

# Self-Efficacy and Its Association with Locus of Control in Diabetes in Turkey

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## ABSTRACT

**Objective:** This descriptive-relational study was conducted to determine self-efficacy levels of individuals with type 2 diabetes, relationship between these levels both some sociodemographic characteristics and health locus of control.

**Methods:** The sample of this study was occurred 325 patients with diabetes who applied to the health care center constituted. Data were collected via 'Questionnaire Form', 'Self-efficacy in Diabetes Scale' and 'Multidimensional Health Locus of Control Scale'.

**Results:** The average age of participants was 53.3±8 years, 51.4% of participants were women. It was found that the diagnosis time 8.7±7.2 years, the level of HbA1c was 8.2±1.1. In the sub dimensions of Diabetes Self-efficacy Scale, the patients got points as follows; sub dimension of Diet+Foot Control 39.4±12.5, sub dimension of Medical Treatment 22.6±3,1, sub dimension of Physical Exercise 9.0±4.5. It was determined that in Multidimensional Health Locus of Control Scale, the patients got the highest points from the sub dimension of Powerful Others Locus of Control. A positive but weak level relation was determined between self-efficacy both total and subdimensions grades dimensions of health locus of control scale ( $p<0.05$ ). According to multiple regression analysis, variables in the model were the age range of 30-40 years, not exercising, not obeying the diabetes regimen has been detected.

**Conclusion:** It is seen that patients with DM have medium level of self-efficacy and tend to believe the effects of external forces at a higher rate in the management of the disease.

**Keywords:** Health locus of control, nursing, self-efficacy, type 2 diabetes

## 1. INTRODUCTION

It is important for diabetic population to acquire positive health behaviors by arranging their life style, as diabetes mellitus (DM) is a chronic disorder affecting all aspects of life. Described as individuals' believing themselves, self-efficacy is a determinant so as to develop and maintain positive health behaviors and a significant factor defining how individuals feel, consider and behave (1-3). One of the concepts accounting for different behaviors individuals exhibit for DM, the locus of control is the perception explaining that positive or negative events affecting individual health status occur as a result of the behaviors or with the effect of external forces such as chance or accidents (4, 5). While those perceiving the consequences of events as an extension of their direct behaviors are described as "internally controlled individuals", others believing that the consequences are independent of their own behaviors, and that the control are due to other factors out of their own are described as "externally controlled". Internally controlled individuals consider that the control of the events encountered and consequences is in their hands, and tend to take the responsibility of their own health and to display positive health behaviors in order to maintain and develop a healthy

life style. Externally controlled individuals, however, seek the consequences of the events they face in the forces out of their domain. Such individuals do not wish to take responsibilities due to the factors, such as the sensitivity to psychological problems and the association between satisfaction, and social and environmental conditions, and consider their health status is dependent on fate and chance (5-8).

In the nursing management of chronic disorders such as DM, such indicators as health control focus are important to be evaluated to develop patients' self-efficacy. In studies investigating the effects of health control focuses on DM, the rates of regular diet and exercises, HbA1c values, self-efficacy levels and self-care behaviors were observed to be affected positively, when internal control focus increased (9-12).

Given that health control focus is the determinant of patients' behaviors, and self-efficacy is also an important component of maintaining these behaviors, nurses' determination of health control focus and self-efficacy levels of patients plays a part in individualized health care. Because the number of studies assessing both of these variables is limited, the

present study was designed and performed to determine the levels of health control focus and self-efficacy in patients with type 2 DM.

### 1.1. Study Questions

1. What are the self-efficacy levels of patients with type 2 DM?
2. Is there an association between health control focuses and self-efficacy levels of type 2 diabetic individuals'?
3. What are the determinants of the self-efficacy level of diabetes patients?

## 2. METHODS

### 2.1. Study Type

The present study was designed and performed as a descriptive-relational type of research.

### 2.2. Study Setting and Features

The study was performed in three health care centers in three counties in the city centre, for the samples include and represent all regions in the province of Konya/Turkey (Konya is a region in Central Anatolia in Turkey). The reasons why health care centers were chosen were associated with the following: the wish to evaluate patients with type 2 DM in settings where they live, lack of factors to affect directly the health control focus and self-efficacy levels of type 2 DM patients and others such as access to health facilities and performing diabetic treatment regularly in medical settings.

### 2.3. Sample Size

The samples participating in the study were composed of diabetic population registered to the automation system of The Turkish Ministry of Health in 2015. While detecting the number of samples, the sample size was defined as 325 with the acceptance of 95% confident interval (CI), 0.05 as significance and 0.10 as the effect of anticipation (13). Inclusion criteria for the study were; (i) to have diagnosis of type 2 DM at least for the last six months, (ii) to be between the ages of 18-65, (iii) to be graduation at least from a primary school. Those with the history of a diagnosed psychiatric disorder and communication problems due to different native languages were excluded out of the study.

