



Comparison of the Effect of Face-to-face and Social Media-based Training on the Self-care of Women with Gestational Diabetes Mellitus (GDM) in Birjand

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Abstract

Background: Gestational diabetes is one of the most common medical complications during pregnancy. Disease control is essential because of the increasing prevalence of this disorder, and the most important control factor is self-care behaviors.

Objectives: The aim of this study was to compare the effect of face-to-face and social media-based education on self-care of women with gestational diabetes.

Methods: This quasi-experimental randomized controlled study was performed on 73 pregnant women with gestational diabetes in Birjand, Iran. Participants completed a self-care and demographic questionnaire and then were divided into three groups (face-to-face, virtual, and control training group). In the face-to-face training group, four training sessions (one hour) were held for one month. The virtual group received two messages per day for 30 days via Telegram, and the control group received only routine training. One month after the intervention, the questionnaire was completed by all individuals.

Results: There was no statistically significant difference between the three groups in terms of mean self-care score before the intervention, but after the intervention, the mean self-care score increased in the face-to-face training group ($P < 0.001$) and social media training group ($P = 0.01$) compared to the control group ($P = 0.22$).

Conclusions: In this study, the effect of face-to-face and virtual education is the same. Therefore, education-based social networks can be used because of the prevalence of coronavirus and transportation problems of pregnant women.

Keywords: Gestational Diabetes, Training, Face-to-face, Social Media, Self-care

1. Background

Gestational diabetes mellitus (GDM) is one of the most prevalent medical complications during pregnancy (1), which is caused by dysfunctional glucose tolerance and first starts or is diagnosed during pregnancy (2). It affects 5 - 18% of all pregnancies (3), while the prevalence of this type of diabetes in Iran ranges from 1.3 to 18.6% (4).

The consequences of gestational diabetes on mothers and babies are extremely critical. The adverse effects of gestational diabetes on the infant are increased risk of macrosomia, neonatal hypoglycemia, shoulder dystocia (5), and intrauterine growth restriction (6). The complications of a pregnant woman may include preterm delivery, polyhydramnios, preeclampsia, and eclampsia. Also, these mothers are more likely to develop type 2 diabetes at older ages

(2).

Because of the increasing prevalence of this dysfunction, its complications, and related costs, it is critical to treat and control the disease (7). Although this disease has no definitive treatment, the most important factor in controlling it is self-care behaviors, with the patients assuming over 95% of care by themselves (8). Providing accurate information to patients about diabetes and its complications will increase their self-confidence in self-care, thus correcting health behaviors (4). Therefore, it is necessary to adopt appropriate interventions such as training, self-care, and increased prenatal care to reduce the consequences (9).

Self-care is a key concept in health progress (7) and is the first step to help patients better care and manage their conditions. The health slogan in 2014 was reading, "A healthy life with self-care", indicating the need to im-

prove one's capacity to take care of his/her health (8). In other words, self-care is an active and practical process directed by the patient and is deemed necessary to prevent short-term and long-term complications. This process includes various physiological, social, emotional, and spiritual dimensions, where the physiological dimension includes nutrition, effects and medication complications, exercise, disease progress and its side effects, methods of prevention and controlling of blood sugar, and regulating medications are important aspects of self-care (10).

Emamgholi Khooshehchin et al. demonstrated that few women with gestational diabetes could take good care actions as such problems as unawareness, difficulty controlling diabetes, improper information, incomplete training about diabetes, and feeling of inability are thought factors hindering self-care. In this study, it was shown that mothers were eager to learn more information. Therefore, necessary self-care training should be given to strengthen self-care (11). Some studies have assessed the role of training interventions in diabetes, reporting that interventions adopted for behavioral changes could effectively improve self-care and abilities to control diabetes (12).

A study by Johnson and Berry evaluated one-dimensional education by using SMS exclusively for the education of pregnant women, which led to the promotion of self-management and empowerment of diabetic pregnant women (13).

