

Comparison of the effect of multimedia and illustrated booklet educational methods on women's knowledge of prenatal care

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ABSTRACT

Background: E-learning can increase knowledge in patients and provide an efficient way to enhance the personnel-patient interaction as well as patient-specific education materials. So, the aim of this study was to compare the effects of two methods, multimedia and illustrated booklet educational method, on primigravida women's knowledge of prenatal care.

Materials and Methods: This was a quasi-experimental study based on pre- and post-tests carried out on 100 primigravida women (50 in electronic and 50 in illustrated booklet groups) referring to Navabsafavi Health Center of Isfahan University of Medical Sciences in 2012. Subjects were randomly divided into two groups of learning interventions, including multimedia and illustrated booklet. Subjects' knowledge scores were collected using a researcher-made questionnaire with 50 questions.

Results: Before training, the mean scores (out of 50) of knowledge in e-learning and illustrated booklet education groups were 29.21 ± 7.4 and 30.01 ± 6.4 , respectively. The difference between the mean scores was not significant 4-6 weeks after education. The score was 44.74 ± 3.4 in the e-learning group and 40.74 ± 6.4 in the illustrated booklet group, which showed a statistically significant difference ($P < 0.01$). Also, the level of knowledge increased in e-learning and illustrated booklet groups as 61% and 37%, respectively.

Conclusion: This study showed that the courses of e-learning training improved the knowledge of pregnant women to a higher extent compared to illustrated booklet education. Therefore, different aspects of e-learning, including computer literacy and infrastructure of telecommunications, should be revised.

Key words: Iran, knowledge, learning, multimedia, pregnant women

INTRODUCTION

Prenatal care is one of the most important components of women's health care and plays a key role in reduction of their mortality.^[1,2] During the frequent visits, not only mother's and fetus's health are noted, but also necessary education, as one of the factors to prevent mortality and prenatal complications, is given to the mothers.^[3] Most of the maternal mortalities can be prevented through empowerment of available and quality prenatal health services centers.^[4] Preventive medicine and promotion of individuals' awareness is the quickest way to achieve public health. Based on the World Health Organization (WHO) emphasis on maternal care, paying close attention to promotion of parents' awareness, especially of mothers, is essential.^[5]

Now, provision of the required prenatal education, according to a standard prenatal care program, is not appropriately conducted in Iran.^[6] Education is a base on which culture, knowledge, and technology are founded, as the development and progress of the society needs a dynamic culture, knowledge, and endogenous technology.^[7]

In the new form of education, it is not essential to educate the individuals necessarily in educational centers with closed walls, but it can be extensively conducted at public access with adequate flexibility out of a specific time and place.^[8] E-learning refers to personal education in which the learners can achieve educational goals based on their talents, and in fact, learn how to learn, which is one of the goals of education, and learning goes on in the whole of life. This type of education is the most important application of information technology, which is provided in the form of open-line learning with various modes, such as computer-based learning and web-based learning, and closed-line learning.^[7]

Modification of a message for a specific situation related to a local community sometimes faces problems as the

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individuals' needs may vary from the rest of the society.^[9] Therefore, application of an electronic educational method with consideration of appropriate interactive environments, as well as making virtual environments more attractive to stimulate the learners are recommended.^[10] Research showed that virtual method has better facilities and conditions for learners concerning the place, time, and economic aspects. Virtual education is one efficient way to promote education level.^[7] Therefore, as virtual education is, nowadays, an important issue in continuing education in all professions, it is also recommended in nursing.^[7] These types of programs can improve and promote health providers' education programs and are learner based, so that the learners can tailor the time, place, speed, and content of these programs with their demand and needed information.^[11] In this program, in addition to text, there are pictures, animation, and sound, which can lead to a longer mental recall and better learning of the materials. In virtual education, information can be given to the learners at home, on a trip, or at any time they like, and then, can be printed if needed.^[12] In the lecture method, the taught materials may be forgotten. On the other hand, the treatment team staffs may lay little emphasis on prenatal and postnatal care due to their load of work and frequent tasks. On the contrary, in computer-based programs, the taught materials can be reviewed in case of learners' lack of perception or they being absent-minded. Health care personal should be aware^[13] of this latter issue. With regard to the importance of more efficient and appropriate educational methods in prenatal care and various educational methods currently used in the society, especially in the domain of health and treatment (more often through lectures and pamphlets),^[14] we decided to investigate the effect of multimedia and illustrated booklet educational methods on the knowledge of primigravida women referring to Navabsafavi Health Care Center in Isfahan.

