Original Article

Effect of smartphone-based education on knowledge and self-care of reproductive health in married students

Azam Karimi Vanestanagh, Azizeh Farshbaf-Khalili[1], Khalil Esmaeilpour[2], Mohammad Asghari Jafarabadi[3], Niloufar Sattarzadeh Jahdi

Abstract:

BACKGROUND: Education by smartphone-based software is a new method among the world's educational practices. Due to the lack of studies on the effect of this education on promoting knowledge and self-care behaviors of students' reproductive health this study aimed to determine the effect of smartphone-based software education on knowledge and self-care behaviors in the field of reproductive health.

MATERIALS AND METHODS: This RCT with 164 married female students (82 in each group) conducted from October 2019 to January 2020, in Tabriz University and Tabriz medical University. Participants were randomly allocated to two groups of educational intervention and control. Smartphone-based software education designed in four areas of reproductive health. Intervention group was trained for 4 weeks. The score of knowledge and self-care behaviors of participants in both groups were compared at baseline and 8 weeks after intervention. Data were analyzed by SPSS-23 software using Chi-square, independent t-tests, and analysis of covariance tests.

RESULTS: Eight weeks after the intervention, a significant increase was observed in the mean (standard deviation [SD]) score of overall knowledge for reproductive health and all its subdomains ($P < 0.001$), as well as in in the mean (SD) self-care score of reproductive health and all subdomains ($P < 0.05$), except for the family planning in the education group compared to the control group.

CONCLUSION: The findings indicate a significant effect of smartphone-based software on increasing students' knowledge and self-care in all areas of reproductive health except for family planning subdomain of self-care.

Keywords:

Knowledge, mobile application, reproductive health, self-care, smart phone, software

Department of Midwifery, Faculty of Nursing and Midwifery, Tabriz University of Medical Sciences, Tabriz, Iran, [1]Physical Medicine and Rehabilitation Research Centre, Aging Research Institute, Tabriz University of Medical Sciences, Tabriz, Iran, [2]Department of Psychology, Faculty of Education and Psychology, Tabriz University, Tabriz, Iran, [3]Department of Statistics and Epidemiology, Faculty of Health, Tabriz University of Medical Sciences, Tabriz, Iran

Address for correspondence:
Dr. Niloufar Sattarzadeh Jahdi, Department of Midwifery, Faculty of Nursing and Midwifery, Tabriz University of Medical Sciences, Tabriz, Iran.
E-mail: sattarzadehn@gmail.com

Introduction

One of the important dimensions of health in society is the reproduction health status of young people.[1] The components of reproductive health include counseling and information, education and communication about family planning, providing family planning services, education and providing care during pregnancy, safe childbirth and subsequent care, education and promotion of breastfeeding and care for mother and baby.[2]

Self-care is the conscious and purposeful actions and behaviors learned to provide, maintain, and improve people's health.[3] According to the concept of self-care, individuals are responsible for their own health management[4] and should strive to maintain and improve their desired

health by adopting healthy behaviors in life.[5] Therefore, in terms of reproductive and sexual health, individuals need to learn behaviors to help them take care of their health[6] and protect them from the adverse effects related to sexuality and reproduction.[7]

Since human beings can take responsibility for their own health, Orem expresses one of the main concepts of his model entitled as self-care concept and believes that each person has the self-care ability and transform it into purposeful self-care behaviors and roles. According to this model, self-care is a learnable behavior that can provide many of the needs of patients when they become ill or deviate from health.[8]

Obviously, different methods of health education have different effects on health issues, and determining the most effective and appropriate method can play a significant role in reducing costs and reworks in designing and implementing health education interventions.[9]

Studies show that today the internet, the media and friends are the main sources of information, especially for young people in the field of reproductive health.[10] A new field of educational technology that has received a lot of attention today is mobile app-based education and learning. In fact, this type of learning is an expanded form of e-learning.[11] Learning does not have to take place in a fixed environment or at a fixed time with available learning tools. Therefore, mobile app-based learning will be an integral part of the educational process in the future.[12]

Web-based and mobile app-based health interventions, which also known as E-Health and M-Health are behavioral-based methods or therapies designed to be delivered over the internet or the mobile operating system.[13] The use of mobile app-based and the web to improve health behaviors and services is a promising approach to global health that has increasingly been applied to linking young people to health information and services.[14]

