

## Research Paper

## Effectiveness of Virtual and In-person Methods of Education on Pregnant Women's Satisfaction With Childbirth Preparation Classes: A Pilot Study

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**ABSTRACT**

**Background:** Childbirth preparation classes are among the most important components of pregnancy education. This pilot study was conducted to compare the level of satisfaction of pregnant women from holding childbirth preparation classes using two methods of virtual and in-person training.

**Methods:** This is a quasi-experimental post-test pilot study that was performed on 30 nulliparous women in Milad Hospital affiliated with Iran's Social Security Organization, Tehran, Iran from September 2019 to June 2020. The subjects were recruited by convenience sampling and then were assigned voluntarily to two groups of virtual (n=15) and in-person (n=15) training. Both groups received the same educational content on childbirth preparation at 20 to 37 weeks of pregnancy. The virtual educational content was designed based on Mayer's multimedia principles and shared through the Telegram application. The courses were held in eight 2-hour sessions. The satisfaction questionnaire was completed by the participants at 36-38 weeks of pregnancy. The significance level was set at  $P \leq 0.05$ .

**Results:** There was a significant difference between the total score of satisfaction with childbirth preparation courses between the virtual group compared to the in-person training group ( $P=0.028$ ). Also, the results showed that the virtual group was able to significantly attract the spouse's participation in accepting the role of parent compared to the in-person group ( $P=0.05$ ). Also, 100% and 46.7% of the virtual and in-person groups, respectively, were completely satisfied with the way the educational content was presented ( $P < 0.01$ ).

**Conclusion:** Considering the greater satisfaction of pregnant women with virtual training compared to in-person training and its important role in attracting the participation of the spouse and considering that in-person classes are held as a national routine, virtual classes are recommended to be held alongside in-person classes. It is also recommended to use a larger sample size and random allocation in future studies.

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## Highlights

- Childbirth preparation classes are among the most important components of pregnancy education.
- In recent years, the approach to healthcare education has changed, which is associated with increased access to information through virtual networks and the Internet.
- The results showed that the virtual group's satisfaction with childbirth preparation courses was higher than the in-person training group, and this difference was statistically significant.
- The virtual training group was able to significantly attract the spouse's participation compared to the in-person training group.

## Plain Language Summary

Education during pregnancy is very important for improving the health of the mother and child. This study was conducted to compare the satisfaction of pregnant women from childbirth preparation classes using two methods of virtual and in-person training. The results showed that the virtual training group was able to attract the husband's participation in accepting the role of a parent compared to the in-person training group. The results showed that the virtual group's satisfaction with childbirth preparation courses was higher than the in-person training group.

### 1. Introduction

Childbirth preparation courses with the ultimate goal of improving lifestyle during pregnancy, delivery, and after delivery, as well as protecting the rights of pregnant women and fetuses, are held mostly in the form of in-person courses, during the 20th to 37th weeks of pregnancy (Turkzahrani et al., 2012; Lee & Holroyd 2009). Information on how to participate in childbirth preparation classes to receive routine care is given to each pregnant woman referring to public and private healthcare centers. Providing quality prenatal care is the most effective factor in improving the results of pregnancy and childbirth. The advantages of childbirth preparation classes include eliminating pregnancy and delivery misconceptions, improving mother's self-confidence regarding labor and childbirth, empowering women to select a safe delivery method, reducing the need for analgesics during labor and childbirth, improving the interaction of pregnant women with obstetric care providers, increasing satisfaction with the delivery experience, and increasing breastfeeding success (Masoumi et al., 2016). On the other hand, inadequate or lack of prenatal care leads to the tendency towards the cesarean section, postpartum depression, challenges in accepting the maternal role, postpartum mental disorders, breastfeeding failure, miscarriage, and negative feelings about the baby (Gungor and Beji, 2012). Women who are satisfied with the services provided are more

likely to pursue their own care programs and are more willing to participate in self-care; thus, their pregnancy will lead to better outcomes for both mother and baby (Sawyer et al., 2013).