### 2.4. Tools and Methods for Data Collection

The questionnaire was prepared by the researchers in light of literature (14-16). Developed by Van Der Bijl et al. (17), the Self-Efficacy Scale (SES) consisting of four subdimensions and 20 items was also used. In Turkish version of SES, the validity and reliability of which were developed by Kara et al. (18), three subscales were put into the scale. The Cronbach's alpha value was found as 0.89 for the scale. In our study, the Cronbach's alpha value was found as 0.91.

Developed by Wallston et al. (19) and with 18 items and three subscales, the Multidimensional Health Locus of Control Scale (MHCL), including the control focuses of internal health, powerful others and chance, was used as the second scale in the study (19, 20). The reliability and validity of Turkish version were implemented by Ustundag and Budak. The in-consistency coefficient of MHCL was found as 0.63. The Cronbach alpha was calculated as 0.61 in our study.

### 2.5. Data Collection

In collecting data, patients with DM were informed about the design of the study by practitioners in the centers, and all patients with DM were consecutively included into the study by starting from the first patient. On reaching the targeted number in the calculation of the sampling, data collection was discontinued. Due to including human participants, the study was reviewed by the local ethics committee and performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments, Informed consent was also obtained from all participants prior to their inclusion into the study.

### 2.6. Variables

**Dependent Variables :** Total score of self-efficacy

**Independent Variables :** *Sociodemographic Characteristics* (Age, gender, marital status, educational status, profession, perception of economic status, individual cohabited, number of family members) *and Health/Disease Characteristics* (Body mass index-BMI, Use of alcohol and cigarette smoking, diagnostic time of DM, level of HbA1c, History of DM in family, training for DM, status of considering sufficient training, status of regular health controls/follow-ups, type of diabetic treatment, status of regular drug use, status of regular exercise, compliance with regular diabetic dieting, subdimension scores of MHLCS)

### 2.7. Data Analysis

For statistical analysis of the data, a licensed SPSS 22 (IBM SPSS Inc, USA) package program was used. Data are summarized as number, percentage, mean, standard deviation. The suitability of normal distribution was determined by Kolmogorov-Smirnov test. Independent groups used t-test, Pearson correlation and one-way analysis of variance. Tukey HSD test was used to search for variance. The relationship between self-efficacy and Health Control Center was assessed by Pearson correlation analysis. Multiple regression analysis-Backward model was used to determine the self-efficacy determinants. The following assumptions were taken into account while applying the multiple regression model: (i) linear relationship (ii) multivariate normality (iii) no multicollinearity (iv) homoscedasticity. Significance was evaluated as  $p < 0.05$ .

### 2.8. Ethics

Approvals for this study were received from Selçuk University Health Sciences Faculty, Non-Interventional Clinical Researches Ethics Committee Decision no 2015/31 and

Konya Public Health Directorate no 86104336/600. Written informed consent was obtained from each of the participate.

### 3. RESULTS

Of the patients with type 2 DM in the study, mean age was found as  $53.3 \pm 8.0$ , and 51.4% were women, 88.9% were married, and 43.8% were housewives. While 63.4% of the study participants reported the perceived economic status as moderate, 58.9% declared that they lived with partners and children, and mean number of family members was found to be  $3.76 \pm 1.8$ . It was observed that mean body mass index (BMI) of the study participants was  $30.1 \pm 4.8$  kg/m<sup>2</sup>, 76.9% were composed of non-users of tobacco, mean duration of cigarette smoking was  $15.5 \pm 7.9$  years in users, 98.5% were non-users of alcoholic drinks, mean duration of using alcohol was as  $12.6 \pm 4.8$  years among alcohol users, 52.6% had no exercise on a regular basis, 66.5% did not comply with diabetic dieting, and 80.9% were regularly followed-up as to health controls. Among the study participants, it was also determined that mean duration of diagnosis of DM was  $8.7 \pm 7.2$  years, while the level of HbA1c was detected as  $8.2 \pm 1.1$ , 54.2% had no familial history of DM, 87.7% were trained as to DM, and 76.8% had diabetic training at sufficient level. Of the patients with DM, 69.2% were found to absorb only oral antidiabetic drugs, while 88% were detected to take in drugs regularly (Table 1).