There are studies in Iran conducted to evaluate the effect of using mobile based education on the emergency nurses' knowledge about the Emergency Severity Index,[15] determining the effect of e-learning education on primipar women's knowledge on neonatal care,[16] as well as evaluating the effect of distance learning through SMS on academic achievement and satisfaction of medical students.[17] Given the importance of reproductive health in young people and with regard to the previous studies, the researcher did not a study on the effect of education programs on promoting knowledge and self-care behaviors of students' reproductive health

based on smartphone-based software On the other hand, due to the innovation of the plan and the importance of software-based education on promoting healthy behaviors, the research team decided to conduct a study to investigate the effect of smartphone-based software on change of knowledge and self-care behaviors of reproductive health in married students as a susceptible population group in this field.

Materials and Methods

The present research is a randomized controlled clinical trial conducted from October 2019 to January 2020 in Tabriz city. The statistical population of the research included married female students living in dormitories of Tabriz University of Medical Sciences and Tabriz University. The inclusion criteria were being married, being female, studying, and living in dormitories of Tabriz University of Medical Sciences or Tabriz University, having an Android smartphone, the ability to use WhatsApp application, and Smartphone-based software. The exclusion criteria were graduation (graduation, cancellation, dismissal, etc.) and the end of the course for guest students at the time of the study.

The formula for the difference between the two independent mean using the software G * POWER (version 3.1.2) was used to determine the sample size and was calculated considering m = 9.21, m2 = 11.05, and sd1 = 3.04 sd2 = 04 and power of 85% for knowledge[18] n = 50 as well as considering m = 71.8, m2 = 105.8, and ssd2 = 8.9, SS1 = 1.9, and 85% power for reproductive health self-care,[19] n = 4 was calculated. Finally, the sample size was estimated 82 people for each group considering 10% possible drop and design effect = 1.5.

The present research started after obtaining the approval of the Ethics Committee of Tabriz University of Medical Sciences (IR. TBZMED. REC.1397.315) and registration in the Iranian Clinical Trials (IRCT20170705200334052N4). Tabriz University of Medical Sciences and Tabriz University each have four government dormitories. Sampling was performed from all 8 dormitories after obtaining signed informed consent. In this study, two dormitories from each of Tabriz University of Medical Sciences and Tabriz University were randomly assigned to the intervention group and two dormitories were assigned to the control group to prevent the possibility of information contamination. To hide the allocation, 8 closed opaque envelopes were assigned from 1 to 8 for 8 dormitories, and the names of the groups were written on paper and placed in the envelopes by the same person. The number of members of the intervention and control groups in each university and the number of people surveyed in each dormitory were equally selected. After

completing the questionnaires, the researcher returned the first envelope to the first dormitory, and the process continued.

In the dormitories of the intervention group, two sessions of invitational counseling were held based on the William w model. Purkey[20] with a 1-week interval for participants in groups of 10–12 people for 60–90 min to sensitize and challenge them to pay attention to reproductive health. At the end of the first session, smartphone-based software regarding reproductive health education was installed on their Android phone and it was recommended to be read within 4 weeks. In addition, members of the intervention group were invited to follow-up on the WhatsApp software in the group. To remind them reading the educational content through smartphone-based software, a phone call was made to them once a week. Two months after the intervention, the questionnaires were re-completed by both the study groups. The mentioned education software was also installed for the control group after the intervention.

The educational content of the software was compiled using valid sources and instructions of the Ministry and was designed by the researcher in the form of a software program and provided to the software engineer and designed in the form of a program that can be installed on Android phone (Android Studio).

Data collection tools included a researcher-made questionnaire consisting of three parts including Part 1 Demographic Information, Part 2 knowledge about reproductive health, and the Part 3 self-care behaviors of reproductive health.

Knowledge questionnaire included 40 questions in four areas of general reproductive health (14 questions), sexually transmitted diseases and AIDS (9 questions), family planning and contraception methods (8 questions), and diseases and disorders in fertility (9 questions). Three options were considered for each question (correct, incorrect, I have no idea). One point is considered for each correct answer and zero is considered for I have no idea and incorrect answers. The minimum and maximum score is zero and 40 points.