Although face-to-face training courses mostly tend to be advantageous, they also have some disadvantages. The disadvantages include time and space restrictions for trainers and patients. Because of recent advances in information and communication technology, new platforms of virtual space have emerged, including multimedia-based instruction in cyberspace, which provides the ability to send a variety of audio, video, and even short instructional videos at any time. Given the increasing prevalence of the disease, the importance of self-care in gestational diabetes, and the role of education in promoting the role of self-care in the current situation, the use of new methods seems essential.

2. Objectives

In this study, the effect of face-to-face and social media-based education on self-care of women with gestational diabetes was investigated (14). Considering the importance of self-care in gestational diabetes and the existence of few studies on the results of using virtual network training concerning women with gestational diabetes in Iran, this study aimed to compare the effect of face-to-face training and social network-based training on the self-care of women diagnosed with gestational diabetes.

3. Methods

The present study was a quasi-experimental randomized controlled study that was done on 73 pregnant women with gestational diabetes presenting to Birjand's health centers in 2019 in Iran.

The sample size was estimated based on the formula of comparing the two means:

$$n = \frac{(z_{1-\alpha} + z_{1-\beta})^2 (s_1^2 + s_2^2)}{(\bar{x}_1 - \bar{x}_2)^2}$$

($S_2 = 9.3$, $x = 97.4$, $S_1 = 13.4$, $\beta = 0.1$, $\alpha = 0.05$) and the results of the study by Zandinava (15) and the sample size in each group was seven people, according to the results of the mean score of self-care before and after the intervention.

Because the number of women with gestational diabetes was few, the sampling was done in a non-probability form based on inclusion criteria from all General Health Centers in Birjand. A number of 23, 24, and 26 subjects were selected from three geographical areas of Birjand, ie, from northern, central, and southern regions, respectively.

Inclusion criteria were mother's gestational age at 24 - 32 weeks, singleton pregnancy, holding at least the fifth elementary grade, no history of drug and alcohol addiction, no smoking and hookah addiction, and no history of medical disease (diabetes, heart disease, respiratory, renal, epilepsy, hypertension, anemia complications), not studying in medical sciences majors or working in health centers, having a mobile phone running virtual networks and familiarity with it.

Exclusion criteria were unwillingness to continue cooperation, developing a specific disease during the study period, no participation in more than one training session, and not taking any messages in the training group based on social networks.

At first, informed consent was obtained from the participants, and some issues were explained to all participants. Then a demographic-midwifery inventory and a self-care behavior inventory were completed by the patients. Then, the people of each region were randomly divided into three control, face-to-face training, and virtual groups.

Before the training, by completing the self-care questionnaire, the demographic and midwifery questionnaire. The demographic and midwifery inventory consists of two parts. The first part includes individual demographic characteristics such as age, education, and occupation, etc. The second part includes questions about the history of midwifery, such as number of pregnancies, gestational age and abortion, etc.

The Self-Care Questionnaire, taken from the Summary of Diabetes Self-Care Activities Scale (SDSCA) by Toobert et

al. (16), was a 14-item self-report scale. Kordi et al. administered this scale to pregnant women (7). He reduced the scale to remove foot care and developed an 11-item questionnaire that we used in this study. This questionnaire investigated dietary self-care activities (five items), physical activity (two items), blood sugar monitoring (two items), drug use (one item), and smoking (one item) of patients during the past seven days. The answers to all questions were on the Likert scale (0 - 7), except for smoking. In this way, people reported their diabetes-related self-care behaviors on a scale from 0 (I did not do it on any of the days) to 7 (I did it every 7 days of the week). A score of 0 or 1 was assigned to the item of smoking, depending on whether or not they used it.

Because the number of items in each domain was not equal, the scores of each domain were divided by the number of items in that domain. The highest and lowest scores were reported to be 7 and 0, respectively. The validity of the demographic inventory and self-care scale was determined by content validity method. As for the reliability of the questionnaire in this study, 20 patients meeting inclusion criteria were given the inventory, and Cronbach's coefficient for this questionnaire was 0.78. Also, the reliability of this questionnaire was 0.70 in Kordi et al.'s study (7). After completing the initial questionnaires, a needs assessment was performed, and the educational content was adjusted based on the educational that the training package included videos, photos, and texts (17).

