



Impact of Telehealth on Pregnant Women's Self-care, Self-efficacy, and Satisfaction during the COVID-19 Pandemic: A Quasi-experimental Study

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Abstract

Background: Pregnant women need correct information and skills for effective self-care and improved self-efficacy during pregnancy. Maternal training will raise women's awareness of pregnancy and childbirth, leading to higher self-efficacy.

Objectives: The present study aimed to assess the impact of telehealth on pregnant women's self-care, self-efficacy, and satisfaction during the COVID-19 pandemic.

Methods: This quasi-experimental study involved low-risk pregnant women selected from prenatal public clinics in Ahvaz, Iran. Eligible pregnant women (n=150) were assigned to three groups: WhatsApp training (n=50), phone call training (n=50), and control (n=50). Women in the three groups received four face-to-face prenatal care sessions based on the content recommended by the Iranian Ministry of Health. In addition to these four face-to-face sessions, four more virtual training sessions were held for the WhatsApp and phone call groups.

Results: Raising the awareness of pregnant women through telephone counseling was found to not only increase their self-efficacy, self-care, and satisfaction but also reduce the need for in-person visits during the COVID-19 pandemic. Furthermore, a moderate positive correlation was observed between self-efficacy and self-care scores; moreover, they have a relatively negative weak correlation with face-to-face visits.

Conclusion: The results of this study suggested that most pregnant women were satisfied with telehealth during the COVID-19 pandemic, and thanks to this type of care provision, their self-efficacy and self-care levels were high. Reduced face-to-face visits during the pandemic are the main advantage of telehealth.

Keywords: COVID-19, Satisfaction, Self-care, Self-efficacy, Telehealth

1. Background

The approaches of the Millennium Development Goals, women's empowerment, promotion of women's mental health, and reduction of maternal and child mortality have been seriously considered in the field of primary health care. Therefore, attention to self-efficacy and self-care in pregnant women assumes utmost importance as a key to the prevention of adverse maternal and neonatal outcomes (1). Pregnant women need the correct information and skills to take care of themselves during pregnancy (2). This care begins with the pregnant woman's self-care, which involves the woman and her family (3). In their research, Khojasteh et al. demonstrated that maternal education increased women's awareness and familiarity with the process of pregnancy and childbirth, leading to higher self-efficacy for childbirth (4).

In late 2019, a global health concern, which later came to be known as COVID-19, was announced by the World Health Organization (WHO) as a pandemic (5). In response to this health emergency, the

American College of Obstetricians and Gynecologists (ACOG) eliminated restrictions on telehealth. It developed coverage beyond the COVID-19 pandemic, and this type of distance care provision was included in the booklet of gynecologists and midwives for prenatal care (6).

The advantages of telemedicine include facilitating and speeding up access to counseling services, alleviating the burden on clients during the COVID-19 crisis, and improving access to care in disadvantaged areas. Telemedicine also allows health services to be accessed in a wider geographical area, aids in completing electronic health records, helps manage chronic diseases, and reduces healthcare costs and consultation times. In addition, telemedicine offers faster service delivery, cost reduction, and the ability to access care at any time. Finally, telemedicine systems provide simplicity, availability, and affordability as notable benefits (7). The use of telehealth can reduce obstacles usually associated with in-person care. These include difficulties in transportation, a limited number of health providers, child care, long waiting times, and psychosocial stressors (8, 9). According to a

systematic review of the application of telehealth in midwifery and gynecology, this type of care, which is assisted with advanced technologies, has a comprehensive nature (10). Telehealth involves various health services, such as distant monitoring, smartphone apps, and distant picture transmission. Since the emergence of the COVID-19 pandemic, virtual healthcare has become a focus of attention (11, 12).