Self-care questionnaire

This questionnaire corresponded to the division of self-care activities of Orem's theory. The Self-Care Behavior Questionnaire includes 40 questions in four areas of RH. General reproductive health includes 10 questions, sexually transmitted diseases and AIDS include 11 questions, family planning and contraceptive methods include 5 questions, and diseases and disorders in fertility comprised 14 questions. For each question,

five options were considered according to the five-option Likert scale (1 at all, rarely 2, sometimes 3, most often 4, and always 5). The minimum and maximum scores can be equal to 40 and 200 points. The content validity was also used to determine the validity of the knowledge and self-care tools of the researcher-made reproductive health. In reviewing the face validity, the researcher asked the experts to provide the necessary feedback on which the questionnaire be modified after quality analysis of the tool based on the criteria of compliance with grammar, use of appropriate words, placement of items in their proper place, and appropriate scoring. Face validity was confirmed by them. In the content validity study, CVR and CVI levels were obtained equal to 92.8 and 98.9, respectively for knowledge tools, and 91.1% and 99.5%, respectively, for self-care tools, and their opinions were applied in the questionnaire. In this study, reliability was determined from two dimensions of reproducibility (ICC = Intra class correlation) and internal coherence (Cronbach's alpha coefficient) by pre-testing and retesting on 25 participants with a 2-week interval, which was 0.79 and 0.87 for knowledge and 0.84 and 0.80 for self-care, respectively. Then, the questionnaires were given to 10 students in terms of comprehensibility and the necessary corrections were applied before sampling.

The normality of quantitative variables by groups was investigated by Skewness and Kurtosis data. Independent t-test, Chi-square, and Fisher's exact test statistical test were used to compare the two groups in terms of demographic variables. Moreover, Independent t-test was used to compare the mean scores before the intervention between the two groups. The mixed model method was used to apply the cluster effect in the analysis. After applying the covariance structure, the effect of the intervention was investigated in two modes of basic adjusted and fully adjusted. The mean difference was adjusted and the 95% confidence interval (CI) was reported as the effect size. Data analysis was performed with SPSS Version 23 (IBM SPSS Statistics, IBM Corporation, Chicago, IL) at a significant level of 0.05.

Results

In this study, 188 married female students were surveyed during the sampling, of which 164 met the inclusion criteria who were selected for study and randomly divided into control and intervention groups (82 people in each group) [Figure 1]. Table 1 shows that the mean age (standard deviation [SD]) and SD of the subjects were 23.7 and 3.77, respectively, and other demographic characteristics of the participants in the two groups were similar except for the educational grade [Table 1].

Table 1: Demographic characteristics of participants in the intervention and control groups

Variable	Intervention (*n*=82), *n* (%)	Control (*n*=82), *n* (%)	*P*
Age (years), mean (SD)	24.4 (4.2)†	23.03†	0.002**
26-36	28 (34.1)	16 (19.5)	0.052#
18-25	54 (65.9)	66 (80.5)	
Level of education			
Bachelor	49 (59.8)	56 (68.3)	0.004&
Master degree	27 (32.9)	11 (13.1)	
PhD or medical assistant	6 (7.3)	15 (18.3)	
Having sexual relation	62 (75.6)	61 (74.4)	1.000#
Pregnancy history	12 (14.6)	12 (14.6)	1.000#
Having kids	9 (11)	9 (11)	1.000#
Unwanted pregnancy	5 (6.1)	6 (7.3)	1.000#
Abortion	2 (2.4)	4 (4.9)	0.682#
Economic status			
Middle	71 (86.6)	64 (78)	0.219#
High	11 (13.4)	18 (22)	
Husband's education			
High school graduate or lower	11 (13.4)	11 (13.4)	0.156&
Bachelor	53 (64.6)	41 (50)	
Postgraduate	18 (21.9)	30 (36.6)	
Husband's job			
Self-employee	40 (48.8)	31 (37.8)	0.078$
Employee	29 (35.4)	26 (31.7)	
Another	13 (15.9)	25 (30.5)	
Marriage			
Living with spouse	61 (74.4)	61 (74.4)	1.000#
Separate	21 (25.6)	21 (25.6)	

