

Original Article



Effect of Peer Support on Health Literacy in Diabetic Patients With Limited Access to Support Resources in Iran: A Randomized Clinical Trial

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Abstract

Background: Health literacy (HL) is one of the factors influencing the use of health-related information by patients with diabetes. As a social support resource, peers can help improve diabetes knowledge in these patients. The aim of this study was to determine the effect of peer support on HL in patients with type 2 diabetes (T2D) with low support resources.

Methods: This randomized controlled trial was conducted on 80 patients with T2D referring to a diabetes clinic in Aligoudarz. Patients meeting the inclusion criteria were selected by the random sampling method and randomly assigned to two groups of intervention and control each containing 40 cases. The data were collected using the Test of Functional Health literacy in Adults (TOFHLA) at the beginning of the study and after 3 months of educational peer support intervention. Eventually, data were analyzed by the statistical tests of chi-square, Fisher's exact test, *t* test, and paired *t* test.

Results: The results showed that there was no significant difference in the mean (\pm SD) HL between the two groups before the intervention (53.12 ± 13.86 vs. 56.62 ± 10.34 , $P=0.204$). However, the mean HL in the intervention group represented a significant improvement after 3 months of peer intervention compared to the control group (70.27 ± 9.78 vs. 56.87 ± 10.07 , $P<0.001$).

Conclusion: Overall, peer support was found to be effective in improving the HL of diabetic patients with limited access to support resources. Therefore, it is recommended to use the capacity of peers as a social support resource in diabetes care programs.

Keywords: Peer group, Peer support, Social support, Health literacy, Type 2 diabetes

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Introduction

Diabetes is one of the most common non-communicable diseases worldwide. Statistics demonstrate that the number of patients with diabetes in the world was 415 million in 2015, and this figure is expected to reach 642 million by 2040 (1). The evidence indicates that Iran, with 5.4 million people with diabetes by the end of 2019, is the third country in the Middle East and North Africa (MENA) regions in terms of the prevalence of diabetes among the population of 20-79 years (2), and this figure is estimated to reach 9.2 million by 2030 (3).

Diabetes is a chronic disease that requires lifestyle modifications based on a complex treatment plan. Early

diagnosis and proper management of this disease reduce the risk of complications (4). Health policymakers are looking for the causes of poor disease control to improve the management of type 2 diabetes (T2D). Assessing patients' health literacy (HL) is a key for identifying the underlying causes of this problem (5). The World Health Organization defines HL as social and cognitive skills that determine individuals' motivation and ability to understand the information needed to improve and maintain their health (6).

HL is one of the effective factors in the prevention and control of diabetes (7). Low HL in chronic patients is associated with high costs of health care, poor disease



management, and poor health outcomes (8). Patients with T2D with low HL have less knowledge about their disease and poorly adhere to the treatment plan (9,10). These patients also have a weaker relationship with physicians and are less involved in their care and treatment decisions (11). Despite the importance of HL, a systematic review study in Iran reported that inadequate HL is high (43.5%) among Iranian patients with T2D, and a quarter of them have borderline HL (12). This highlights the need for designing and implementing interventions aiming at improving the level of HL in these patients.

Today, despite numerous programs for improving the condition of patients with T2D, self-care education is still the basis of disease control (13). Although the way education is provided in most cases depends on the healthcare staff, they are often unable to meet the growing educational needs of patients with diabetes due to the lack of specialized human resources and limited visit times. Therefore, there is a need for more support resources to educate and follow up patients. Peer support is one of these potential resources (14). Peers are people with diabetes who share their experiences of care processes and disease conditions with similar patients (15). As a low-cost, flexible, and accessible source of social support, especially in areas with limited access to support resources and deprived of health facilities, peers can play an important role in educating and improving patient care processes (16-18). Studies have identified four key functions, including improving self-management capacity in daily life, providing social and emotional support, strengthening relationships with caregivers and community resources, and providing ongoing support to peers (15,16,18-20). Evidence shows that peer support can be effective in improving disease self-management in patients with T2D by enhancing their knowledge and social communication (20-25).