A systematic review by Nguyen et al. revealed that prenatal care through telehealth can increase access to care and reduce face-to-face prenatal care visits. Nevertheless, there is limited evidence on the effectiveness of virtual prenatal care programs (6). Given the fact that COVID-19 is a disease without any definitive treatment, preventative self-care is currently the best approach to combat the virus, especially in pregnant women who are more vulnerable than the rest of society. There is a paucity of information regarding the use of telehealth during the COVID-19 pandemic among pregnant women. Telemedicine training presents a novel approach to educating pregnant women amidst the COVID-19 pandemic (13). Mothers require trustworthy, dependable, and authoritative sources of information to address their queries, understand, handle, and monitor symptoms of risk, as well as alleviate their own stress and anxiety (14).

2. Objectives

In light of the aforementioned issues, the present study aimed to assess the effect of telehealth on low-risk pregnant women's self-care, self-efficacy, and satisfaction during the COVID-19 pandemic in Iran.

3. Methods

3.1. Study participants and sampling

This quasi-experimental study was conducted on low-risk pregnant women who were assigned into three groups: WhatsApp, phone call, and control (face-to-face). Data were collected from June 2021 to May 2022. Based on the findings of a previous study and using MedCalc statistical software with a 95% confidence interval and 5% error, the sample size was calculated at 129 cases (43 participants in each group). The final number of participants in each group was set to be 50 taking into account a sample attrition rate of 20%. Eligible pregnant women (n=150) were allocated to three groups: WhatsApp training (n=50), phone call training (n=50), and control (n=50).

The inclusion criteria entailed an age range of 18-35 years, gestational age of 6-20 weeks based on first-trimester sonography or last menstrual period, basic literacy, having a WhatsApp-compatible cell phone throughout the study, and having a low-risk singleton pregnancy. On the other hand, the women

were excluded from the study if they had a history of infertility or any physical-mental disorders. Other exclusion criteria included smoking, alcohol consumption, or substance abuse. Low-risk pregnant women were randomly selected from three public health centers in Ahvaz, namely No 1 East Health Center (phone call group), Bahonar Health Center (WhatsApp Group), and Gharb-11 Health Center (control group). All of these public centers offered health care services free of charge. The design of care content was based on the care needs of women under prenatal care routinely provided in health centers.

3.2. Intervention

Usually, eight prenatal care sessions are provided by midwives in public health centers in Iran: one prenatal care session during weeks 6-10, 16-20, 26-30, 31-34, 33-35, and three sessions during 38-40 weeks. In these sessions, information regarding nutrition and physical activity during pregnancy, sex and sleep health in pregnancy, personal hygiene and disease prevention, risk symptoms in pregnancy, required supplements, and immunization is provided. In each session, the midwife measures the blood pressure, weight, body mass index, and fetal heart and prescribes necessary lab tests and sonography. Due to the COVID-19 pandemic, these sessions were reduced to four sessions. Women in the three groups received four face-to-face sessions (Weeks 6-10, 28-30, 31-34, and 37) of prenatal care based on the content recommended by the Iranian Ministry of Health. In addition to these four face-to-face sessions, four more sessions (Weeks 16-20, 33-35, 39, and 40) of virtual training were held for the WhatsApp and phone call groups. Communication in the WhatsApp group and phone calls were two-way, and the participants could ask their questions at any time of the day or night. The content of all the virtual sessions was presented by the researcher based on the integrated maternal health care booklet.

In the WhatsApp group, educational materials were provided to pregnant women using WhatsApp in four sessions. Educational content was presented in the form of text with photos to attract more attention. Educational content was sent to participants in weeks 16-20, 33-35, 39, and 40, and they could ask their questions in the same WhatsApp space. The participants were asked to activate the "last seen" feature of their WhatsApp to ensure that the messages sent were viewed by them. Before the participants joined the WhatsApp group, they were also required to share their last seen status with the researcher. The participants had to be online at least once a day so that they could see the content uploaded to the group. The researcher checked the last-seen status of pregnant women, and in case a mother was not online, did not receive messages, or did not respond for two days, she would be sent an SMS. In the event that a woman did not respond to

the SMS, the researcher would make a phone call and inquire about the problem. The women were asked to provide another number so that they could be re-sent the missed message through WhatsApp.