†These variables were reported as mean (standard deviation), **Independent *t*-test, #Fisher's exact test, $Chi-square test, &Chi-square-by trend
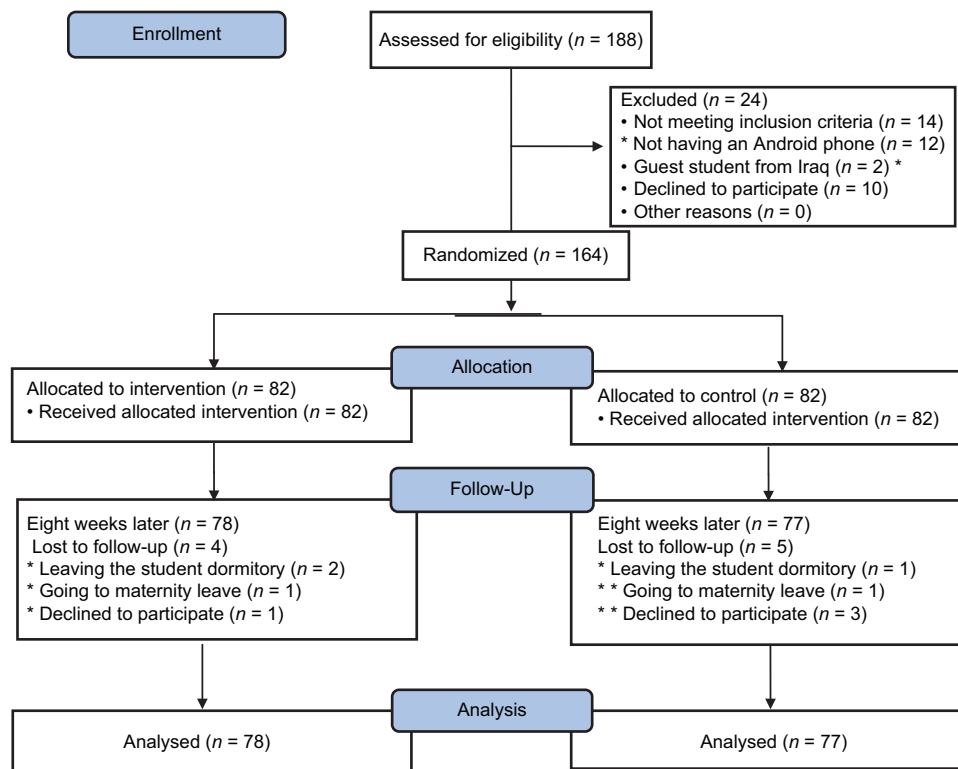

Figure 1: Flow Diagram of the study

The mean (SD) of total knowledge scores in the intervention group was 19.7 (6.5) before the intervention and 20.63 (7.35) in the control group. Eight weeks after the intervention, it reached 31.2 (6.8) for the intervention group and 22.4 (5.7) for the control group (adjusted Difference (AD): 8.8; 95% CI: 6.5–11.1; $P < 0.001$). The subdomain scores of general reproductive health, sexually transmitted diseases and AIDS, family planning and contraception, and prenatal diseases and disorders were similar in the two groups ($P > 0.05$). However, after the intervention, a significant increase was observed in the intervention group in all areas compared to the control group ($P < 0.001$) [Table 2].

The mean (SD) of the total score of self-care behaviors before the intervention was 147.6 (20.05) in the intervention group and 146.5 (26.2) for the control group ($P > 0.05$). However, the mean (SD) score of self-care behaviors increased significantly 8 weeks after the intervention in the intervention group (162.06 (17.98) (compared to the control group (151.3 (26.6)) (aD: 11.6; 95; % CI: 6.7–16.5; $P < 0.001$). The subdomain scores of general reproductive health, sexually transmitted diseases and AIDS, family planning and contraception, and prenatal diseases and disorders were similar in the two groups ($P > 0.05$). However, 8 weeks after the intervention, a significant increase was observed in all subdomains ($P < 0.05$) compared to the control group [Table 3].

Discussion

The purpose of this research was to investigate the effect of smartphone-based software training on the knowledge and self-care behaviors of reproductive health of married students. The results showed the positive effect of this education on the knowledge and self-care behaviors of reproductive health in married students. This issue also shows an increase in people's interest in using educational technologies.