In the face-to-face training group, four training sessions were held in the form of lectures and group discussions using video projectors, training images, and videos. In the first session, gestational diabetes and its associated complications, as well as the benefits of self-care behaviors to prevent the complications, were explained. In the second session, the importance of observing a healthy diet and acquiring skills in planning a healthy diet was explained. In the third session, solutions to keep blood sugar within a normal range, the importance of performing proper physical exercises, injection of insulin, and working with blood sugar control devices were explained. Finally, in the fourth session, a summary of previous topics was explained. At the end of each session, the pamphlets related to training points of the same session were provided to the patients.

As for the training group, the training points were sent via two messages on social networks each day for up to a month. The training courses included texts, photos, and videos, which were sent via Telegram, as the content expressed in the virtual training was the same as the face-to-face training group. The control group received routine training by the midwife for about five to ten minutes orally at health centers. One month after the intervention ended,

the self-care inventory was completed again by all participants in this study. In order to observe ethical considerations, a training package was provided to the control group after the questionnaire was completed.

Data were analyzed by SPSS software version 19. The Kolmogorov-Smirnov test was used to investigate the normalcy of data distribution. The data had a normal distribution. Chi-square and Fisher's exact tests were used to compare demographic characteristics in three groups, while ANOVA test was applied to compare the mean self-care score before and after the intervention. Moreover, intra-group comparison was made by paired *t*-test. In all statistical analyses, the statistical significance was reported to be $\alpha = 0.05$.

4. Results

The present study demonstrated that the mean age of pregnant mothers participating in the control group was 31.37 ± 4.79 years, face-to-face training was 34.04 ± 5.88 years, and social network-based training was 30.58 ± 6.67 years. There were no statistically significant differences between them. The three groups did not have a statistically significant difference from each other in terms of other demographic variables (mother's age, mother's education, mother's occupation, spouse's occupation, spouse's education) (Table 1). Three groups showed no statistically significant difference in terms of mean total self-care score before the intervention started; however, the mean total self-care score showed an increase in face-to-face training ($P < 0.001$) and social network-based training groups ($P = 0.01$) compared to the control group ($P = 0.22$) after the intervention started. Although the mean changes in the face-to-face and social network-based training group were greater than that of the control group, no statistically significant difference was observed (Table 2).

Considering self-care domains, the mean nutrition score before the intervention showed no statistically significant difference; however, the mean nutrition score in the face-to-face training group showed a statistically significant increase compared to the other two groups ($P = 0.001$) after the intervention (Table 2). In the domain of activity, no statistically significant difference was noted in the mean activity score before the intervention in the three groups; however, the mean activity score in the face-to-face training group indicated a statistically significant rise compared to the other two groups after the intervention (Table 2). There was no statistically significant difference between the mean blood sugar control score and drug-taking score in the three groups after the intervention (Table 2).

Table 1. Demographics of the Three Groups Studied ^a

Variables	Control	Face-to-face Training	Social Networks Training	P-Value
Mother's education				0.06
Primary	5 (20.8)	5 (20)	1 (4.2)	
Junior	3 (12.5)	7 (28)	2 (8.3)	
High school	2 (8.3)	5 (24)	8 (33.3)	
Academic	14 (58.4)	7 (28)	13 (54.2)	
Mother's job status				0.29
Housekeeper	22 (91.7)	24 (96)	20 (83.3)	
Employer	2 (8.3)	1 (4)	4 (16.7)	
Spouse' education				0.36
Primary	1 (4.2)	2 (8)	1 (4.2)	
Junior	3 (12.5)	6 (24)	4 (16.7)	
High school	6 (25)	11 (44)	8 (33.3)	
Academic	14 (58.3)	6 (24)	11 (45.8)	
Spouse' job status				0.26
Unemployed	1 (4.2)	1 (4)	3 (12.5)	
Laborer	5 (20.8)	13 (52)	7 (29.2)	
Self-employed	8 (33.3)	6 (24)	8 (33.3)	
Employee	10 (41.7)	5 (20)	6 (25)	

^a Values are expressed as No. (%).