MATERIALS AND METHODS

This was a quasi-experimental two-group study conducted on 100 primigravida women (50 in multimedia educational group and 50 in illustrated booklet group) referring to Navabsafavi Health Care Center in Isfahan in 2012. The inclusion criteria were being primigravida, having Iranian nationality and residing in Isfahan, gestational age 6-12 weeks, having at least the literacy to read and write Persian, having a computer or a VCR at home and being able to use them, being able to speak, hear, and see, lack of a high-risk pregnancy, not being a working staff of medical sciences affiliated units, and not having attended delivery preparation classes. Sample size was calculated as 42 subjects in each group (total of 84 subjects) after a pilot study was conducted on 20 women (10 women in

each group) and by the use of mean comparison formula (with CI = 95% and power = 90%). With 20% as the rate of possible subjects' dropout during the study and to have the upmost assurance for adequate number of subjects, the total number of subjects was calculated to be 100.

The researcher referred to Navabsafavi Health Care Center in Isfahan after obtaining approval for the study from the ethics committee of Isfahan University of Medical Sciences. In order for a homogenous conventional prenatal care education, it was tried to conduct the education with matched subjects in both groups. Therefore, just one health care center was selected (Navabsafavi). Sampling was by convenient sampling method, in which among the women daily referring to the center, one was randomly assigned to the multimedia group and one to the illustrated booklet group. At first, the researcher selected the qualified subjects based on the subjects' selection checklist and inclusion criteria, gave them an informed consent form to sign, and explained the goal of research to them. Then, before any education was given, a questionnaire of personal, familial, and fertility characteristics and a questionnaire of mothers' awareness of prenatal care were filled by the subjects in both groups. The 50-item questionnaire of prenatal care education included five educational dimensions of personal, psychological, and sexual health (10 questions), nutrition and medicational complements (10 questions), benefits, preparation, and appropriate place for natural delivery (8 questions), breast feeding and family counseling (10 questions), and infants' care and high-risk infants' signs (12 questions), which were scored by true, false, and no idea options with a score range of 0-50. Due to lack of availability of a standard questionnaire in this field, such a questionnaire was designed through use of countrywide national project, references, and textbooks, and its validity was confirmed by five faculty members of the nursing and midwifery school. Its reliability was confirmed by use of a pilot study (conducted on 10 pregnant women) and calculation of Cronbach's alpha ($\alpha = 0.94$).

In order to make the study blinded, the statistician cooperating with the researchers was unaware of the group assignments until the final results were obtained.

In the group of multimedia, after the midwifery personnel visited the pregnant women, a CD was given to them. The CD contained prenatal care education through text, pictures, animation, and sound, as well as a slideshow. Access to internet was not possible for all women in the form of an open line in the present study, and it was found that in similar studies, the materials were taught through multimedia method. On the other hand, the internet speed is so low that it leads to low quality of sound and image in

online education in Iran. Therefore, educational content was in the format of a web page or Flash Video (FLV), Windows Media Video (WMV), and MPEG-4 (MP4), as these formats can be used in a closed-line web. After explanation was given to the pregnant women as to how to use the CD, they were informed that they would be asked some related questions 4-6 weeks later.

In the second group, after being visited and educated by the midwifery personnel, the subjects were given an educational booklet that contained text with pictures (illustration). The subjects were asked to study the material, and 4-6 weeks later, an awareness questionnaire was again filled for them through a phone call. Education content in both multimedia and illustrated booklet education groups, designed by the researcher, was similar.

Any subject's questions concerning education and the software as well as other questions, asked on phone, were answered.

The data were analyzed by independent *t*-test, paired *t*-test, and chi-square test through SPSS version 14. Significance level was considered as 0.05.

RESULTS

The results showed that 61% of the subjects had education ≤ high school diploma and 39% had university education. About 90% were homemakers, 89% had adequate income, and 87% of pregnancies were unexpected [Table 1].