In the phone call group, pregnant women received educational content in the form of a phone call at an appointed time. Telephone calls were made in weeks 16-20, 33-35, 39, and 40. The length of the telephone call was 15 min, and participants' questions were answered. Educational information content was similar in the WhatsApp and phone call groups. The WhatsApp and phone call group had four face-to-face meetings with specific intervals (same as the control group) to perform clinical examinations. The control group received educational information and care in person and routinely. All three groups of pregnant women completed a demographic questionnaire, Self-Care Questionnaire, and Self-Efficacy Questionnaire on their first visit to health centers. The mentioned questionnaires, in addition to the Satisfaction Questionnaire, were completed by pregnant women again in the last week of pregnancy (37-40th weeks). Due to the possibility of not visiting the health centers in person during the last weeks of pregnancy, participants could answer the questionnaires online if they wish.

3.3. Measurement of study variables

The following scales were used to measure the study variables:

Descriptive information form: A two-part researcher-made questionnaire was used for measuring this variable. The first section was related to the demographic information of women and their husbands (e.g., age, educational attainment, occupation, and economic status). The second section was devoted to obstetric information, including gestational age at the time of recruitment, number of face-to-face visits to health centers, first-trimester BMI, and pregnancy status.

Self-efficacy questionnaire: In order to measure this variable, the Self-Efficacy Questionnaire of Scherer et al. (1981) was used. The Scherer scale consists of 17 items which are rated based on a 5-point Likert scale (5: strongly agree, and 1: strongly disagree). Questions number 1, 3, 8, 9, 13, and 15 are reversely scored from 5 to 1, and the other questions 2, 4, 5, 6, 7, 10, 11, 12, 14, 16, and 17 are scored from 1 to 5. The range of overall score of this questionnaire ranges from 17-85, with higher and lower scores representing strong and weak self-efficacy, respectively. A Cronbach's alpha of 0.86 was obtained for this questionnaire in the study by Scherer et al. (15). The validity and reliability of the questionnaire were approved in the research by Mirmehdi and Karimi (2012). In the mentioned study, Cronbach's alpha coefficient was 0.67, and its validity was 0.59 (16).

Self-Care questionnaire: This researcher-made questionnaire encompasses 16 items which are

scored on a four-point Likert scale (0: strongly disagree; 3: strongly agree). Scores between 0-16, 17-32, and 33-48 are considered weak, moderate, and desirable, respectively. The content validity of this questionnaire was verified. A number of 10 faculty members of Ahvaz Jundishapur University of Medical Sciences were asked to review the questionnaire, which was later modified according to their comments. A Cronbach's alpha of 0.73 was obtained for the reliability of this questionnaire administered to 150 women who met the inclusion criteria.

Satisfaction questionnaire: In order to assess pregnant women's satisfaction with pregnancy care, Haqqani et al.'s (2016) pregnancy satisfaction questionnaire was used. This questionnaire includes 12 items scored based on a 5-point Likert scale (completely dissatisfied: 1 and completely satisfied: 5). Its validity and reliability were confirmed by Haqqani et al. To determine the validity of the measurement tool, content validity was used. In this way, the research tool was compiled using scientific sources, and after obtaining the opinions of several experts in obstetrics, gynecology, and medical training, it was revised and finalized. The reliability of the tool was investigated by conducting a study on 20 pregnant women and calculating Cronbach's alpha. Cronbach's alpha of the satisfaction questionnaire was 0.85 (17).

3.4. Statistical analysis

In order to compare quantitative variables, a one-way analysis of variance was used. Qualitative variables were compared using Fisher's exact test. Paired sample t-test was used to compare the before and after mean scores of variables. The Tukey post hoc test was used to compare the mean score of the face-to-face visit, self-care, and efficacy in pairs between the groups. Linear regression was used to investigate the relationship between self-efficacy, satisfaction, self-care, and face-to-face visits. To investigate the relationship between self-efficacy, self-care, and face to face visit, the Pearson correlation coefficient was used. Data were analyzed in SPSS software (version 24). The significance level in all tests was set at 0.05.