5. Discussion

The findings of the present study demonstrated that training in the form of face-to-face training on social network-based training was effective in improving the mean total self-care score of pregnant women with gestational diabetes compared to the control group; however, comparing the two training methods, no difference was observed between the two intervention groups. Johnson and Berry investigated the effect of self-care in women with gestational diabetes using SMS reminders, with the results indicating the positive effect of SMS training on the total self-care score in women with gestational diabetes (13).

Aligholipour et al. compared face-to-face training and multimedia messaging (Telegram) training on self-care measures by 66 patients with diabetes, where the mean self-care scores increased in both intervention groups; however, no significant difference was noted between the two groups under intervention. Thus the results of the present study were consistent with this study. One of the strengths of the present study was the existence of a control group, as Aligholipour et al.'s study concerned the two face-to-face and multimedia messaging (Telegram) training (18). Also, a study by Masoudi et al. compared the effectiveness of face-to-face and distance training in reducing common complaints of pregnant women during pregnancy. The findings suggest that training via new technologies such as mobile phones can be quite effective alongside face-to-face training (19).

In a study, Besharti investigated the effect of face-to-face and distance training (Telegram) of 138 women on the self-efficacy of osteoporosis preventive behavior, concluding that theory-based self-efficacy training through face-to-face and social network courses (Telegram) was effective in strengthening the self-efficacy of osteoporosis-preventing behaviors (20). However, the social network of Telegram training was found to be more effective than face-to-face training, which is not consistent with the findings of the present study. One of the reasons for the difference between the results of the present study and those of Besharti's study is the continuation of virtual training and the non-continuation of face-to-face training in his study. In the Besharti's study, face-to-face training was formed only in one session; however, virtual training was gradually performed on a daily basis for two weeks. One of the strengths of the present study was that the two groups received the interventions in the same time period such that both groups received training for one month.

Considering self-care domains, ie, nutrition, Maheri et al. concluded that face-to-face training had a positive effect on nutrition, which is consistent with the findings of the present study. However, in a study by Aligholipour et al., nutrition scores significantly increased in both virtual-based and face-to-face training groups. One of the reasons for the difference was the duration of intervention and the patients in Aligholipour et al.'s study, where the intervention period in Aligholipour et al.'s study lasted for three months, with the patients receiving information on nu-

Table 2. Comparison of Total Self-care Score and Its Domains in the Three Groups Studied

Group/Time	Total Self-care Score	Mean Changes	Nutrition Score	Activity Score	Blood Sugar Control Score	Drug Adherence Score	Paired Statistical t-test Result
Control group							
Before intervention	2.73 ± 1.31	0.05 ± 0.19	3.55 ± 1.44	1.06 ± 1.51	2.14 ± 2.74	3.2 ± 3.38	P = 0.22; t = 1.23
After intervention	2.78 ± 1.26		3.48 ± 1.47	1.37 ± 1.87	2.25 ± 2.74	3.22 ± 3.39	P = 0.5; t = 0.67
Face-to-face training group							
Before intervention	2.23 ± 1.00	0.76 ± 0.93	2.85 ± 1.37	2.54 ± 2.27	0.14 ± 0.33	2.68 ± 3.4	P < 0.001; t = 4.07
After intervention	2.99 ± 0.82		3.94 ± 0.81	3.48 ± 2.17	0.38 ± 0.69	2.48 ± 3.38	P = 0.05; t = 1.98
Social media-based training							
Before intervention	2.61 ± 0.83	0.55 ± 1.01	3.82 ± 1.18	2.16 ± 2.00	0.58 ± 0.84	1.5 ± 2.76	P = 0.01; t = 2.68
After intervention	3.17 ± 0.88		4.22 ± 0.93	3.02 ± 2.33	1.25 ± 2.16	2.04 ± 3.25	P = 0.11; t = 1.63
ANOVA test							
Before intervention	P = 23/0; F = 481		P = 0.03; F = 3.41	P = 0.02; F = 3.73	P = 0.009; F = 9.81	P = 0.17; F = 1.79	
After intervention	P = 0.42; F = 0.86		P = 0.07; F = 2.72	P = 0.001; F = 6.50	P = 0.008; F = 5.16	P = 0.47; F = 0.74	
Post hoc test							
Before intervention			P = 0.036	P = 0.02	P = 0.005		P = 0.22; t = 1.24
After intervention				P = 0.003	P = 0.006		

