# Relationship between Health-Promoting Behaviors and Family Perceived Social Support in Type 2 Diabetes Patients

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**ABSTRACT**

**Aims** Evaluating diabetics' health-promoting behaviors is an essential part of nursing care. This study aimed to examine the relationship between health-promoting behaviors and perceived social support from the family in patients with type 2 diabetes.

**Materials & Methods** This was a descriptive cross-sectional study. The data were collected from a foundation university hospital in Tabriz, Iran. The sample consisted of 183 type 2 diabetes patients. Data were collected using the Perceived Social Support from Family and Health-Promoting Behaviors scales.

**Findings** The average score of social support was 15.07±6.74 (range: 0 to 20), and the average score of health-promoting behaviors was 49.62±17.74 (range: 0 to 112). There was a significant and positive correlation between the scores of health-promoting behaviors and perceived social support (r=0.28, p<0.001). We predicted the changes in health-promoting behaviors based on the regression analysis of the changes in perceived social support from the family (B=0.563).

**Conclusion** Family social support affects health-promoting behaviors in type 2 diabetes patients, and should be considered during interventions to improve health-promoting behaviors by nurses and other healthcare providers. We suggest other descriptive correlational studies with a higher sample size and interventional studies on this subject.

**Keywords** Health; Social Support; Family; Diabetes Mellitus

**CITATION LINKS**

[1] Effects of health education programs for the ... [2] Perspectives of persons with type 2 Diabetes ... [3] Health-promoting behavior is positively associated ... [4] Determinants of health-promoting behaviors ... [5] Obesity of children and adults-pandemic ... [6] Relationship of sedentary lifestyle with obesity and comorbidities. In: Physical ... [7] Relationship between characteristic, hypertension and ... [8] Assessment of quality of life, psycho-emotional state, eating behavior ... [9] The nature of perceived social support: Findings of ... [10] The Relationship between perceived social support ... [11] Assessment of health promoting behaviors and relevant factors among type 2 ... [12] People with type 2 diabetes report dietitians, social ... [13] Partner involvement in type 2 Diabetes self-management ... [14] Impact of physical exercise and caloric ... [15] Effectiveness of a nurse-led mindfulness stress-reduction ... [16] Well-being therapy and lifestyle intervention in type 2 ... [17] Effect of a very low-carbohydrate ketogenic diet ... [18] The relationship between health literacy ... [19] Perceived diabetes risk and actual risk level in relatives of ... [20] The relationship between self-care activities, social support ... [21] Relationship between perceived social support and ... [22] Study on social support for exercise and its impact on the level of ... [23] Health behavior changes after a diabetes diagnosis: The moderating ... [24] The relationship between health literacy and health promoting behaviors in ... [25] Physical and psychosocial factors associated with health-promoting ... [26] Perceived social support in individuals with diabetic ... [27] Relation between perceived social support and health ... [28] Social support and self-care behaviors in diabetic patients referring to ... [29] The relationship between perceived social support from family and diabetes self-management among patients ... [30] Self-care in Iranian patients with diabetes: A systematic review and ... [31] Social support and peer group integration of adolescents ... [32] Effects of self-efficacy and social support on health promotion ... [33] Health promoting behavior model based on spiritual health, social ... [34] Health promoting self-care behaviors and its related factors ... [35] General self-efficacy and diabetes management self-efficacy of diabetic patients referred to diabetes clinic of ...

## Introduction

The focus of health-promoting behaviors of nurses is fixated on disease prevention and the alteration of individuals' behavior considering their health condition. However, their role as health promotors is complicated. Based on Pender's definition, a health-promoting behavior is any action individuals undertake to increase or maintain self or group health conditions and self-fulfillment. Pender *et al.* categorized health-promoting behaviors into six aspects, including nutrition, physical activity, stress management, health accountability, individual interactions, and spiritual development [1].

The global increase in type 2 diabetes poses a significant public health challenge worldwide [2].

Health-promoting behaviors regarding patients with diabetes include behaviors, by which the patient pursues proper nutrition, regular exercise, avoiding harmful behaviors, early diagnosis of the disease symptoms, controlling emotions, coping with tensions, and improving interpersonal relationships [3]. Chen categorized the health-promoting behaviors of patients with diabetes into six aspects focused on physical activities, reducing risk-taking, enjoying life, stress management, personal accountability for wellness, and healthy nutrition [4]. Diabetes can cause significant alterations in various aspects of life [5], such as dietary habits [6], physical activity [7], and emotional well-being [8]. Due to these reasons and due to the chronic nature of diabetes, presenting suitable strategies for controlling diabetes is a challenge for most diabetes patients [9]. Family support can lead to better self-care [10]. Social support from family members can help patients with diabetes adapt to their disease and cope with its challenges [11]. Since most diabetes care is done at home, the family can play an important role in controlling blood sugar levels. Diabetes can cause vital alterations in various aspects of life; hence, managing this disease without familial and social support would be difficult [12].