3.5. Ethics approval and consent to participate

The present study was approved by the Ethics Committee of Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran (Ref No: IR.AJUMS.REC.1399.248). The participants were briefed on the objectives of the study, and their informed written consent was obtained. They were also ensured of the confidentiality of their information and their right to withdraw from the study whenever they wanted. Participation in this study and the services offered therein were totally free.

4. Results

A total of 150 women were recruited in this study, of whom 47, 45, and 47 cases completed the study in the WhatsApp, phone call, and control groups, respectively (Figure 1). No statistically significant differences were observed between the three groups

of WhatsApp, phone call, and control in terms of age ($p=.318$), weight ($p=.68$), gestational age ($p=.213$), occupation ($p=.987$), education ($p=.96$), gravidity ($p=.751$), parity ($p=.751$), physical activity ($p=.868$), type of pregnancy ($p=.516$), and economic status ($P=.2$) (Table 1).

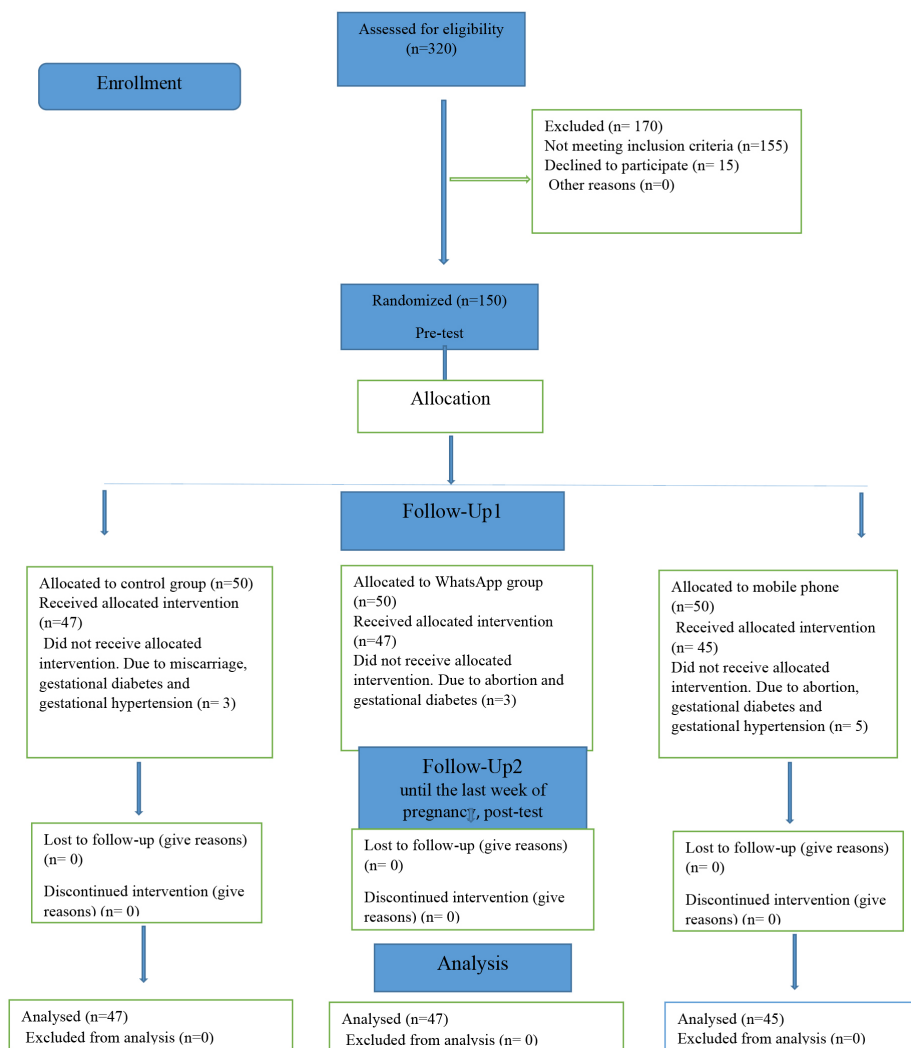


Figure 1. Enrolment of participants into three groups of control, WhatsApp, and phone call