trition in advance as the diabetes was chronic, while the present study lasted for one month on mothers with gestational diabetes (18, 21).

People’s attitudes toward change in nutrition were found not to be effective via short-term training, as attitudes are said to form a hidden mental structure in the human personality system, and it is difficult to work on this domain.

In the domain of activity, Maheri et al. showed that face-to-face training had a positive effect on activity, which is consistent with the results of the present study; however, Seyed-Andi et al. explored the effect of e-learning on self-care behavior of people with type 2 diabetes, concluding that the activity score in the virtual group increased after the intervention (12, 21).

The reason for the difference can be the duration of the intervention, that lasted three months, but the present study was performed for one month. Also, the patients in the present study did not perform activities due to pregnancy and fear of preterm delivery.

In the domain of blood sugar control, Oshvandi et al. examined training methods for self-care of diabetic patients, showing that the blood sugar control score increased significantly after training, which was contrary to the results of the present study. In their study, all participants obtained a glucometer, but it was not necessary to find a glucometer in the present study (22). In Aligholipour et al.’s study, the drug adherence score increased after training. One of the reasons for this was that 50% of participants in Aligholipour et al.’s study had diabetes for more than 10 years, resulting in an increased duration of illness in participants (18).

It is recommended that future studies concern the effect of virtual-based training methods on other variables in pregnant mothers with gestational diabetes (quality of life, self-efficacy, etc.) as well as fasting blood sugar, pregnancy outcome, and complications of gestational diabetes on the fetus.

The findings of the present study demonstrated that training in the form of face-to-face training on social network-based training was effective in improving the mean total self-care score of pregnant women with gestational diabetes compared to the control group; however, comparing the two training methods, no difference was observed between the two intervention groups.

5.1. Conclusions

In general, the results of this study suggest that virtual training and face-to-face training have positive effects on self-care activities in pregnant mothers with gestational diabetes. Therefore, if case mobile phones or personal computers and internet communication are available to pa-

tients and families today, virtual training can be used to improve and facilitate the learning process. With the onset of coronavirus disease 2019 (COVID-19) and fewer visits by pregnant women with gestational diabetes to health centers, virtual training will be a good method to increase self-care, and nurses and midwives can get the information they require to take care of themselves.

While monitoring multimedia tools, patients receive step-by-step information, knowledge, and skills for self-care, and, if necessary, they engage with midwives and receive feedback in this connection. Nevertheless, one may argue that the human relationship between a nurse and midwife with a patient is the most basic principle guiding nursing and midwifery practice. Therefore, in practice, virtual training should not completely be an alternative to face-to-face training and should be applied as a complementary or integrated approach. Also, when using virtual training to instruct patients, some other factors such as context, culture, and beliefs should be taken into account. In general, the results of this study suggest that virtual training and face-to-face training have positive effects on self-care activities in pregnant mothers with gestational diabetes.

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Footnotes

Authors' Contribution: Study concept and design: M. H., and M. T.; Analysis and interpretation of data: M. H., and G. Sh.; Drafting of the manuscript: M. H.; Critical revision of the manuscript for important intellectual content: M. H., M. T., and M. H.; Statistical analysis: G. Sh.

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