**Table 1.** Baseline characteristics in the participants

	Mean±SD	
Age	53.3±8.0	
Body mass index	30.1±4.8 kg/m <sup>2</sup>	
	Number	%
<b>Gender</b>		
Female	167	51.4
Male	158	48.6
<b>Marital status</b>		
Married	289	88.9
Single	36	11.1
<b>Perceived economic status</b>		
Bad	41	12.6
Average	206	63.4
Good	78	24.0
<b>Status of regular exercise</b>		
Yes	79	24.3
No	171	52.6
Sometimes	75	23.1
<b>Status of compliance with regular diabetic dieting</b>		
Yes	216	66.5
No	109	33.5
<b>Status of regular health controls</b>		
Yes	263	80.9
No	62	19.1
<b>Status of training for DM</b>		
Yes	285	87.7
No	40	12.3
<b>Total</b>	<b>325</b>	<b>100.0</b>

It's found that total score of self-efficacy scale is  $71.1 \pm 16.8$ , score of diet+foot control subdimension is  $39.4 \pm 12.5$ , score of medical treatment subdimension is  $22.6 \pm 3.1$  and score of physical exercises subdimension is  $9.0 \pm 4.5$ . From the Multidimensional Health Locus of Control Scale, it's determined that score of internal health control focus is  $25.3 \pm 6.8$ , score of powerful others health control is  $27.3 \pm 4.7$  and score of chance control focus is  $17.9 \pm 5.5$ . The scores of the scales are presented in Table 2.

**Table 2.** The distribution scores from the subscales of the self-efficacy and multidimensional health locus of control scales

	Mean±SD	Median	Minimum	Maximum
<b>Self-efficacy Scale</b>				
Diet+Foot Control	39.4±12.5	43.0	12	60
Medical Treatment	22.6±3.1	25.0	5	25
Physical Exercises	9.0±4.5	10.0	3	15
Total	71.1±16.8	75.0	20	100
<b>Multidimensional Health Locus of Control Scale</b>				
Internal Health Control Focus	25.3±6.8	27.0	6	36
Powerful Others Health Control Focus	27.3±4.7	27.0	6	36
Chance Control Focus	17.9±5.5	27.0	6	36

When the association between subscale of diet+foot control of SES and health control focus scale was investigated, it was seen that internal health control and powerful others control focuses displayed a significant association, but there was no association between chance control focus and subscale of diet+foot control. It was observed that as the scores of internal health control and powerful others focuses increased, the score of diet+foot control increased and affected the internal health control focus weakly, while affecting the powerful others focus too weakly. However, as to the medical treatment subscale, a positive and too weak association was seen to be present only in powerful others focus. Also, in the physical exercise subscale, a positive and weak association was found with all the subscales of health control focus scale. Likewise, except for self-efficacy total score and the chance subscale of health control scale, an association at positive and weak level was observed with the other two subscales ( $p < 0.05$ ). Association with the self-efficacy scale and health locus of control are presented in Table 3. In order to evaluate the effect of the independent variables, multiple regression analysis was used in all variables which affecting the total self-efficacy scale score were included in the analysis and it is presented in Table 4. According to analysis by Backward method, the most recent variables in the model were the age range of 30-40 years ( $p = 0.008$ ), not exercising ( $p = 0.009$ ), not obeying the diabetes regimen ( $p = 0.000$ ) has been detected.

**Table 3.** Association with the self-efficacy scale and health locus of control

	Diet+Foot Control	Medical Treatment	Physical Exercises	Total
Internal Health Control Focus	r=0.351 p<0.001	r=0.100 p=0.072	r=0.394 p<0.001	r=0.386 p<0.001
Powerful Others Control Focus	r=0.202 p<0.001	r=0.177 p=0.001	r=0.305 p<0.001	r=0.265 p<0.001
Chance Control Focus	r=0.028 p=0.615	r=-0.065 p=0.244	r=0.265 p<0.001	r=0.038 p=0.494

**Table 4.** Self-efficacy determinants of individuals with type 2 diabetes (Multiple regression analysis-Backward model)

Determinant Factors	Beta	t	p
Age (30-40 ages=1)	-0.125	-2.705	0.008
Exercise (No=1)	-0.129	-2.630	0.009
Adherence to diabetic regimen (No=1)	-0.739	-15.144	<0.001
Perceived efficiency of training (insufficient=1)	-0.121	-2.625	0.010
<b>F=80.422 p&lt;0.001</b>	<b>R=0.823</b>	<b>R<sub>square</sub></b>	<b>=0.678</b>