In Iran, the program of childbirth preparation classes has been notified to the vice-chancellor for the health of the medical universities of the country since 2008 and is still being implemented (Turkzahrani et al., 2012). Because maternity classes are not mandatory and information is easily accessible via the Internet, attending maternity classes has not been well received. In addition, classes begin when almost half of the pregnancy is over and the pregnant woman has gained a significant amount of information through the Internet and social media (Tsai et al., 2018).

The approach to education in the field of health has changed in recent years, which is increasingly associated with increasing access to information through virtual networks and Internet (Ghaffari et al., 2017). Online learning has enabled many learners to establish personal relationships and share personal experiences. Although many alternate education methods have been employed to motivate healthy behaviors in pregnant women, women have increasingly been drawn toward digital sources and the Internet to obtain information on pregnancy in particular. Also, the emergence of mobile technology in the field of health, by providing easy access to educational materials and increasing communication, has increased the motivation of people and im-

proved their ability to solve problems related to the field of health (Daly et al., 2017). Internet-based education, in addition to providing educational materials in various fields, especially in the field of health, allows its users to exchange experiences through interpersonal interaction (Ghaffari et al., 2017).

Learning through online social networks has been increasing worldwide. In Iran, the Telegram application hosted via social media in particular ranks 14 among the most popular (Ghaffari et al., 2017). Education through social media plays an important role in teaching and forming positive behaviors at the community level (Savabi Esfahani, et al., 2016; Kohan, et al., 2016). There are many benefits to using social media to accrue health information (Moorhead et al., 2013), where attitudes can be shaped through an interactive environment (Ghaffari et al., 2017).

Little research has been conducted on the virtualization of childbirth preparation training courses via social media, despite pregnant women and others turning to this platform for advice. It has been shown that web-based training significantly reduces stress and increases the self-efficacy of pregnant women, and therefore, it is possible to improve the quality of prenatal care by integrating conventional methods of prenatal education with Internet-based methods (Tsai et al., 2018). In addition, a study on perinatal education through Facebook showed that primiparous women have obtained more pregnancy-related information from virtual and Internet sources than multiparous women- highlighting the importance of pregnant women accessing evidence-based information through internet resources and social media (Wu and Hung, 2019). On the other hand, in a study on exclusive breastfeeding training through the Telegram application, mothers stated that Telegram-based training was more useful than in-person breastfeeding training courses, and they also believed that Telegram social media is an effective educational tool in the field of health care (Ghaffari et al., 2017). Additionally, another study found that perinatal e-learning is an effective learning method that increases pregnant women's satisfaction with how information is presented (Mohamadirizi et al., 2014).

Social media as one of the most important online tools can be used by hospitals, clinics, and gynecologists to communicate evidence-based scientific information about pregnancy and guide pregnant women, and correct misconceptions in this field. This is despite the fact that childbirth preparation courses in Iran are usually in-person. However, considering the ease of access to

the Internet and virtual mass media in Iran, the present study was conducted to compare the level of satisfaction of pregnant women with birth preparation classes using two methods of virtual and in-person education.

## 2. Materials and Methods

### Design, setting, and sample

This is a quasi-experimental pilot post-test study that was performed on nulliparous women who had been referred to the prenatal clinic of Milad Hospital in Tehran to receive prenatal care from September 2019 to June 2020. The Milad Hospital affiliated with Iran's Social Security Organization was selected because it is the largest specialized and subspecialized hospital in Iran and has an active prenatal clinic that holds an average of ten in-person training courses in a month and each training course is conducted by two trained instructors. Other reasons for choosing this hospital as the research setting are the existence of different socioeconomic classes of pregnant women and the extent of geographical areas covered, as well as the small number of women participating in other qualified prenatal courses in other prenatal clinics. Inclusion criteria were having Iranian nationality, the age of 18-35 years, gestational age of 18-20 weeks, the ability to read and write, and having a mobile phone or computer with Internet access and Telegram app (for the virtual group). Those with a high-risk pregnancy, a history of infertility, mental illness, reluctance to continue participating in the study, not sending any feedback through the Telegram app in the virtual group, and not attending more than two training sessions in the in-person group were excluded. The subjects were voluntarily assigned to two virtual and in-person groups. Figure 1 shows the flowchart of the recruitment process.