The perceived social support from the family can potentially increase the patient's ability to enhance his/her coping ability with stressful events in life. However, the role of perceived social support from the family to control diabetes and adapt to the environment is mostly ignored [13]. Given the importance of health-promoting behaviors in diabetes management, it is important to understand the current state of these behaviors among patients. Several studies have found that patients with diabetes often have low levels of physical activity [14], stress management [15], personal accountability for wellness [16] or healthy nutrition [17]. Studies on health-promoting behaviors are limited [4].

Most studies have indicated that the average score of health-promoting behaviors in type 2 diabetes is relatively low or moderate in Iran [11, 18] and other countries [6, 19].

The literature review showed that the average score of social support for type 2 diabetes was different from low to moderate or good levels in Iran and other countries [20-22].

Health-promoting behaviors of patients with diabetes may be promoted by multiple interventions to train the patients [3]. Studies have suggested a significant correlation between health-promoting behaviors, fasting blood sugar (FBS) levels, HbA1c levels, and disease management [4], and social support and self-care behaviors [10].

Despite considering the role of family social support in the management of diabetes [10], we did not find any study on the relationship between the two concepts. One study in 2022 showed that mobilizing social support from family may help individuals adopt health-promoting behaviors and manage diabetes after a diagnosis among middle-aged and older adults [23].

This study focused on three behaviors, including drinking, smoking, and physical activity [23]. We did not find any study on the relation between the two concepts in all dimensions. This study was done to explore the relationship between perceived social support from the family and health-promoting behaviors in patients with diabetes. The results of the study could be helpful in identifying effective interventions to promote these behaviors.

## Instrument and Methods

This cross-sectional and descriptive correlational study was conducted on patients with type 2 diabetes referring to the endocrine clinic at Sina Training and Medical Center (a primary center of this field in Tabriz) affiliated with Tabriz University of Medical Sciences, Tabriz, Iran, from September 2021 to January 2022. Due to a lack of access to the complete list of patients, we selected the participants of this study using a convenience sampling method following the inclusion/exclusion criteria. Considering a reliability coefficient of 95%, a power of 90%, and using an estimation of a notable correlation coefficient for the researchers on the two mentioned parameters equal to 0.25, we calculated the sample size using the related formula to determine the correlation. Then, by adding a 10% dropout for invalid questionnaires, the number summed to 183 participants.

The standard normal deviate for $\alpha = Z\alpha = 1.9600$
The standard normal deviate for $\beta = Z\beta = 1.2816$
$C = 0.5 \times \ln[(1+r)/(1-r)] = 0.2554$
Total sample size $= N = [(Z\alpha + Z\beta)/C]2 + 3 = 164$

The inclusion criteria included type 2 diabetes patients aged 30 to 70 years, a definite diagnosis of diabetes based on the American Diabetes Association guideline, conscious patients able to communicate, lack of speech and hearing difficulties, lack of mental or psychological problems (according to patients), and not using psychoactive drugs. The exclusion

criteria included a lack of response to more than 20% of the statements.

**Measures**
The data were collected using the Health-Promoting Behaviors Scale (HPBS) and Perceived Social Support from Family (PSS-Fa).

Personal information was collected using a demographic form, including age, gender, level of education, height, weight, marital status, residence address, race, history of diabetes, membership in diabetes-related associations, a history of diabetes among the family members, and the frequency of visiting a physician (to control diabetes), and tablet or insulin usage.

**HBPS**
Chen *et al.* (2013) designed this questionnaire in Taiwan [3], and Tol *et al.* (2014) translated it into Persian [4]. The higher scores on this scale indicate better behaviors to promote health. This scale investigates health-promoting behaviors from six aspects (physical activities: seven statements, reduction of risk-taking: seven statements, enjoying life: three statements, stress management: five statements, personal accountability for wellness: three statements, and healthy nutrition: three statements). This Likert-scale questionnaire uses a scoring system of zero to four (0: never, 1: rarely, 2: sometimes, 3: mostly, 4: always).