#### 4. DISCUSSION

Patients' total score of self-efficacy was determined as 71.1±16.8. Previous studies were mostly evaluated in terms of self-efficacy total score, and the score was seen to range between 52-74 (21-23). Based on these findings, it may be suggested that diabetic population has moderate level of self-efficacy. It was seen that the lowest subscale score the participants received in our study was related to physical exercise, and the finding was consistent with that found in the study by Al-Khawaldeh et al. in 2012 (22). We consider that individuals receive lower scores from physical exercise subscale, because physical exercises require behavioral changes and extra time, and due to obesity and other disorders associated with advanced age such as respiratory diseases or osteoarthritis. In terms of MHCL scores of the participants, it seems that individuals with DM tend to believe in the effects of external forces more in the disease management. In other studies, the internal control, the powerful others control and the chance control focuses were found as 27.2±6.3, 30.8±5.2 and 15.6±6.6 in the study performed by Al Nawafa'h and Hamdan-Mansour (21) as 26.0±4.2, 24.9±4.6 and 20.9±5.9 in the study by Aflakseir and ZarrinPour (24), as 25.9±5.6, 23.7±5.6 and 17.4±5.9 in the study by Williams et al. (25), and 27.9±6.3, 18.9±6.6 and 25.3±5.6 in the study conducted by Zahednezhad et al. (26), respectively. In various studies, it was observed that the internal control and powerful others control focuses were higher in the individuals with DM (9, 27). However, no studies related to the control perception of the patients with DM have been encountered in Turkey. The fact that the scores of internal control focus are close to those obtained from the powerful others control focus can be referred to higher rate of disease perception in patients. Individuals may also need others' assistance because the disease lead to complications and due to the chronic nature of

the disease. This may also give rise to an increase in powerful others control focus. In addition, the fact that the priorities of the powerful others control and internal control focuses are variable in previous studies is considered to originate from educational and socio-cultural differences.

Given that the health control focus is the determinant of health behaviors (16, 26, 28, 29), the determination of health control focuses is of an importance in order to define self-efficacy in patients with type 2 DM. When the association between internal health focus and self-efficacy was investigated, as the score of internal control focus increased, the scores of diet+foot control, physical exercise and total self-efficacy were observed to be also increased. It is accepted that individuals with internal control focus believe their coping strategies against any negative events (29). The internal control focus was found to have a positive significance with mean score of self-efficacy (9). It may be suggested that the patients with higher rates of internal control focus comply with treatment modalities and believe their own strengths to cope with health challenges at a higher rate (26, 30). Despite the study reporting that those with higher rates of internal control focus care about their health status more (10), another study emphasizes that the internal control focus has no effects on the compliance with diet (24). It is also reported that the internal control focus is associated with age (28), economical status (28, 31, 32), physical and mental health status, and health behaviors (33). The fact that individuals with higher rates of internal control focus consider their problems encountered in daily life originate from their own features and strive to cope with these problems may increase such individuals' motivation, and the increase is one of the reasons demonstrating the association between self-efficacy and internal control focus.

In addition, we consider that the reason why the score of internal control focus in study participants was not so high is associated with lower rates of mean age and educational level. The fact that no significance was present in the medical treatment subscale may be explained by patients' adherence to drug regime and the inexistence of forceful behaviors in medical treatment. When the association between the powerful others control focus and self-efficacy was investigated, a significant difference was found to be present in all subscales. In the chance control focus, however, the difference was observed only in physical exercise subscale.

The patients in the study group are seen to increase the score of self-efficacy with the effects of external factors, such as family, friends or health professionals. In a study where the control perceptions of nurses and patients were compared, nurses and patients are seen to have higher rates of external control focus (21). In another study performed by Aflakseir and Zarrin Pour (2014) it was observed that while the individuals with external control focus had higher adherence to diet, those with chance control focus had lower adherence (24). In a study performed by Grotz et al. (2011) in German population, it was found that the elderly, those from lower socio-economic levels and emigrants had higher rates of

powerful others control and chance control focuses (34). It was also reported in the same study that chance health focus was less related to health behaviors, such as physical activity, dental health or regular hospital visits.

Because individuals with external control and chance control focuses consider that all their failures are out of their own control, the rate of such individuals' motivation may be suggested to be lower. In addition, the socio-cultural environment including individuals with higher religious attitudes or faith also affects almost all types of control focuses (6). It should be kept in mind that patients with more fatalistic attitudes and approaches to health challenges are treated as a risk factor in terms of health behaviors, and chance may have some indirect effects on health behaviors.

Multiple regression analysis suggests that being ages between 30 and 40 years ( $\beta$  0.125), not doing exercise ( $\beta = -0.129$ ), not obeying the diabetes regimen ( $\beta = -0.739$ ) and perceived insufficient diabetes training ( $\beta = -0.121$ ) are determinants of the self-efficacy score. Other variables that were found to be significant in analyses were not identified as determinants. There are studies reporting that self-efficacy is related to age (35, 36), exercise (23, 37, 38), compliance with the diabetes diet (37) and training (3, 39, 40) in the literature.

## 5. CONCLUSIONS

It is seen that patients with DM have medium level of self-efficacy and tend to believe the effects of external forces at a higher rate in the management of the disease. Based on these findings, control focuses of diabetic population should be defined meticulously, and the internal control focus should be improved to obtain their independency. Due to the limited sample size of our study, it is recommended to conduct studies with a larger sample size.

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