Despite the importance of HL and its key role in improving and promoting community health, a few studies have so far focused on the effectiveness of support interventions on improving HL through clinical trials in patients with T2D in Iran. Further, due to the limitations of the research community, including the lack of specialized human resources and limited access to health, and treatment and education facilities, on the one hand, and the benefits of peer support strategies, on the other hand, this study aimed to investigate the effectiveness of peer support interventions on the HL of patients with T2D in a deprived area in Aligoudarz.

Materials and Methods

The present randomized controlled trial was performed on 80 patients who referred to the diabetes unit of Hefdah Shahrivar Clinic in Aligoudarz in Lorestan province. The study population included patients with T2D who referred to this clinic from March 5, 2020, to May 9, 2020.

The inclusion criteria were being diagnosed with T2D by a specialist physician for at least 1 year and having a

diabetes record in the clinic, being over 18 years of age, having a haemoglobin A1c (HbA1c) higher than 7%, not participating in other education related to diabetes in the last 1 years, not suffering from a cognitive disorder, not developing chronic complications of diabetes, and having access to the telephone. On the other hand, absence in more than two education sessions, the emergence of new physical problems leading to inability to self-care, withdrawal from cooperation, and change of the place of residence were among the exclusion criteria. The phases of performing the peer support program are listed in Figure 1.

All patients participated in three two-hour diabetes self-care education sessions at the beginning of the study. This education course was conducted by the patients' healthcare providers in the clinic. The content of the sessions was prepared according to the American Diabetes Association Standards of Care 2018 and the current instructions of the Ministry of Health of Iran and was implemented after simplifying the concepts. The content of the education included the principles of diabetes self-care.

After the education course, the participants were randomly assigned to two groups of 40 members (Figure 2). The sample size was determined as 40 patients in each group (N = 80) according to HL changes in a similar study (26), the probability of type 1 error (α) of 0.05, test power ($1-\beta$) of 0.80, a confidence level of 95%, and the sample size formula for comparing the two means.

Trained peers were needed to implement the peer support intervention. To select the peers, a list of patients with diabetes volunteered to work with the research team as potential peers was prepared by the research team after completing the three-day self-care education and based on the inclusion criteria. The peer inclusion criteria were being diagnosed with T2D for at least one year, having at least a high school diploma, having basic knowledge about diabetes (participation in the three-day education), and having no chronic complications of diabetes as determined by a physician. The other inclusion criteria included adhering to the treatment plan (based on their

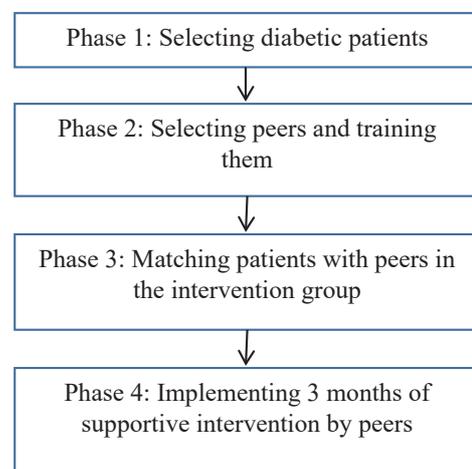


Figure 1. Phases of Peer Support Program.