4.1. Outcomes

4.1.1. Face-to-face visits

A significant difference was observed between the three groups in terms of the number of post-intervention face-to-face visits ($P<.001$). A significant difference was also found between WhatsApp and control groups ($4.06\pm.52$ vs. $4.74\pm.7$; $P\leq.001$) and between phone call and control groups ($4\pm.522$ vs. $4.74\pm.706$; $p\leq.001$); nonetheless, no significant difference was detected between WhatsApp and phone call groups ($P=.56$) (Table 2).

4.1.2. Self-care

Before the intervention, the self-care score of the

control group (12.7 ± 3.29) was significantly higher than that of the two intervention groups ($P=.027$). Nevertheless, after the intervention, a significant difference between the three groups ($P<.001$), no significant difference between WhatsApp and phone call groups (34.5 ± 5.53 vs. 32.8 ± 4.96 ; $P=.115$), and a significant difference between WhatsApp and control groups ($P<.001$), and between phone call and the control groups ($P<.001$) were observed. Moreover, based on the paired samples t-test, there was a significant difference between pre and post-test scores in WhatsApp ($P<.001$), phone call ($P<.001$), and control ($P<.001$) groups (Table 2). Based on the results of linear regression, women with one

Table 1. Demographic characteristics

		WhatsApp n=50	Phone n=50	Control n=50	P-value
		Mean ± SD			
Age (y)		27.08±3.74	26.42±4.03	25.87±3.84	.318
BMI (kg/m ²)		23.2±1.69	23.08±1.6	22.9±1.78	.68
Gestational age (wks)		15.7±3.89	16.06±3.81	14.74±3.42	.213
		N (%)			
Occupation	Employed	10(21.3)	10(22.2)	10(21.3)	.987
	Housewife	33(70.2)	33(73.3)	34(72.3)	
	Student	4(8.5)	2(4.4)	3(6.4)	
Education	Diploma	13(27.7)	10(22.2)	15(31.9)	.96
	Associate degree	4(8.5)	5(11.1)	5(10.6)	
	Bachelor	22(46.8)	20(44.4)	21(44.7)	
	Master's degree and higher	2(4.3)	4(8.9)	2(4.3)	
Gravid	1	33(70.2)	34(75.6)	36(76.6)	.751
	≥2	14(29.8)	11(24.4)	11(23.4)	
Para	0	33(70.2)	34(75.6)	36(76.6)	.751
	≥1	14(29.8)	11(24.4)	11(23.4)	
Physical activity	Low	29(61.7)	30(66.7)	34(72.3)	.868
	Medium	14(29.8)	11(24.4)	10(21.3)	
	Good	4(8.5)	4(8.9)	3(6.4)	
Type of pregnancy	Desired	38(80.9)	39(86.7)	42(89.4)	.516
	Undesired	9(19.1)	6(13.3)	5(10.6)	
Economic status	Weak	7(14.9)	8(17.8)	10(21.3)	.2
	Medium	29(61.7)	34(75.6)	32(68.1)	
	Good	11(23.4)	3(6.7)	5(10.6)	

Table 2. Comparison between groups regarding the number of visits, satisfaction, self-care, and self-efficacy