The source of obtained information in both groups has been presented in Figure 1.

Both groups were homogenous concerning subjects' occupation ($P = 0.351$), education ($P = 0.221$), and unexpectedness of pregnancy ($P = 0.760$).

[Table 2] shows that the mean scores of awareness about prenatal care increased significantly after intervention compared to before intervention in both groups of multimedia method and booklet.

In addition to these changes, awareness scores in both groups showed the highest increase in multimedia (61%) compared to illustrated booklet group (37%). Mean difference results showed a significant difference in the percentage of awareness score change (an increase) in both groups ($P = 0.002$).

The highest and the lowest mean scores, obtained in various dimensions of awareness before and after intervention in

Table 1: Comparison of mean qualitative variable scores between the educational groups before the study

Educational group Variables	Educational group				P value
	Multimedia		Booklet		
	Mean	SD	Mean	SD	
Age (years)	25.1	3.12	25.3	2.02	$P=0.951$
BMI (kg/m ²)	25.1	0.01	24.4	1.32	$P=0.758$
Gestational age (months)	21.1	0.03	20.4	0.08	$P=0.463$
Spouse's age (years)	28.9	0.08	29.6	0.04	$P=0.397$

BMI, body mass index

Table 2: Comparison of mean scores of primigravida women's awareness with prenatal care education before and 4 weeks after intervention in two groups of multimedia and illustrated booklet

Educational group	Educational group				Independent t-test
	Multimedia (n = 50)		Illustrated booklet (n = 50)		
Awareness scores	Mean	SD	Mean	SD	
Before intervention	29.21	7.4	30.01	6.4	$P=0.234, t=-6.64$
Four weeks after intervention	44.74	3.4	40.74	6.4	$P=0.001, t=-8.64$
Paired t-test	$P=0.001, t=-11.31$		$P=0.001, t=-8.64$		

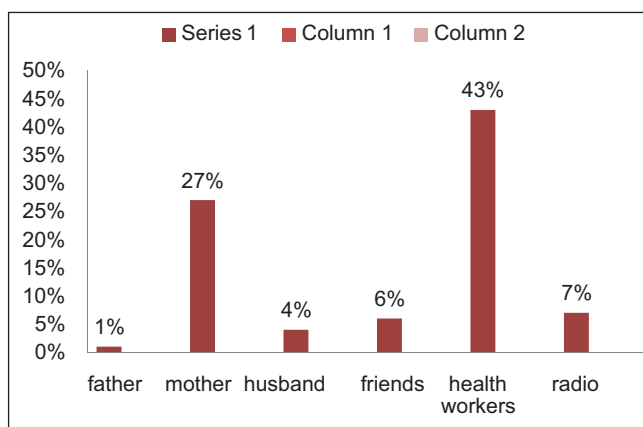


Figure 1: Frequency distribution of subjects based on the source of obtained information of prenatal education

both multimedia and illustrated booklet groups, were for health and preparation for delivery, respectively [Table 3].

DISCUSSION

The findings showed that the mean total score of awareness had a significant increase after intervention compared to before intervention in both groups, which reveals the

Table 3: Mean scores of primigravida women's awareness dimensions concerning prenatal education before and 4-6 weeks after intervention in both groups of multimedia and illustrated booklet

Awareness dimensions	Educational group							
	Illustrated booklet				Multimedia			
	Before intervention		After intervention		Before intervention		After intervention	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Personal, psychological, sexual, health	7.13	1.1	10.12	1.0	6.02	1.6	10.02	1.4
Nutrition	6.4	1.2	9.4	1.3	6.6	1.7	9.0	1.2
Delivery preparation	5.2	1.1	8.3	1.3	5.1	1.1	7.1	1.3
Breast feeding	6.6	1.1	9.6	1.2	6.8	1.5	7.5	1.4
Infants' care	5.4	1.2	9.5	1.1	5.5	1.2	8.7	1.3