Considering the nature of a pilot clinical trial study, based on the available evidence and the rule of thumb, the minimum required sample size is 12 people in each group (Julious, 2005). Taking into account the possibility of attrition, 34 subjects were considered as the study sample. In the virtual group, two subjects were excluded due to preterm labor and heart failure, and in the in-person group, two subjects were excluded due to preeclampsia and being absent in more than two educational sessions (Figure 1). Finally, the subjects were allocated to two groups: virtual training (n=15) and in-person training (n=15).

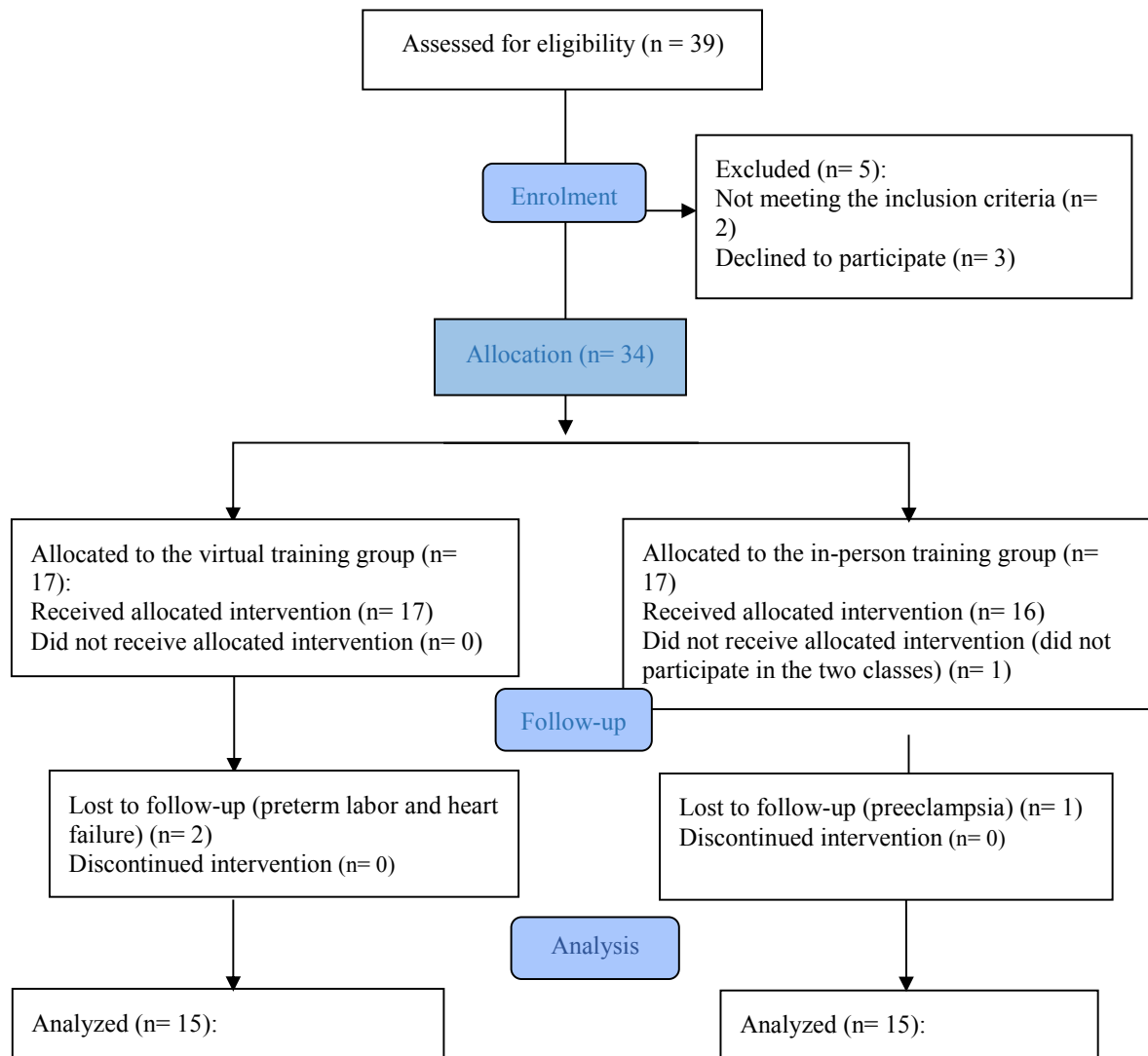


Figure 1. Flowchart of the recruitment process

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### Intervention for the virtual group

A channel called “Virtual Childbirth Preparation Courses” was created in the Telegram application to upload and run the content of virtual education, which was created in accordance with the national guidelines of the Iran Ministry of Health and Medical Education (Turkzahrani et al., 2012) and designed based on Meyer’s multimedia principles (Clark & Mayer, 2016), in the form of text, image, podcast, video casts, and video clips in MPEG-4 (MP4) format. Simultaneously, another Telegram group was created with the same name to address participant queries. This content was also approved by five members of the scientific committee of the School of Nursing and Midwifery of Iran University of Medical Sciences. The maximum size of educational files was 50 MB in the form of 5-15 minute

videos. In order to prevent the sudden upload of content and increase the quality of education, the content of each session was uploaded in divided sections on a daily basis (except Thursday and Friday) during the time allocated for that session. In total, the educational contents included six PDF files, 12 videos, four podcasts about relaxation and breathing techniques during labor, 14 video casts, and 64 MP4 video files about exercises during and after pregnancy, massage, labor positions, birth ball exercises, and postpartum exercises that were uploaded in the Telegram channel according to Table 1. Before joining the group, the subjects were told to set up a Telegram app on their phone so that the last hour of their Telegram seen would be displayed and they would be online at least once a day, and they could read the messages and provide feedback.