		WhatsApp	Phone	Control	p*	p*** (1-2)	p*** (1-3)	p*** (2-3)
Face-to-face visit		4.06±.527	4±.522	4.74±.706	<.001	.56	<.001	<.001
Self-care	Pre-test	11.36±3.67	10.82±3.27	12.7±3.29	.027			
	Post-test	34.5±5.31	32.8±4.96	20.7±3.66	<.001	.115	<.001	<.001
p** (within groups)		<.001	<.001	<.001				
Self-efficacy	Pre-test	32.04±5.86	34.15±6.43	34.76±5.71	.074			
	Post-test	51.95±6.57	59.04±8.3	43.19±5.96	<.001	<.001	<.001	<.001
p** (within groups)		<.001	<.001	<.001				
Satisfaction		50.89±4.67	48.73±4.21	34.61±4.17	<.001	.022	<.001	<.001

*One-way analysis of variance, **Paired-sample t-test, ***Tukey post hoc test

pregnancy compared to women with ≥ 2 pregnancies (coef: 1.74; P=.026), students compared to housewives (coef: 3.92; P=.005), and subjects with a

university degree compared to those with a diploma (coef: 3.63, coef:10.85; P<.001) had significantly higher post-test self-care scores (Table 3).

Table 3. Regression of self-care

Self-care		coef	Std. err	β	P
Physical activity(yes)*		.002	.515	0.00	.996
Type of pregnancy(wanted)**		.808	1.02	.79	.439
Socio-economic-status(weak)	Medium	1.34	.879	1.53	.128
	Good	-.687	1.35	-.51	.612
Gravida (1) **a		1.74	.77	2.26	.026
Job (housewife)					
Employed		.666	.932	.71	.476
Student		3.92	1.37	2.85	.005
Education(diploma)					
High school		-1.31	1.15	-1.14	.257
Associate degree		1.73	1.18	1.46	.148
Bachelor		3.63	.799	4.55	<.001
Master's degree and higher		10.85	1.75	6.18	<.001
Group(evidence)					
WhatsApp		13.8	.789	17.57	<.001
Phone call		11.6	.785	14.7	<.001

*: compare of no, **: compare of unwanted, **a: compare of gravid≥2,

4.1.3. Self-Efficacy

No significant difference was observed between the pre-intervention scores of the three groups ($P=.074$). After the intervention, however, the difference was significant ($P<.001$). Based on the results, participants in the phone call group obtained significantly higher self-efficacy scores compared to their counterparts in the WhatsApp group ($P<.001$). In addition, after the intervention, the self-efficacy score of the control group was significantly lower than that of the WhatsApp group (43.19 ± 5.96 vs. 51.95 ± 6.57 ; $P<.001$) and phone call group (43.19 ± 5.96 vs. 59.04 ± 8.3 ; $P<.001$). Furthermore, based on the paired samples t-test, there was a significant difference between pre-and post-test scores in WhatsApp ($P<.001$), phone call ($P<.001$), and control ($P<.001$) groups, separately (Table 2). Based on the results of linear regression, employed mothers had significantly higher self-efficacy scores than housewives (coef: 3.16; $P=.019$), as well as those with higher degrees than diplomas ($P<.05$). In addition, participants with less than a high school diploma had

significantly lower levels of post-test self-efficacy (coef: -3.63; $P=.029$) (Table 4).

4.2. Satisfaction

After the intervention, the satisfaction score of women was significantly higher in both WhatsApp and phone call groups than in the control group ($P<.001$). The satisfaction score of the WhatsApp group was significantly higher compared to the phone call group (50.89 ± 4.67 vs. 48.73 ± 4.21 ; $P=.022$) (Table 2).

4.3. Correlation

The relationship between self-efficacy, self-care, and face-to-face visits was investigated using the Pearson correlation coefficient. A moderate positive correlation was observed between self-efficacy and self-care ($r=0.7$; $P<.01$). Face-to-face visits demonstrated a negative and weak Correlation with self-efficacy ($r=-0.26$; $P<.01$) and self-care ($r=-0.26$; $P<.01$) (Table 5).