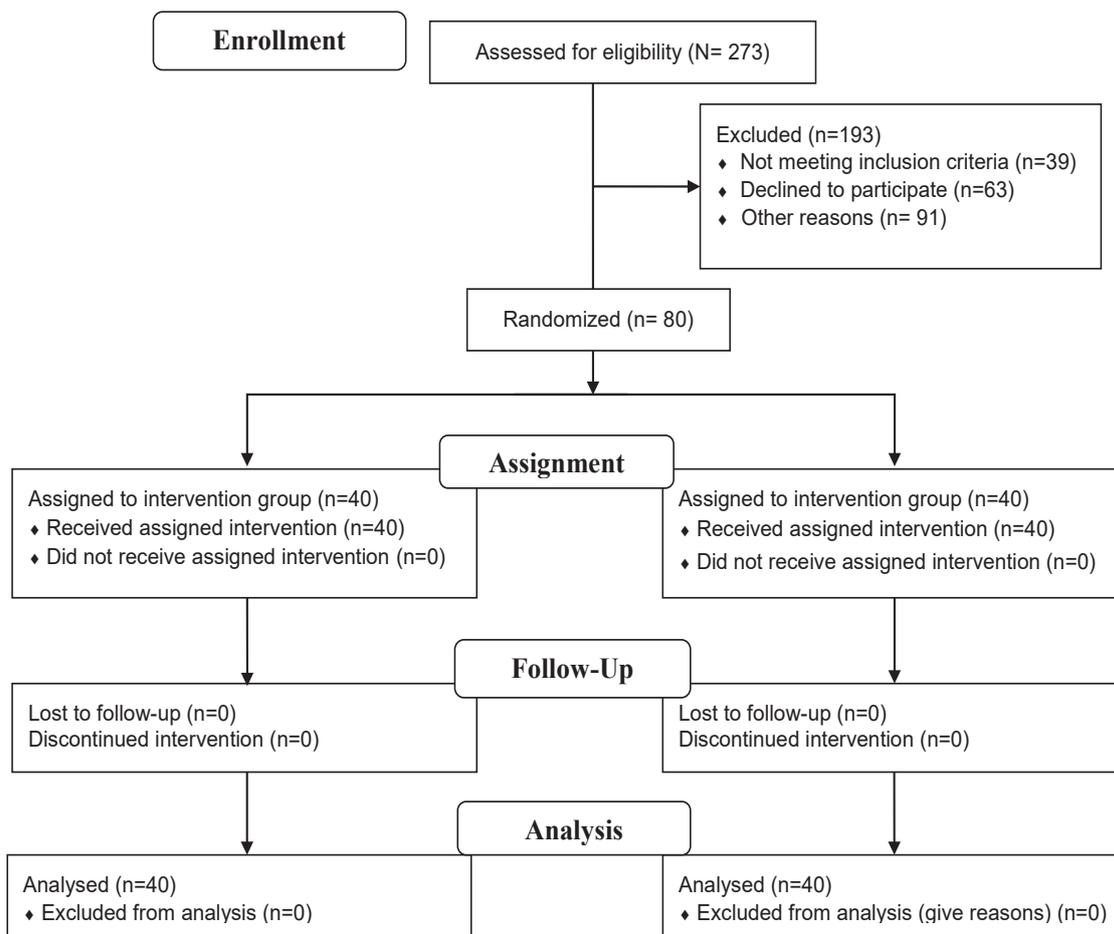


Figure 2. Overview of Recruitment and Group Assignment.

documents on the diabetes record and HbA1c of less than 8%), having good social relationships, and being familiar with the culture and language of the people in the area. The research team interviewed with the potential peers to assess their communication and interpersonal skills. Then, peers with the higher scores were selected from the eligible ones and asked to sign an informed consent form if they wished to cooperate in the study.

The selected peers participated in four 3-hour theoretical and practical education sessions per week for one month. The content of the education included an introduction to concepts, importance, and benefits of the peer support program, communication skills, and clear message exchange, as well as the way of supporting patients and designing care goals based on barriers to and facilitators of patient support. Moreover, the other included issues were the principles of diabetes self-care in daily life and the way to hold group meetings and answer patients' questions, along with the principles of telephone follow-ups and constant communication with the research team. The education was performed through holding group discussions, having questions and answers, having role-playing games, and showing an educational video. According to some studies (16,17), the number of sessions held for peers was 3 sessions, but one session was added to patients' training according to the literacy level

of the selected peers and their basic information about diabetes and their self-care (based on the results of face-to-face interviews with them). Finally, the peers received a booklet containing educational materials, the schedule and content of the support program they had to provide to the patients, and a SIM card to communicate with the patients and the research team.

After the preparation of the peers, patients in the intervention group were randomly categorized into 4 groups of 10 members using scratch cards. The healthcare providers and the person analyzing the data were unaware of the random assignment of the participants to the intervention and control groups. To reduce the relationship between the patients of the two groups, visit times were arranged so that the intervention and control groups were received on even and odd days, respectively.