To ensure the correct training in breathing and relaxation techniques, one 2-hour session was specified for in-person training in the hospital. Also, to standardize the training, a visit to the delivery room was held for both groups.

### Intervention for the in-person group

The childbirth preparation courses of the in-person group were held in the hospital according to the national guidelines of the Iran Ministry of Health and Medical Education. The courses were held in eight 2-hour sessions during the 20-37 weeks of pregnancy. In each session, one hour was devoted to theoretical topics, 45 minutes to stretching exercises, breathing, and relaxation techniques, and practical training on correcting position and massage, and 15 minutes were devoted to the questions and answers. Video tutorials, audio playback, music tracks, posters, manikins, whiteboards, and slides were also used for teaching in classrooms as needed. It should be noted that both groups received routine prenatal care and had the same educational content, time, and goals of training courses (Table 1). The subjects were followed up in both groups until 36-38 weeks of gestation.

Both groups received an equal number of prenatal care visits in the hospital. Also, both groups attended the delivery room visit and all the pregnant women in the virtual training group participated in a session of stretching exercises, relaxation, and breathing techniques that was held in person at the hospital.

### Instruments

The demographic information questionnaire was completed in the 18- 20 weeks of pregnancy and included age, level of education and employment status of couples, economic status, and recent pregnancy status.

In this study, the final evaluation questionnaire of childbirth preparation classes under the supervision of the Ministry of Health and Medical Education was used (Turkzahrani et al., 2012), and some items were added to measure the subjects' satisfaction with the virtual classes. The questionnaire was completed by self-reporting after the intervention in the 36<sup>th</sup>-38<sup>th</sup> weeks of pregnancy.

The questionnaire with nine questions evaluated the effectiveness of classes, satisfaction with the content, and how the virtual and in-person training materials were provided (Table 3). The items were responded on

a 3-point Likert scale, ranging from "No=1", "Somewhat=2", and "Yes=3".