In line with this research, in the cross-sectional study by Leey and Moon[21] mothers' use of the mobile app allowed them to perform postpartum care on a regular basis, as well as increase their knowledge of proper diet. Although the outcome was different with our study, in both studies only women of childbearing age were examined after education through mobile app. A semi-experimental study in Gachsaran, Iran,[22] showed a positive effect of implementation of educational program on increasing knowledge among patients with type 2 diabetes in the intervention group. Despite the diversity of the research community and type of education, the alignment of this study with our results can be in random selection of individuals and the use of education in increasing people's awareness.

The study of Hebert LE *et al*.[23] showed that the literacy and interest of the intervention group in learning about long-term methods of reversible prevention has increased using mobile phone application. The result was not immediately apparent, but users of the app had more knowledge than those under control 3 months later. The reason for similar results with our study may be the randomly selection of participants and using mobile phone software as an educational tool. The findings of these three studies consistent with the present study show that the use of mobile phones can be useful for increasing the users' knowledge and self-care. Reproductive health education is the first and foremost step in increasing the knowledge and skills needed to make informed, responsible, and healthy

Table 2: Comparison of the mean knowledge score on reproductive health and its subdomains among the study groups

Variable	Mean (SD)		Adjusted differences (95% confidence interval)	P
	Intervention group	Control group		
Total knowledge (0-40)				
Baseline	19.7 (6.5)	20.6 (7.4)	-	0.405
After intervention	31.2 (6.8)	22.4 (7.5)	8.8 (6.5-11.1)	<0.001
General reproductive health (0-14)				
Baseline	8.5 (2.4)	8.4 (2.9)	-	0.792
After intervention	11.5 (2)	9 (2.8)	2.5 (1.9-3.1)	<0.001
Sexual transmitted diseases (0-9)				
Baseline	3.7 (1.8)	3.8 (2)	-	0.744
After intervention	6.9 (1.8)	4.5 (2.1)	2.5 (1.9-3.1)	<0.001
Family planning (0-8)				
Baseline	2.1 (2.1)	3.1 (2.1)	-	0.004
After intervention	5.5 (2.2)	3.1 (2.2)	2.9 (2.3-3.5)	<0.001
Disorders* (0-9)				
Baseline	5.4 (1.8)	5.3 (2.07)	-	0.841
After intervention	7.3 (1.7)	5.6 (2.03)	1.6 (1.1-2.1)	<0.001

Independent *t*-test was used to compare baseline values and ANCOVA adjusted for baseline values was used to compare after intervention values. for . *Disorders included gynecological cancers, infertility. SD=Standard deviation

Table 3: Comparison of the mean self-care score on reproductive health and its subdomains among the groups

Variable	Mean (SD)		Adjusted differences (95% confidence interval)	P
	Intervention group	Control group		
Total self-care (40-200)				
Baseline	147.6 (20.5)	146.5 (26.1)	-	0.748
After intervention	162 (18)	151.3 (26.6)	11.6 (6.7-16.5)	<0.001
General reproductive health* (10-50)				
Baseline	37.6 (5.1)	36.8 (6.8)	-	0.400
After intervention	41 (4.9)	37.9 (6.7)	2.8 (1.4-4.2)	<0.001
Sexual transmitted diseases (11-55)				
Baseline	42.8 (7.4)	42.6 (8.1)	-	0.843
After intervention	45.7 (5.9)	43.3 (7.5)	2.7 (0.9-4.4)	0.003
Family planning (5-25)				
Baseline	17.8 (4.4)	18.2 (4.6)	-	0.501
After intervention	19.3 (4.1)	18.9 (4.5)	0.63 (−0.57-1.8)	0.298
Disorders** (14-70)				
Baseline	49.5 (8.4)	48.9 (11)	-	0.685
After intervention	56.1 (8.2)	51.1 (11.6)	5.2 (3-7.4)	<0.001

Independent *t*-test was used to compare baseline values and ANCOVA adjusted for baseline values was used to compare after intervention.values.*Disorders included gynecological cancers, infertility. SD=Standard deviation

decisions, as well as protecting young people from the dangers of reproductive and sexual problems.[24]