The peer support program was conducted within 3 months. The content of the training sessions by the peers is provided in Table 1. According to the plan, the peers could call their patients and talk to each patient about care issues. The average time of telephone calls was set at 15 minutes once a week. All training sessions were performed according to the standards of the current instructions of the Ministry of Health of Iran during the intervention.

In all the sessions, the peers followed pre-determined topics and submitted the details of handwritten data of the

sessions and telephone conversations to the research team. The team reviewed the reported cases and discussed the quality of the sessions with the peers. During the study and if necessary, the peers were in contact with the research team.

The patients in the control group received routine clinic care, including a monthly visit by a diabetes nurse and nutritionist. In addition to the peer support, patients in the intervention group received routine clinic care. Considering that this study was conducted at the time of the coronavirus outbreak, arrangements were made in this regard. To maintain the participants healthy, the peers held group meetings in accordance with health protocols and observed social distance in open spaces. Prior to group sessions, masks, gloves, and disinfectants were provided to the participants.

First, demographic and disease characteristics were extracted from the patients' diabetes records and registered, and then the Test of Functional Health Literacy in Adults (TOFHLA) questionnaire was used to measure HL. This questionnaire consists of numerical ability and reading comprehension sections. The numerical ability section measures a person's ability to understand and act on the healthcare providers' recommendations requiring calculations. This part includes 10 health tips on prescribed medications, when to visit a doctor, use of financial aid, and an example of a medical test result. These points are given to the person in the form of cards, and relevant questions are asked accordingly. The scores in this section vary from 0 to 50. The reading comprehension section examines the patient's ability to read real healthcare texts in three parts and consists of 50 questions. The texts include preparation for an upper gastrointestinal tract image, the part related to patient rights and responsibilities in the insurance policy forms, and the standard hospital consent form. The scores in this section vary from 0 to 50. In total, the scores of the two sections of numerical ability and reading comprehension are in the range of 0-100, which are classified into inadequate (0-59), borderline (60-74), and adequate (75-100) HL levels. This questionnaire has been validated by Tehrani Banihashemi in Iran, and the reliability of the instrument has been obtained by Cronbach's alpha test as 79% and 88% for numerical ability and reading comprehension sections, respectively (27). In the present study, the reliability of the questionnaire was

measured by the test-retest method. Based on Cronbach's alpha test, the internal consistency of the questionnaire was 0.77 and 0.83 for reading comprehension and numerical ability sections, respectively. The questionnaire was completed at the beginning of the study and after 3 months of peer support intervention during face-to-face interviews with each patient.

The obtained data were analyzed with SPSS 22. The tables of distribution, frequency, mean, and standard deviation (SD) were used to summarize demographic and disease characteristics. The difference between these variables in the two groups was measured by chi-square and Fisher's exact tests. To examine changes in HL, the Kolmogorov-Smirnov test was performed, indicating that the data were normal. Leven's test also showed the equality of variances. Moreover, an independent *t* test was applied to examine the mean intergroup changes in HL. Eventually, paired *t* test was employed to investigate the mean intragroup differences of this variable before and after the intervention in each group, and the significance level was considered to be less than 0.05.

Results

Based on the results, 80 patients with T2D participated in this study. The mean (\pm SD) age of the participants was 53.65 ± 14.26 and 54.47 ± 12.89 years in the intervention and control groups, respectively. Additionally, the mean (\pm SD) of the duration of diabetes was 10.67 ± 4.41 and 8.90 ± 3.59 years in the intervention and control groups, respectively. None of the patients received financial assistance for their care or treatment. The results revealed no significant difference between the participants of the two groups in terms of demographic and disease characteristics (Table 2).

The investigation of the frequency (percentage) of participants' HL before the intervention represented that 54 (67.5%), 22 (27.5%), and 4 (5%) patients had inadequate, borderline, and adequate HL levels, respectively. The mean (\pm SD) of participants' HL at the beginning of the study was 54.87 ± 12.27 (Table 3).