Table 4. Regression self-efficacy

self-efficacy	coef	Std. err	β	P
Physical activity(yes)*	-483	737	-.66	.514
Type of pregnancy(wanted)**	.02	1.47	.01	.989
Socio-economic-status(weak)				
Medium	-.715	1.25	-.57	.571
good	-3.94	1.93	-2.04	.044
gravida (1) **a	1.83	1.1	1.66	.099
job (housewife)				
employed	3.16	1.33	2.37	.019
student	3.43	1.96	1.75	.083
Education(diploma)				
high school	-3.63	1.64	-2.2	.029
associate degree	5.69	1.7	3.35	.001
bachelor	5.55	1.14	4.86	<.001
master's degree and higher	14.51	2.51	5.77	<.001

*: compare of no, **: compare of unwanted, **a: compare of gravid \geq 2,

Table 5. Correlation Analysis

Variable	Self-efficacy	Self-care	Face to face visit
Self-efficacy	1	.7**	-.263**
Self-care	.7**	1	-.36**
Satisfaction	.46**	.65*	-.37**

** . Correlation is significant at the 0.01 level (2-tailed)

5. Discussion

The present study aimed to assess the effect of telehealth on self-care, self-efficacy, and satisfaction of pregnant women. According to the results, raising the awareness of pregnant women through WhatsApp and phone call counseling increased self-efficacy and self-care; moreover, it reduced the need for face-to-face visits during the COVID-19 pandemic. According to our results, thanks to telehealth, pregnant women who are not infected with the COVID-19 virus can have convenient access to routine care without being worried about contracting the infection from an overcrowded hospital or waiting rooms of healthcare facilities. Given the rapid

spread of COVID-19, telemedicine technologies can play a more pivotal role in maintaining social distancing (18).

5.1. Face-to-face

As evidenced by our results, the control group differed from the WhatsApp and phone call groups. In addition, no significant difference was observed in the number of visits between the telephone care and WhatsApp groups. In a study by Meltzer et al., the use of a mobile prenatal care app was associated with reduced in-person visits (19). A large number of perceived barriers to reducing in-person visits are potentially addressed by mobile health apps (20). A pilot study by Marko et al. revealed that the use of a

mobile phone app along with remote monitoring devices makes a system feasible for prenatal care (21). In justification, it can be said that the researcher has responded to the needs of clients at any hour of the day and night through Internet and telephone conversations and has continued to follow up until their needs are fully resolved.

5.2. Self-care

According to the results of our study, telephone and WhatsApp training during the COVID-19 pandemic were effective in the improvement of self-care during pregnancy; however, no significant difference was found between the phone and WhatsApp groups. In women at a high risk of preeclampsia, self-care training can be effective in the prevention and control of this condition (22). The benefits of self-care activities through telemedicine have also been shown in women with gestational diabetes mellitus (GDM) during the COVID-19 pandemic (23). A relatively small but significant improvement in HbA1C status in telemedicine was reported in a meta-analysis by Ming et al. (24). The study by Hashemzahi et al. (2022) confirmed the effectiveness of COVID-19 self-care training via telemedicine and reported that it caused a significant decrease in scores related to the perceived stress and anxiety of pregnant women during the coronavirus pandemic (14).

5.3. Self-efficacy

In the present study, tele-call care and WhatsApp care were able to significantly increase pregnant women's self-efficacy scores during the COVID-19 pandemic. One way of telemonitoring aimed at offering education about the disease and supporting the health of clients in self-management activities is telephone support. These self-management activities include physical activity, medication adherence, and diet, which result in reduced adverse effects of the disease (25). Farrag et al. pointed out that tele-nursing support significantly increased the self-efficacy score of women with GDM (26). Nevertheless, Homko et al. found no significant difference between the intervention and control groups in terms of their self-efficacy score (27).

The findings of the present study highlighted the need for additional support for pregnant women. The self-care and self-efficacy scores of pregnant women before the intervention illustrated that women need more support and education during pregnancy. Therefore, in order to improve pregnant mothers' mental and physical outcomes during the COVID-19 pandemic, it behooves healthcare providers to be particularly sensitive to these mothers' increased need for support (28). In this respect, simple interventions can be performed without the physical presence of mothers. For instance, offering telephone counseling services can be beneficial in decreasing

the fear of childbirth and promoting self-efficacy (29).