The lowest and highest scores were 0 and 112, respectively. Tol *et al.* reported an internal consistency of 0.9 for the Persian version to determine the reliability of the scale for measuring health-promoting behaviors of patients with diabetes in Iran [4]. This study also used a test-retest method to calculate internal consistency. In another study in Iran in 2018, the total reliability of the scale was 0.96 [24]. We determined the internal correlation coefficient by examining 20 participants at a two-week interval. The internal correlation coefficient of the scale was 0.91.

**PSS-Fa**
We used a measurement scale for social support from the family suggested by Procidano (1983) to measure the perceived social support from the family [9]. The scale consisted of two separate sections for friends and family. This study only applied the section dedicated to family. The scale included 30 statements with measuring responses, including yes, no, and I don't know. The answer 'yes' to statements 1, 2, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, and 18, and the answer 'no' to statements 3, 4, 16, 19, and 20 received one point. The 'I don't know option did not receive any score. The lowest and highest scores were 0 and 20, respectively. The higher numbers on this scale indicated better-perceived support from the family by the patient [9].

Azar Tol *et al.* (2011) also used this measuring scale in Iran to measure social support from the family. They reported an internal consistency of 0.85 for the Persian version [10]. In another study in Iran in 2018, the total reliability of the scale was 0.96 [24]. The reliability of the scale in the current study was also assessed using the internal consistency reliability test (0.93).

**Ethical Considerations**
Ethical approval was obtained from the Tabriz University of Medical Sciences (IR.TBZMED.REC.1400.339). The participants were instructed not to write their names on the questionnaires. Written consent was obtained from the participants after explaining the research purpose and methodology, they were assured that the data would remain confidential and would not be used or made available in any context beyond this study.

**Data Collection**
The author visited the clinic multiple times at different shifts (morning and evening) to perform the sampling. The author then distributed the questionnaires inside a folder, and the patients added their responses. If the participant could not read and write, the author asked the questions and filled out the questionnaire. The participants were provided with sufficient time to answer the questionnaires.

**Data Analysis**
Data were analyzed using SPSS 16.0 (IBM Inc., Armonk, NY, USA) for Windows. The mean and standard deviation (SD) were used as descriptive statistics. The symmetric quantitative data were described using mean and SD, and the asymmetrically distributed data were described using the median and interquartile range.

Qualitative data were reported as frequency and percentage. Skewness and kurtosis values and variance coefficients were obtained using the Shapiro-Wilk test, which was performed to determine whether the scale scores were distributed normally.

We investigated the relationship between the variables using the Pearson correlation coefficient. We also used multivariate regression to control the confounding variables while examining the relationship between health-promoting behaviors and social support. Cronbach's alpha was used to calculate the internal consistency coefficient of the scales.

# Findings

Most participants were women (61.5%) and married (95.1%), had a family history of diabetes (56.1%), were not smokers (90.7%), and reported using oral medication (27.1). The average age of the participants was 59 years, and the average duration of their diabetes (after the diagnosis) was 14 years (Table 1).

The average score of social support was 15.07±6.74 (range: 0 to 20). The average score of health-promoting behaviors was 49.62±17.74 (range: 0 to 112; Table 2).

**Table 1)** Frequency and mean of demographics of diabetes patients

| Variable | | Frequency (%) |
|---|---|---|
| **Gender** | Female | 112 (61.5) |
| | Male | 70 (38.5) |
| **Occupation** | Freelancer | 30 (18.1) |
| | Retired | 16 (9.6) |
| | Housewife | 83 (50) |
| | Unemployed | 25 (15.1) |
| | Employee | 12 (7.2) |
| **Level of education** | Under diploma | 137 (74.9) |
| | Diploma | 29 (15.8) |
| | University degree | 17 (9.3) |
| **History of diabetes in the family** | Yes | 101 (56.1) |
| | No | 79 (43.9) |
| **Diabetes type** | Oral Medication | 49 (27.1) |
| | Insulin therapy | 15 (8.3) |
| | Both | 117 (64.6) |
| **Cigarette smoking** | Yes | 17 (9.3) |
| | No | 165 (90.7) |
| **Marital status** | Single | 9 (4.9) |
| | Married | 173 (95.1) |
| **Age (years)** | | 59.47±11.78 |
| **Type 2 diabetes history (years)** | | 14.26±7.47 |
| **Height (cm)** | | 167.87±7.74 |
| **Weight (kg)** | | 75.70±12.07 |
| **HbA1C** | | 8.34±1.86 |