The study of within-group effects in the intervention group showed that the mean HL had a significant decrease after 3 months of intervention compared to before the intervention ($P < 0.001$) although these changes were not significant in the control group ($P = 0.115$). The study of

Table 1. Content of the Peer Training Program During Three Months of Supportive Intervention

| Session | Objectives | A Summary of Topics and Activities | Educational Time (min) |
|---------|---|---|------------------------|
| 1 | Healthy nutrition and blood sugar control | Identifying barriers to and facilitators of self-care behaviors and expressing experiences | First month (120) |
| 2 | Physical activity, foot care, and control of complications | Exchanging information with group members and providing solutions | Second month (120) |
| 3 | Diabetes medication | Exchanging information with group members and providing solutions | Third month (120) |
| 4 | Get acquainted with simple and useful activities for health | Suggesting group exercise, group walks, and simple exercises that can be performed at home without any facilities | Monthly (60) |
| 5 | Group food purchase | Familiarizing yourself with the right foods for diabetics, reading food labels, and explaining important points, and choosing the most economical and appropriate foods for each meal that fit the nutrition pyramid in diabetics | Monthly (60) |

intergroup changes indicated that there was no significant difference between the intervention and control groups in terms of mean HL before the intervention ($P=0.204$). However, the mean HL in the intervention group confirmed a significant improvement in this group after the intervention in comparison with the control group ($P<0.001$, Table 3).

Discussion

The findings revealed that there was no significant difference in the mean of HL between the two groups before the intervention. Contrarily, HL in the intervention group was significantly improved after the intervention compared to the control group.

Consistent with the findings of the present study, Tol et al found that education in small groups can improve HL in women with T2D (7). Although the type of intervention in this study is different from that in our study, placing patients in small groups can lead to the exchange of information between group members who have a similar disease and help improve their knowledge about the disease. However, the competence of group members to

share experiences, the scientific accuracy of the exchanged information, and the manner of educating in this study differ from those of peers in our study. In addition, other goals such as social and emotional support of patients in addition to information exchange were considered in our study.

In this regard, Hejazi et al also reported that education based on self-efficacy theory leads to improved HL in patients with T2D (26), which conforms to our findings, implying that providing specific diabetes education has led to increased HL. The results of our study also represented that the peer support program, despite emphasizing the specific knowledge of diabetes, has led to improved HL. In this regard, Caruso concluded that the acquisition of diabetes-specific knowledge is associated with increased HL (28). These results have been confirmed in different societies by different analysis methods and even using different tools (29,30).

In another study, Kandula et al also demonstrated that multimedia education programs lead to improved HL and disease knowledge in patients with T2D (31), which is in line with our study findings in terms of applying various educational approaches. In designing the peer support program, we also attempted to increase patients' access to information by holding group meetings in public places, telephone follow-up, and face-to-face meetings.

The other findings of the present study showed that the HL score of most participants was inadequate at the beginning of the study. This finding corroborates with the results of Charoghchian Khorasani et al and Mehrtak et al on patients with T2D, reporting HL as 68.5% and 59.3% and inadequate, respectively (32,33). In these studies, the TOFHLA questionnaire was used to measure HL as well. Consistent with our results, Momeni et al reported that in most cases, HL is inadequate in Iranian patients with diabetes (34), highlighting the need for using new and available strategies to promote HL.

The findings of the present study confirmed the effectiveness of peer support in improving the HL of diabetic patients with mostly inadequate HL. Similarly, some studies (18,22) emphasized the flexibility of this source of support with different sociocultural conditions (by choosing a peer with sociocultural characteristics similar to those of patients with diabetes), there is little evidence to support this finding (34). Furthermore, the application of peer strategies depends on some factors such as basic knowledge, experience, and communication skills of peers and their acceptance by patients, which can affect