According to the results, in the control group, the self-efficacy score was significantly higher than that before the intervention; however, this difference was less significant compared to both intervention groups. In justifying it, the positive role of media and virtual networks, such as TV, radio, Instagram, Twitter, Telegram, and other social media, in providing information and the identification of danger signs cannot be ignored. They can raise people's level of awareness in dealing with pandemics.

In the present study, participants with higher educational attainment were more successful in terms of self-efficacy and self-care than those with lower levels of education. In addition, women with previous pregnancies, employed ones, and students experienced higher levels of self-care than housewives. The results of the study by Samuei et al. indicated that women and people with higher education showed more protective behaviors and adaptation during the pandemic. The level of education mainly increases caring behaviors in two aspects: more access of educated people to evidence-based findings, and caring behaviors increase the likelihood of having more valid social interactions (30). However, in the present research, unlike the study by Samuei, housewives had lower levels of self-care and self-efficacy than female students and employees.

5.4. Satisfaction

In the present study, counseling of pregnant women by phone call and App resulted in a higher level of satisfaction compared to the control group. Moreover, the satisfaction of the App group was significantly higher than other groups, which may be attributed to the higher variety, excitement, and attractiveness of the App. During the COVID-19 pandemic, client satisfaction with telemedicine was high. Patient trust in their provider is an essential foundation for fostering patient satisfaction (31). In the study by Haqqani et al. (2016), the use of SMS teaching methods in the provision of prenatal education led to a marked increase in the satisfaction of pregnant women (17).

According to our results, in proportion to the increase in self-efficacy score, self-care score also increased, and in fact, there was a positive and significant relationship between the two variables. In order to raise pregnant women's self-efficacy, they need to be made aware of general and specific self-care principles, and as mentioned earlier, recent studies on COVID-19 have devoted more attention to general self-care principles, such as knowledge acquisition, preventive behaviors, and mental health in particular (32). Furthermore, we discovered an inverse relationship between the number of face-to-face visits and changes in both self-efficacy and self-care.

5.5. Strengths, limitations, and suggestions for future research

The present study is worthwhile in that it provides evidence for the effect of face-to-face and telehealth methods on pregnant women's self-care, self-efficacy, and satisfaction. Therefore, telehealth can be used to encourage women to participate in prenatal care. Despite its strengths, the present study suffers from some limitations. Firstly, online questionnaires are often associated with risks of bias, namely recall, selection bias, attentional bias, response bias, and non-response bias. In addition, among the obstacles presented to the accurate implementation of telehealth training in Iran, we can point out the lack of specialized training among medical staff, slow Internet, and the lack of importance attached to this easy and accessible method by health organizations. Since the present study examined the effect of telehealth on self-efficacy and self-care of low-risk pregnant women, it cannot be generalized to high-risk pregnant women, and it is suggested that this study will be conducted on high-risk pregnant women.

6. Conclusion

Thanks to the affordance of telehealth during the COVID-19 pandemic, pregnant women were found to be satisfied and have a high level of self-efficacy and self-care since they were given the opportunity to reduce their in-person visits during this pandemic. Telehealth also allows health providers to conduct safe, timely, and high-quality ambulatory care for clients without increasing the risk of disease exposure for both parties.

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Footnotes

Authors' contributions: SA was the main investigator and was involved in the study design, data collection, and writing process. SGH analyzed the data and wrote the first draft. HB, NZ, MM, and MB helped in data collection, analysis, and writing process. MI contributed to the analysis, critically reviewed the paper, responded to reviewers' comments, and provided the final manuscript. All authors read and approved the final manuscript.

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by the Ethics Committee of Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran (Ref No: IR.AJUMS.REC.1399.248). The participants were briefed on the objectives of the study, and their informed written consent was obtained. They were also ensured of the confidentiality of their information and their right to withdraw from the study whenever they wanted. Participation in this study and the services offered therein were totally free.

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