**Table 2)** Total scores and the mean scores of the dimensions of the Health-Promoting Behaviors Scale (HPBS) and Perceived Social Support from Family (PSS-Fa) scales

| Dimensions | Average | Standard deviation | Number of questions | Range of scores | Average scores (0-100) |
|---|---|---|---|---|---|
| **Physical activities** | 7.83 | 7.48 | 7 | 7-35 | 22.37 |
| **Reduced risk-taking** | 9.14 | 6.10 | 7 | 7-35 | 26.11 |
| **Enjoying life** | 8.30 | 2.91 | 3 | 3-15 | 55.33 |
| **Stress management** | 10.51 | 3.86 | 5 | 5-25 | 42.04 |
| **Responsibility for self-care** | 9.29 | 2.43 | 3 | 3-15 | 61.9 |
| **Healthy nutrition** | 5.16 | 2.23 | 2 | 2-10 | 51.6 |
| **The total score of the Health-Promoting Behavior Scale** | 49.62 | 17.74 | 27 | 0-112 | 44.30 |
| **The total score of Perceived Social Support from the Family Scale** | 15.07 | 6.74 | 20 | 0-20 | 75.35 |

The average score of the domains of physical activities, reduced risk-taking, enjoying life, stress management, responsibility for self-care, and healthy nutrition was 7.83±7.48, 9.14±6.10, 8.30±2.91, 10.51±3.86, 9.29±2.43, and 5.16±2.23.

**Table 3)** The correlation (r) between the average score of health-promoting behaviors and perceived social support from the family in patients with type 2 diabetes (Pearson Correlation coefficient)

| Health-promoting behaviors | Perceived social support | p Value |
|---|---|---|
| **Physical activity** | 0.21 | 0.001 |
| **Reduced risk-taking** | 0.13 | 0.07 |
| **Enjoying life** | 0.34 | 0.001 |
| **Stress management** | 0.26 | 0.001 |
| **Responsibility toward self-care** | 0.14 | 0.05 |
| **Healthy nutrition** | 0.13 | 0.07 |
| **The total score of health-promoting behaviors** | 0.28 | 0.001 |

In the domain of health-promoting behaviors, the highest averages were related to responsibility for self-care (61.9; range: 0 to 100), and the lowest averages were related to physical activities (22.37; range: 0 to 100).
There was a significant and positive relationship between the scores of health-promoting behaviors and perceived social support (p<0.001, r=0.28).

The alterations in health-promoting behaviors were predictable based on the linear regression of the changes in perceived social support from the family (B=0.563). Some demographical variables, including age (p<0.001; B=0.291), glycosylated hemoglobin level (p<0.001; B=0.234), and education level (p<0.001; B=0.444) could predict the changes in health-promoting behaviors (Tables 3 and 4).

**Table 4)** Linear regression to examine the predictive effect of perceived social support from the family on health-promoting behaviors (Adjusted R²=0.563; All cases p Values<0.001)

| Parameter | Constant | B | β | t | R² |
|---|---|---|---|---|---|
| **Physical activity** | -7.583 | 0.307 | 0.752 | 14.629 | 0.566 |
| **Avoiding hazardous conditions** | -4.499 | 0.273 | 0.814 | 17.966 | 0.663 |
| **Concept of enjoying life** | 2.645 | 0.114 | 0.708 | 12.383 | 0.501 |
| **Stress management** | 1.383 | 0.073 | 0.588 | 9.304 | 0.345 |
| **Responsibility toward self-care** | 9.320 | 0.115 | 0.282 | 3.730 | 0.080 |
| **Healthy nutrition** | 2.731 | 0.155 | 0.710 | 12.901 | 0.504 |

## Discussion

The present study aimed to determine the health-promoting behaviors and their relationship with perceived social support from the family in diabetic patients at diabetes clinics of Tabriz. The result

indicated that considering the range of the scores, the average score of health-promoting behavior in patients with diabetes was lower than the average. Chen *et al.* (2013) assessed the relationship between health-promoting behaviors and controlling type 2 diabetic patients and indicated that the level of health-promoting behaviors in these patients was low, which is consistent with the results of the current study [3].

In some other studies in Iran, the level of health-promoting behaviors in most type 2 diabetic patients was also poor [11, 18]. In Tol *et al.*'s study, the mean score of total health-promoting behaviors in participants was 55.88±18.09 [4], which was higher than our study, and in another study in Iran, the average score of health-promotion behaviors in diabetic patients was good [24]. Wu *et al.* (2004) indicated that diabetes patients were more likely to engage in health-promoting behaviors if they were physically well [25] and Tol *et al.* indicated that there was a significant association between total health-promoting behavior and some demographic variables, such as age, occupation, and family income [4]. The findings of our study, in line with the linear regression model, indicated a significant relationship between health-promoting behaviors and age, education, and glycosylated hemoglobin level; thus, the differences in characteristics of participants in studies might justify the variety of results.