Table 2. Demographic Characteristics of the Study Groups

| Demographic Characteristics | | Experimental Group | Control Group | P Value |
|-----------------------------|---------------------|--------------------|---------------|--------------------|
| | | No. (%) | No. (%) | |
| Age (y) | Less than 50 | 19 (47.5) | 16 (40) | 0.499 ^a |
| | More than 51 | 21 (52.5) | 24 (60) | |
| Gender | Male | 17 (42.5) | 16 (40) | 0.820 ^a |
| | Female | 23 (57.5) | 24 (60) | |
| Marital status | Single | 3 (7.5) | 1 (2.5) | 0.796 ^b |
| | Married | 31 (77.5) | 33 (82.5) | |
| | Widow | 5 (12.5) | 4 (10) | |
| | Divorced | 1 (2.5) | 2 (5) | |
| Occupation | Housewife | 12 (30) | 16 (40) | 0.744 ^b |
| | Self-employed | 8 (20) | 10 (25) | |
| | Corporate job | 9 (22.5) | 5 (12.5) | |
| | Retired | 3 (7.5) | 4 (10) | |
| | Student | 2 (5) | 1 (2.5) | |
| | Farmer | 6 (15) | 4 (10) | |
| Education | Illiterate | 2 (5) | 3 (7.5) | 0.445 ^b |
| | Primary school | 11 (27.5) | 5 (12.5) | |
| | High school diploma | 13 (32.5) | 12 (30) | |
| | Academic education | 14 (35) | 20 (50) | |

^aChi-square; ^bFisher's exact test.

Table 3. Comparing Mean (\pm SD) HL Before and After Three Months of Intervention in Two Groups

| Variables | Group | Baseline Mean (\pm SD) | Difference Mean | After 3 Months of Intervention Mean (\pm SD) | Difference Mean | P Value ^b |
|-----------------|----------------------|---------------------------|-----------------|---|------------------|----------------------|
| Health literacy | Experimental | 53.12 (\pm 13.86) | | 70.27 (\pm 9.78) | | <0.001 |
| | Control | 56.62 (\pm 10.34) | -3.5 \pm 3.52 | 56.87 (\pm 10.07) | 13.4 \pm -0.29 | 0.115 |
| | P-value ^a | 0.204 | | <0.001 | | - |

SD: Standard deviation.

^at test, ^bPaired t test.

the results. Therefore, further clinical trial studies following a peer supportive approach are needed on diabetic patients with different sociocultural characteristics to investigate the effect of peer support on improving HL.

To the best of our knowledge, the present study is the first clinical trial to evaluate the effectiveness of peer support on HL in Iran. It is noteworthy that this study was conducted following a support approach on patients with T2D in an area deprived of support resources, which is unique in its kind. Another strength of this study is the use of peers with a similar culture, language, and living conditions to those of the study participants. This eliminated potential problems with effective communication. On the other hand, one of the limitations of this study was the inadequate HL of the study participants due to the location and context of the research environment. To control the effect of this issue in all stages of education, the concepts were provided to the participants as simplified as possible while maintaining the scientific principles of the subject. Another limitation of the study was the concurrence of the study with the coronavirus outbreak, which may have affected the study process due to the observance of all health protocols.

Conclusion

Overall, the findings of the present study showed that peer support can lead to improved HL in patients with T2D with mostly inadequate HL. These results can help diabetic patients' caregivers to use peer support resources to educate, exchange, and apply scientific information in simple language as appropriate to the culture and lifestyle of patients, especially in areas deprived of health facilities.

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Authors' Contribution

AS: Introduction, Writer/methodologist/main researcher/discussion writer (40%); FE: Methodologist/main researcher/statistical analyst (35%); FAS: Methodologist (15%); MI: Methodologist (10%).

Conflict of Interests

Authors declare that they have no conflict of interests.

Ethical Permissions

The present study is the result of a research proposal approved by the School of Nursing and Midwifery of Shahid Beheshti University of Medical Sciences, Tehran (with the ethics code of IR.SBMU.PHARMACY.REC.1398.348 on 02.03.2020 and registration code IRCT20150525022406N2 in the Iranian Registry of Clinical Trials). At the beginning of the study, written and informed consent forms were obtained from the participants while explaining the research objectives. They were also assured that they could leave the study at any time, and this issue would have no effect on their care process.

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