To assess the content validity, the corrective opinions of ten midwifery faculty members were used and the necessary changes were made to the questionnaire. The Cronbach's alpha of the questionnaire was calculated as 0.73.

### Statistical analysis

Data analysis was performed by SPSS software, version 19, using descriptive and inferential statistics. Descriptive statistics, such as numerical indicators and frequency distribution tables were used to describe the data. Chi-square and Fisher's exact tests were used to compare qualitative variables and an independent t-test was used to compare quantitative variables. In all tests, the significance level was considered to be  $P \leq 0.05$ .

## 3. Results

Table 2 shows the personal characteristics of the groups. The Mean $\pm$ SD age of the virtual and the in-person groups was 25.4 $\pm$ 4.79 and 28.13 $\pm$ 3.61, respectively. There was no significant difference in terms of personal characteristics between the groups ( $P > 0.05$ ).

Table 3 shows the numerical indicators of satisfaction with the educational courses in Telegram-based and in-person training groups and the significance tests. The total satisfaction score was 26.06 for the virtual training group and 24.86 for the in-person training group, which indicates a significant difference between the two groups ( $P = 0.028$ ).

The results showed that 100% of the virtual group were satisfied with the theoretical and practical content of the training course, while 80% and 93.3% of the in-person group were satisfied with the theoretical ( $P = 0.08$ ) and practical ( $P = 0.33$ ) content of the in-person classes, respectively and this difference was not statistically significant. In the intervention and the in-person groups, 66.7% and 60% of women, respectively, stated that by passing the training course, they could overcome the fear and anxiety of childbirth, but this difference was not statistically significant ( $P = 0.71$ ). In both groups, 73.3% of the subjects stated that by passing the relevant training courses, they could design correct and specific planning for childbirth, but there was no statistically significant difference between the groups ( $P = 0.73$ ). In the virtual and in-person groups, 93.3% and 80% of the subjects could respectively identify the symptoms of childbirth by passing training courses, but this difference was not statistically significant ( $P = 0.3$ ).

**Table 1.** The educational content of Telegram-based, and in-person training in childbirth preparation courses

Time	Content	Subheadings	In-person training	Uploading the Virtual Content to Telegram Channel
First session: 20-23 gestational week	-Personal hygiene with an emphasis on anatomy and physiology during pregnancy	-An introduction to the reproductive system -Changes and adaptations of the body during pregnancy, common complaints and coping strategies, -Personal hygiene	-Teaching theoretical topics through group discussion and lectures -Exercise training during pregnancy -Relaxation practice	4 video casts for theoretical content 9 videos for exercises during pregnancy 1 podcast for relaxation
Second session: 24-27 gestational week	-Nutrition during pregnancy	-Nutrition and healthy diet during pregnancy -An introduction to the food pyramid	-Teaching theoretical topics through group discussion and lectures -Exercise training during pregnancy -Relaxation practice	1 video cast for theoretical content 9 videos for exercises during pregnancy, Relaxation techniques
Third session: 28-29 gestational week	-Mental health during pregnancy	-An introduction to the fetal growth and development -Preparing for motherhood -Preparing for fatherhood	-Teaching theoretical topics through group discussion and lectures -Exercise training during pregnancy -Relaxation practice	2 video casts and 1 PDF file for theoretical content 9 videos for exercises during pregnancy Relaxation techniques
Fourth session: 30-31 gestational week	-Risk factors for pregnancy	-The warning signs of preterm birth and ways to treat preterm labor	-Teaching theoretical topics through group discussion and lectures -Exercise training during pregnancy -Relaxation practice	1 video cast for theoretical content 9 videos for exercises during pregnancy 1 podcast for relaxation
Fifth session: 32-33 gestational week	-Planning for childbirth and selecting the type of delivery	-Natural delivery vs. cesarean section -Different types of painless and low-pain methods during labor -Selecting the delivery location and necessary equipment for delivery	-Teaching theoretical topics through group discussion and lectures -Exercise training during pregnancy -Relaxation practice Visiting the delivery room in person	2 video casts and 1 PDF file for theoretical content Relaxation techniques Visiting the delivery room in person
Sixth session: 34-35 gestational week	-An introduction to vaginal delivery	-An introduction to birth hormones -An introduction to labor stages and self-care at each stage	-Teaching theoretical topics through group discussion and lectures -Exercise training during pregnancy -Relaxation practice -labor stages and childbirth	1 video cast, 1 PDF file, and 2 videos for theoretical content 11 videos for labor and childbirth 1 podcast for breathing techniques 1 podcast for relaxation techniques
Seventh session: 36 gestational week	-Postpartum care and breastfeeding	-Postpartum care and symptoms of risk -An introduction to breastfeeding methods and breast diseases -An introduction to postpartum exercises	-Teaching theoretical topics through group discussion and lectures - massage during pregnancy and labor - Postpartum exercises	1 video cast, 1 PDF file, and 8 videos for theoretical content 8 videos for massage during pregnancy, labor and Postpartum exercises
Eighth session: 37 gestational week	-Neonatal care	-Neonatal care and the related risks	-Teaching theoretical topics through group discussion and lectures - Neonatal care	2 PDF files and 2 videos for theoretical content 9 videos for postpartum exercises Neonatal care