Regarding the various aspects of health-promoting behaviors, the lowest mean scores were related to physical activities. The findings of this study are in line with most other studies in Iran [18, 24]. It seems that patients with chronic diseases, such as diabetes, have not had accurate and comprehensive information about the advantages of regular exercise and may lack essential motivators for physical activity [24] In our study, the highest mean scores were related to responsibility for self-care. In another study conducted by Mirsamiyazdi *et al.* in Iran using another scale to measure health-promoting behaviors in type 2 diabetes patients, the most common health-promoting behaviors were blood sugar control and foot control. [18] In another research conducted in Iran using our scale, the highest scores of health-promoting behaviors were observed in the nutrition dimension [24]. The differences in characteristics of participants in studies might justify the variety of results. We believe that responsibility for self-care is more related to the follow-up of patients from the treatment centers, and considering that in our study, in most cases, the date of the patient's follow-up was determined after the completion of the patient's visit, and often follow-up was done by the treatment centers, this possibly affected the results. It is suggested that more studies be conducted on the role of medical centers in promoting health-promoting behaviors in type 2 diabetic patients. The results of the current study indicated that considering the minimum and maximum scores, the mean scores of perceived social support from the family were acceptable. The relevant studies have shown a satisfactory level of perceived social support from family and friends of diabetic patients [26-28]. A similar study in Uganda also reported that 95.3% of diabetics received adequate support from their family members [29].

According to the results of our study, there was a positive and statistically significant relationship between the level of perceived social support from the family and the health-promoting behavior of diabetic patients. Some other similar studies also discovered a significant relationship between social support from family members and self-care and self-management of diabetic patients [29].

Based on the regression model, the alterations in perceived social support from the family can predict the changes in health-promoting behaviors. With one unit change in the level of social support, health-promoting behavior would change by 0.56 units.

Similar to the current study, our literature review indicated that perceived social support from the family plays a vital role in controlling and encouraging diabetic patients toward self-caring and pursuing treatment and healthy diets [21, 28, 30, 31] which explains the predictor role of social support. Jo *et al.* (2019) indicated that social support had a positive and significant correlation with health-promoting behaviors, and social support predicted 40% of the health-promoting behaviors of stroke patients [32].

According to another study, social support also plays a vital role in health-promoting behaviors in cardiovascular patients [33].

The findings of this study, in line with the linear regression model, indicated a significant relationship between health-promoting behaviors and age, education, and glycosylated hemoglobin level. Other similar studies [11, 34] also have revealed that increased education levels were concurrent with increased health-promoting behaviors, which was consistent with the current research. Increased education levels promoted knowledge in patients about their disease, thereby increasing their self-care and health-promoting behaviors. The findings of this study indicated that with increasing age, health-promoting behaviors of diabetes patients decrease.

Aging decreases the physical and cognitive abilities of individuals, which may be the reason for decreased health-promoting behaviors. However, Maheri *et al.* [11] indicated that the age group of 50-65 years had better health-promoting behaviors compared to diabetic patients under 50 and over 65 years.

The current study revealed a significant inverse relationship between the glycosylated hemoglobin level and health-promoting behaviors. Thus, lower health-promoting behaviors were concurrent with higher glycosylated hemoglobin levels. Dehghan *et al.* [35] also reported a significant relationship between glycosylated hemoglobin levels and health-

promoting behaviors. The less a person performs health-promoting behaviors, the higher the blood sugar and glycosylated hemoglobin levels will be.

## Study limitations
The application of a questionnaire for diabetics to assess health-promoting behaviors was the strength of this study. The current study had limitations that should be considered when using its results, including small sample size, the mere survey of patients' attitudes, the probability of inaccuracy in answering questions and considering only one medical center. Therefore, further studies with larger sample sizes are suggested. We conducted our study with a convenient sampling method. It is suggested that more studies be conducted in Iran to measure health-promoting behaviors with a larger sample size.

## Conclusion
The result of the current study indicated that the average score of health-promoting behavior in patients with diabetes was lower than the average. Therefore, it is necessary for healthcare providers to focus on interventions that increase health-promoting behaviors. Further studies with larger sample sizes are suggested in regard. Based on our research, family social support is a factor that affects health-promoting behaviors in diabetic patients, and it should be considered during interventions to improve health-promoting behaviors by nurses and other healthcare providers.
Interventional studies to increase promoted behaviors with interventions based on family support are suggested. In addition, it is suggested that the participation of the family should be encouraged as much as possible.

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