within a certain time limit can all be the limitations of the research. The study was conducted in two groups of nursing and midwifery in a single college and, in spite ofnecessarycoordinationto prevent the two groups of sharing the film, there was the possibility of sharing information in the two groups, as a possible limitation of this study.

An important finding of this study is that using a mobile-installed application increases the learning motivation, knowledge, and performance of students. It is, therefore,recommended that professors increase the learning experience of students and reinforce their self-learning behaviors by investigating various educational methods and the use of technology through engaging students in the learning process. Technology-based teaching can complement traditional learning, and practical learning using educational films programmed into a mobile device may affect the younger generation training. The clinical and practical training should focus on the design and production of educational films based on the cultural context of the society in the future.

Acknowledgments

The present research is based on the research project No. 320 at Guilan University of Medical Sciences. Herewith, the authors are grateful to the deputy director of research and technology at Guilan University of Medical Sciences for financial support of this research, as well as the professors and students participating in this study.

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