**Table 2.** Personal characteristics of the subjects in virtual and in-person training groups (N=34)

Characteristic	Group	Mean±SD/No. (%)		P*
		Telegram-based training (n=17)	In-person training (n=17)	
β Age (y)		25.4±4.79	28.13±3.61	0.14
Level of education †	Under diploma	2(13.3)	0(0)	0.1
	Diploma	5(33.3)	6(40)	
	Collegiate	8(53.4)	9(60)	
Level of education of the spouse†	Under diploma	1(6.6)	2(13.3)	0.29
	Diploma	9(60)	5(33.3)	
	Collegiate	5(33.3)	8(53.4)	
Employment status†	Housewife	12(80)	11(73.3)	0.27
	Employee	3(20)	2(13.3)	
	Self-employment	0(0)	2(13.3)	
Employment status of the spouse†	Worker	4(26.7)	0(0)	0.22
	Employee	3(20)	7(46.7)	
	Self-employment	8(53.3)	8(53.3)	
Economic status†	Undesirable	1(6.7)	0(0)	0.5
	Relatively desirable	9(60)	10(66.7)	
	Desirable	5(33.3)	5(33.3)	
Recent pregnancy status <sup>δ</sup>	Wanted	12(80)	11(73.3)	0.5
	Unwanted	3(20)	4(26.7)	

\* P≤0.05 is significant; β Independent samples t-test; <sup>δ</sup> Chi-squared test; † Fisher's exact test

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The results showed that the subjects in the virtual group (93.3%) compared to the in-person group (73.3%) were able to significantly attract the participation and cooperation of their husbands during pregnancy (P=0.05). A relatively similar percentage of both groups stated that they could take care of their baby after completing the virtual (80%) and the in-person (86.7%) training courses; this difference was not statistically significant (P=0.63). The results showed that all subjects of the virtual group were fully satisfied with the method of presenting information and training, while in the in-person group, 53.3% were relatively satisfied and 46.7% were fully satisfied with the method of presenting information; this difference was statistically significant (P<0.01). In both groups, 100% of the subjects stated that they would recommend attending these training courses to their friends and relatives (P=0.9).

#### 4. Discussion

This pilot study was conducted with the aim of comparing the level of satisfaction of pregnant women from holding childbirth preparation classes using two methods of virtual and in-person training. According to the results of this study, the virtual group's satisfaction with childbirth preparation courses was higher than the in-person training group, and this difference was statistically significant. There was also a significant difference between the virtual and in-person training groups in terms of satisfaction with the way educational content was presented so that the virtual training group showed more satisfaction.