The present study indicated that the mean of self-care scores in the intervention group increased significantly compared to the control group after 8 weeks of smartphone-based software education, which shows the positive effect of using smartphone-based software on married women's self-care. As Orem believes, people have the ability to take care of themselves, which makes them the goals and behaviors of self-care. According to this model, self-care is a learnable behavior that can provide many of the needs of patients when they become ill or deviate from health.[8] This study is consistent with the study by Karimi *et al*.[25] that was conducted according to the self-care model of Orem to examine the awareness, skills, and abilities of self-care in both experimental and control groups. The level of awareness, skill, and self-care in colorectal cancer patients was low before the intervention, but was moderate after the intervention. In the study by Oshvandi *et al*.,[26] the researchers conducted self-care training for 66 patients with implantable cardiac defibrillators within a month, which was question-and-answer based on face-to-face training. The results of this research showed that the scores of patients in the experimental group increased in the field of knowledge, desire, skill, and self-care ability. This increase in scores indicates the effectiveness of Orem's self-care education in these patients. Despite the differences in the research community, the reason for the alignment of these two studies with the present study could be in the use of educational method based on the self-care pattern of Orem.

The study by Kulathinal *et al*.[27] showed that the use of reversible contraceptive methods (18% increase in the intervention area versus 2% increase in the control area) increased using mobile application. The results of this study are consistent with the present research on general self-care. The reason for the inconsistency of this study in the field of family planning can be due to differences in the participants and duration of intervention.

In the study by McCarthy *et al*.,[28] there was no evidence of a difference in the ability to accept contraceptive methods using application of mobile apps. The results of this study are consistent with the present research in terms of family planning. It seems that face-to-face along with mobile apps training or longer interventions with more interactions between the counselor and the client is needed to increase the effectiveness in family planning and preventing pregnancy. The alignment of these two studies could be due to the use of mobile phones to educate individuals. Although a number of the above studies have shown the effectiveness of mobile software training, none of these studies have examined the effect of this type of education on different areas of reproductive health.

One of the strengths of this plan was the use of a password to use educational software, which made it impossible for anyone other than the intervention group to use the educational content of the software. Using the smartphone-based software education method has always been associated with challenges, such as having an Android phone and installing software with the original password, etc. However, the main limitations of this study for students were the large number of questions in the questionnaire and the rather short follow-up time, which made some participants tired. Therefore, it is recommended to use shorter questionnaires and longer

follow-up time for participants. It is recommended to conduct this research on other youth groups in other centers and not just educational settings. Moreover, studies with a longer follow-up period and other training methods based on modern technologies such as E-Health and M-health should be performed.

Conclusion

The results of the research illustrated that training based on smartphone-based software was effective in increasing the knowledge and self-care of medical students and Tabriz University except for self-care in the field of family planning. It is recommended to continue this software education along with face-to-face education in this area. Given that insufficient knowledge of reproductive health can affect the future of individuals, especially young people, and put them at irreparable danger, having well-written educational programs and using up-to-date and popular methods can be a way to raise awareness and improve self-care behaviors and prevent the consequences of these risks. On the other hand, designing a proper educational program for students becomes very important because not only the health of this stratum but also the health of society depends on their level of knowledge and type of performance.

Conflicts of interest
There are no conflicts of interest.