efficiency of both education methods in increasing the mean total score of awareness. In addition, the results showed that education resulted in an increase in the score of women's awareness in all dimensions of prenatal care in both groups. In the study of Kue (2009), there was a significant difference in the score of awareness 2 weeks after education in both multimedia and conventional method groups, and the score of awareness increased to 7.2 and 1.7 in the intervention and control groups, respectively ($P < 0.001$).^[13] Huang (2007) reported an increase in breast feeding awareness score from 14.7 to 19.2, two weeks after intervention, and an increase in the score of breast feeding attitude from 97 to 103 in the study group. There was a significant difference concerning breast feeding awareness and attitude ($P < 0.001$).^[12] The results of the present study showed that multimedia method increased the level of pregnant women's awareness about prenatal care up to 6 weeks after intervention. Gustafson *et al.* (2001) showed there was a significant difference in two groups of computer education and brochure education, concerning awareness of breast cancer in the US.^[15] Murray *et al.* (2001) showed that although use of computer and multimedia increased patients' awareness of primary care in hypertrophied prostate patients, the difference between these two groups (multimedia and conventional) was not significant.^[16] Meanwhile, our results showed the efficacy of both methods of multimedia and illustrated booklet.

Figure 2 shows that there was a significant difference in percentages of awareness scores in the two groups, and the percentage of awareness score change was more in the multimedia group compared to the illustrated booklet group.

Therefore, the effect of multimedia in improvement and promotion of awareness level is more. In Mangeli's study (2008), pamphlets containing physical and psychological changes of pregnant women were used, and before and 1 month after, marital satisfaction pamphlets were filled. The results showed that the level of marital satisfaction increased from 168.7 to 187.3 after education in the study

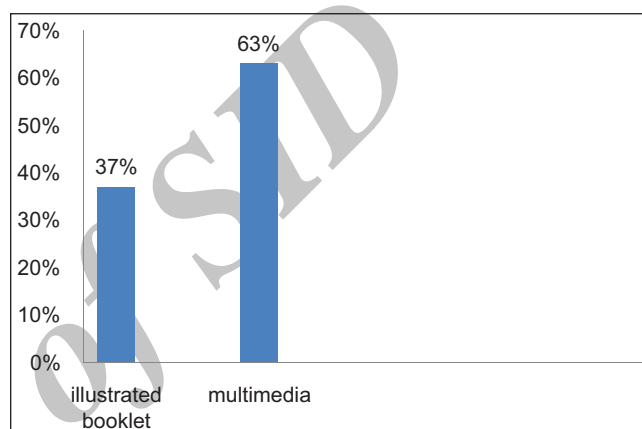


Figure 2: Comparison of awareness score increase percentage after intervention in multimedia and illustrated booklet groups

group.^[17] Davis (2002) showed that pamphlet presentation was more efficient than the conventional method, as the visits to physicians dropped from 20% to 2% after education with a booklet.^[18]

Meanwhile, Hosseini showed that pamphlet education was ineffective on students' awareness. He reported the reason of this ineffectiveness as subjects not reading the pamphlet.^[14] Langkamp (2006) concluded that verbal education accompanied with written education was more effective than just verbal education.^[19] In fact, in multimedia method, the verbal information, in addition to written form together with animation can be available to learners at home, on a trip, or whenever they need, and then, can be printed if needed. The ability to regulate working mothers' education with their work schedule is another advantage of this educational method, while inability to use a computer, low speed of internet, and impossibility of downloading many educational materials are among the limitations of web-based education. On the other hand, multimedia method can act as an important source of health information for those who are not used to reading books and articles. Although in all studies the criterion of learning is the obtained score from the test, multimedia

method seems to cause a deeper learning in the learners, as in this method, the learners are responsible for their own learning and the emphasis is on production of knowledge and not necessarily on obtaining knowledge.^[10,20,21] The obtained results of the present study showed higher effect of multimedia method in the increase of awareness level, compared to illustrated booklet education method.

Therefore, conducting educational programs can have an effective role on increasing and promoting pregnant mother's awareness. Based on the obtained results of the present study, it is suggested to apply multimedia education along with the conventional method in health care centers due to its less cost and time needed.

CONCLUSION

The results of this study showed higher effects of multimedia method and revealed that the increase in levels of mothers' knowledge of prenatal care was more in the multimedia than the illustrated method. This method can be a solution for managers planning a prenatal education outline, modification and promotion of learners' levels of a knowledge that leads to lower costs and time saving for healthcare providers.

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