**Table 3.** Comparing satisfaction with the educational courses in Telegram-based and in-person training groups (N=34)

Questions/Groups	Telegram-based Training (n=17)			In-person Training (n=17)			P Independent t-test
	No. (%)						
	No	Somewhat	Yes	No	Somewhat	Yes	
I am satisfied with the theoretical content	0(0)	0(0)	15(100)	0(0)	3(20)	12(80)	0.08
I am satisfied with the practical content	0(0)	0(0)	15(100)	0(0)	1(6.7)	14(93.3)	0.33
By passing this course, I can overcome the fear and anxiety of childbirth	0(0)	5(33.3)	10(66.7)	0(0)	6(40)	9(60)	0.71
By passing this course, I can design correct and specific planning for childbirth	0(0)	4(26.7)	11(73.3)	1(6.7)	3(20)	11(73.3)	0.73
By passing this course, I can recognize the symptoms of childbirth	0(0)	1(6.7)	14(93.3)	0(0)	3(20)	12(80)	0.3
By passing this course, I can get my spouse involved	0(0)	1(6.7)	14(93.3)	0(0)	4(26.7)	11(73.3)	0.05
By passing this course, I can take care of my baby	0(0)	3(20)	12(80)	0(0)	2(13.3)	13(86.7)	0.63
I am satisfied with the way the educational content is presented (virtual, in-person)	0(0)	0(0)	15(100)	0(0)	8(53.3)	7(46.7)	< 0.01
I recommend others to participate in these training courses	0(0)	0(0)	15(100)	0(0)	0	15(100)	0.9
Total scores		26.06			24.86		
P value (between groups)				0.028			

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Tsai et al. (2018) conducted a quasi-experimental study in Taiwan to determine satisfaction with the presentation of a web-based antenatal care system during the prenatal period. The intervention group received a web-based training program with perinatal routine training and the in-person group received only perinatal routine training. The results of the study showed that the web-based system has improved the satisfaction of pregnant women with perinatal care and pregnant women were more satisfied with providing information in the virtual training method and the content of web-based training. In addition, the majority (90%) of pregnant women who used the web-based system tended to use the system in their next pregnancy and recommend the use of the web-based system to their pregnant friends and relatives Tsai et al. (2018). The findings of some other studies also show that virtual prenatal care courses have improved the satisfaction of pregnant women, and enabled pregnant women to manage their pregnancies and maintain their health during this critical period (Chang et al., 2015; Salonen et al., 2011).

In addition, Mohamadirizi et al. (2014), by conducting a quasi-experimental study aimed at determining the nulliparous women's satisfaction with perinatal e-learning compared to the guide booklet showed that 4-6 weeks after receiving e-learning with the use of audio, film, animation,

and video files, the level of satisfaction of young women with educational content and information is increased by 94%, while only 54% of the training group was satisfied through the guide booklet (Mohamadirizi et al., 2014). The results of this study were in line with the present study and showed that virtual training is an effective learning method.

The satisfaction of pregnant women with receiving virtual and Internet-based education in each subset of prenatal education, especially in the field of breastfeeding and infant care, has been shown in several studies (Ghafari et al., 2017; Salonen et al., 2011).

The study of the use of the Telegram social network for teaching breastfeeding and complementary feeding of children among mothers showed that most information about pregnancy and postpartum, especially breastfeeding, is obtained through searching on virtual networks and the Internet. In line with the results of the present study, the findings showed that 100% of users considered membership in the group and educational content useful and acknowledged that Telegram is a very useful media in the field of education related to health issues. Most mothers believed that Telegram-based training is more useful than attending classes (Ghafari et al., 2017).



In line with the present study, the results of Solenan et al. (2011) on the effectiveness of an internet-based intervention enhancing Finnish parents' satisfaction during the postpartum period showed that Internet-based education increases parental satisfaction with their success in infant care. Although this increase was not statistically significant, it was obvious that Internet-based training could have a beneficial effect on infant care. They believed that access to Internet resources and social networks is expanding and can be examined and verified as a new educational method in the field of reproductive health (Salonen et al., 2011). On the other hand, it has been shown that pregnant women, especially nulliparous women, are more willing to obtain pregnancy-related information from virtual networks and Internet resources. This highlights the importance of pregnant women accessing evidence-based information through Internet resources and social networks (Wu and Hung, 2019).