References

1. Doulatian M, Hajian S, Simbar M, Alavi MH. Knowledge and Attitude of Nonmedical Students Regarding Reproductive Health; 2007;16;3-11
2. Detels R, Tan CC. Oxford Textbook of Global Public Health. USA: Oxford University Press; 2015.
3. Alimoradi Z, Kariman N, Ahmadi F, Simbar M, AlaviMajd H. Development and psychometric properties of the female adolescents' sexual reproductive self-care scale. Int J Adolesc Med Health 2019;316;38.
4. Naue U. 'Self-care without a self': Alzheimer's disease and the concept of personal responsibility for health. Medicine, Health Care Philosophy 2008;11:315.
5. Richard AA, Shea K. Delineation of self-care and associated concepts. J Nurs Scholarsh 2011;43:255-64.
6. Women U, UNICEF. International Technical Guidance on Sexuality Education: An Evidence-Informed Approach. UNESCOs ISBN 978-92-3-100259-5 UNESCO Publishing; 2018.
7. World Health Organization. The Sexual and Reproductive Health of Younger Adolescents in Developing Countries: Research Issues in Developing Countries: Background Paper for Consultation. World Health Organization; 2011.
8. Valizadeh S, Aliafsari E, Moghbeli G, Soheili A. Applicablity of Orem's self-care model in Iran: An integrated review. J Urmia Nurs Midwifery Fac 2017;15:313-28.
9. Didarloo A, Pourali R, Gharaaghaji R, Rahimi B. Comparing the effect of three health education methods on the knowledge of health volunteers regarding breast self-examination. J Urmia Nurs Midwifery Fac 2014;12:109-16.
10. Rahmanian SA, Khadivzadeh T, Esmaily H. Comparison of the effect of group counseling and integrated counseling (group and individual) on sexual knowledge and attitude in women on the verge of marriage. Iran J Obst Gynecol Infert 2017;20:77-88.
11. Hanafi HF, Samsudin K. Mobile learning environment system (MLES): The case of Android-based learning application on undergraduates' learning. arXiv 2012;3;3
12. Lee KB, Salman R. The design and development of mobile collaborative learning application using android. J Inform Technol Appl Educ 2012;1:1-8.
13. Andersson G. Internet interventions: Past, present and future. Internet interventions. 2018;12:181-8.
14. Ippoliti NB, L'Engle K. Meet us on the phone: Mobile phone programs for adolescent sexual and reproductive health in low-to-middle income countries. Reproduc Health 2017;14:11.
15. Yazdannik A, Dsatjerdi EI, Mohamadirizi S. Utilizing mobile health method to emergency nurses' knowledge about Emergency Severity Index triage. J Educ Health Promot 2018;7:10.
16. Mohamadirizi S, Fahami F, Bahadoran P. The effect of E-Learning education on primipar women's knowledge about neonatal care. Iran J Neonatol IJN 2013;4:24-7.
17. Sichani MM, Mobarakeh SR, Omid A. The effect of distance learning via SMS on academic achievement and satisfaction of medical students. J Educ Health Promot 2018;7:29.
18. Mahmood-Abad SSM, Shahidi F, Abbasi-Shavazi M, Shahrizadeh F. Evaluating knowledge, attitude and behavior of women on reproductive health subjects in seven central cities of Iran. J Reproduc Infertility 2007;7;4
19. Kabirian A, Abedian Z, Mazloum SR, Kabirian M. The effect of self-care behaviors based on evidence-based education on the severity of dysmenorrhea amongst girls. J Torbat Heydariyeh Univ Med Sci 2017;5:26-31.
20. Schmidt JJ. Invitational counselling: An expanded framework for comprehensive school counselling programs. Canadian J Counselling 1997;31:6-17.
21. Lee Y, Moon M. Utilization and content evaluation of mobile applications for pregnancy, birth, and child care. Healthcare Inform Res 2016;22:73-80.
22. Jalilian F, Zinat Motlagh F, Solhi M. Effectiveness of education program on increasing self management among patients with type II diabetes. Scientific J Ilam Univ Med Sci 2012;20:26-34.
23. Hebert LE, Hill BJ, Quinn M, Holl JL, Whitaker AK, Gilliam ML. Mobile contraceptive application use in a clinical setting in addition to standard contraceptive counseling: A randomized controlled trial. Contraception 2018;98:281-7.
24. Lou C-h, Zhao Q, Gao E-S, Shah IH. Can the Internet be used effectively to provide sex education to young people in China? J Adolescent Health 2006;39:720-8.
25. Karimi S, Vanaki Z, Bashiri H. The effect of Orem self-care ability of patients with colorectal cancer. Avicenna J Nurs Midwifery Care 2016;24:105-12.

26. Oshvandi K, Keshmiri K, Salavati M, Emkanjoo Z, Musavi S. Effectiveness of education based on Orem's self-care model in self-care activity of patients with implantable cardioverter defibrillators. Hayat 2014;19:47-55.

27. Kulathinal S, Joseph B, Säävälä M. Mobile Helpline and Reversible Contraception: Lessons from a controlled before-and-after study in Rural India. JMIR mHealth uHealth 2019;7:e12672.

28. McCarthy O, Ahamed I, Kulaeva F, Tokhirov R, Saibov S, Vandewiele M, *et al*. A randomized controlled trial of an intervention delivered by mobile phone app instant messaging to increase the acceptability of effective contraception among young people in Tajikistan. Reprod Health 2018;15:28.