The results of another study conducted on Somali women were consistent with the present study. In this study, prenatal education was presented in the form of multimedia and video films with the content of preparation for pregnancy and childbirth. The results showed that 60% of pregnant women considered the educational content useful, all the women were completely satisfied with perinatal education through multimedia and recommend the use of this educational method to those around them, especially nulliparous women (DeStephano, Flynn, & Brost, 2010).

The present study showed that a significant percentage of the virtual training group acknowledged that they could, after passing the virtual education course, overcome the fear and anxiety of childbirth (66.7%), design a correct and specific schedule for their delivery (73.3%) and correctly recognize labor symptoms (93.3%); which was similar to the results of the in-person training group. Therefore, the similarity of the results in the two groups can also confirm the effectiveness of e-learning and be the beginning of future studies. Among the mentioned abilities, the lowest percentage of effectiveness of both virtual and in-person training was related to reducing the fear of childbirth and anxiety. Studies have shown that several factors affect the fear of childbirth; therefore, increasing the knowledge and awareness of pregnant women about the process of childbirth and related measures can only eliminate some of the causes of fear, and it cannot reduce the fear of childbirth in all pregnant women. Consequently, in addition to the method of providing information, factors, such as identifying physical and psychological factors affecting fear and the unique

characteristics of the target groups are also involved in reducing the fear of childbirth (Hosseini, et al., 2018; Stoll et al., 2018).

Since the target group in most training courses are pregnant women and men are less able to participate in in-person classes due to their employment, the possibility of virtual training fills the void of spouse participation (Mortazavi, et al., 2014) because this educational method removes the obstacles related to the health system, such as the female environment of service centers, lack of space, lack of training programs in the field of parenting for men, and lack of human resources (Fathnezhad Kazemi, et al., 2017). However, the results of a review study in Spain showed that although a significant percentage of pregnant women used social media to obtain health information, they did not consider it valid because anyone could share this information with these people (Hudnut-Beumler, et al., 2016). Therefore, it should be noted that the direct supervision of the researcher on the educational content and the removal of invalid information shared by the researcher play an important role in creating a useful and reliable educational environment.

It was a pilot study with its own limitations. The main limitation was the small sample size and the inability of the researchers to perform the random allocation. Therefore, it is suggested that future studies overcome these limitations and carry out this study in wider dimensions. In addition, it is suggested to use more valid separate tools for each of the variables, including anxiety and fear of childbirth, satisfaction with postpartum education, and baby care.

## 5. Conclusion

This study aimed to compare pregnant women's satisfaction with childbirth preparation classes in two virtual and in-person training methods. The results showed that the virtual group's satisfaction with childbirth preparation courses was higher than the in-person training group, and this difference was statistically significant. Also, the virtual education group was able to significantly attract the participation of their spouses in accepting the role of parents compared to the in-person education group and their satisfaction regarding the method of providing information was significantly higher. Both groups stated that they would recommend attending virtual and in-person classes to those around them. According to the expansion of educational technologies and the development of the use of smartphones and the advantages of virtual education,

it is suggested that virtual childbirth training courses in Iranian hospitals be gradually held alongside in-person training, or a combination of both types of training should be used in these courses.

## Ethical Considerations

### Compliance with ethical guidelines

The study was approved by the Research Deputy of [Iran University of Medical Sciences](#) (Code: IR.IUMS.REC.1397.980) and was registered at the [Iranian Registry of Clinical Trials \(IRCT\)](#) (Code: IRCT20180427039436N2). Prior to the study, pregnant women were informed about the objectives, the process of the study, and the confidentiality of their information, and their informed consent was obtained. It should be noted that the researcher and all instructors of childbirth preparation classes participated in a 60-hour coaching course held by the Iran Ministry of Health and had a maternity readiness coaching certificate.

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### Authors' contributions

Both authors equally contributed to preparing this article.

### Conflict of interest

The authors declared no conflict of interest.

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