

Investigating Health literacy, knowledge and self-efficacy in patients with type 2 diabetes referring to health centers in shahrekord

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ABSTRACT

Background and Objective: Type 2 diabetes is one of the most important public health problems. Health literacy, self-efficacy and knowledge are important factors influencing self-care behaviors in diabetic patients. The aim of this study was to determine the health literacy, knowledge and self-efficacy of diabetic patients referring to health centers in Shahrekord.

Materials and Methods: This cross-sectional descriptive study was performed on 138 diabetic patients referring to Shahrekord health centers in 2017. Patients were selected via convenience random sampling from five health centers and entered the study. The data were collected using demographic variables, health literacy questionnaire (TOHFLA), knowledge and self-efficacy. In this study, SPSS 18 and descriptive and inferential statistical tests (linear regression analysis and Pearson and analysis of variance) was used to analyze data.

Results: The results showed that 52.9% of the patients had inadequate health literacy. The mean score of health literacy in diabetic patients was 45.23 ± 21.43 , the mean score of knowledge was 66.39 ± 23.37 and the mean score of self-efficacy was obtained 31.09 ± 34.21 . There were significant relationships between health literacy, self-efficacy and knowledge ($P = 0.001$); the results of multiple regression analysis indicated that knowledge is the main predictors of health literacy.

Conclusion: Regarding the low level of health literacy and self-efficacy of diabetic patients, it is necessary to implement interventions using health education models to enhance their health literacy and self-efficacy for improving quality of their lives

Paper Type: Research Article

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Introduction

Diabetes is the most common chronic disease in the world (1). According to the International Federation for Diabetes, the number of diabetic patients will reach 439 million in 2030, and the prevalence of diabetes in developing countries will be 69 % (2). 80% of diabetics are from low to middle income countries (3). Diabetes mitigates the burden of the health system considerably with medical costs associated with hospitalization, medications, and treatment of complications (4). Diabetes, if not managed properly (5), impose a person with a range of undesirable and irreversible complications including heart attacks, stroke, amputation, blindness (6), peripheral neuropathy, pain in the legs, peripheral vascular problems and ultimately kidney disease (3).

On the other hand, having proper knowledge of the effective factors in the development of the disease is one of the factors affecting the prevention and control of diabetes (7). Health literacy is one of the most influential factors on the knowledge level (1). Health literacy is the degree to which individuals can obtain, understand and process health-related information that is essential for health decision-making (8).

Only half of adults, especially sensitive and vulnerable groups, have sufficient and adequate health literacy (9). Inadequate health literacy has a significant effect on patients' behavior. Also, it has adverse effects such as: poorer health status, an increase in hospitalization and a twofold increase in mortality rates in comparison to other people (3). Low levels of health literacy are more common in people with chronic illnesses like those with diabetes

and hypertension (10).

Many studies have been done on the impact of health literacy on the health status, but the results of the health literacy impact on health are not properly available (2). It was evidenced that self-efficacy is another factor influencing health behaviors. Inadequate health literacy in relation to a health issue can affect the individual self-efficacy in their self-care program. Health literacy can lead to improved self-efficacy (11).

In diabetic patients, self-efficacy is known as a self-care strategy (12) and leads to increased self-esteem in self-care (2). Considering the importance of diabetes and the effect of knowledge, health literacy and self-efficacy in diabetic patients' self-care, the aim of this study was to determine the health literacy, knowledge and self-efficacy of diabetic patients referring to health centers in Shahrekord.

Materials and Methods

This cross-sectional descriptive study was performed in 2017. The statistical population of this study were diabetic patients who referring to health centers in Shahrekord. Patients were selected via convenience random sampling from five health centers among the 11 health centers of Shahrekord. Among diabetic patients referring to these centers, 138 patients were randomly selected. In this way, the files in the centers were numbered based on the available codes. Then, the files were randomly selected by drawing. The sample size was determined based on the following formula with 95% confidence and 80% power test.

$$n = \frac{(z - 1 \frac{\alpha}{2} + z1 - \beta)z}{\omega 2}$$

The inclusion criteria for this study were complete consent form and their diabetes disease were confirmed by a specialist physician. To identify and ensure that subjects under study are people with reading ability, they were first asked to read part of the questionnaire. People who were not willing to cooperate and complete the questionnaire, as well as those with visual impairment, psychiatric and perceptual disorders were excluded from this study.

The subjects were also informed about the purpose of the study and optional participation in the study and entered with consent. All patients were asked to answer the questionnaire with honesty and they were assured that all requested information in the questionnaire would be used confidentially and the results would report in general.

Individual characteristics of the patients were obtained by asking 5 questions (age, sex, marital status, level of education, history of the disease). The Test of Functional Health Literacy in Adults (TOFHLA) (was used to assess the health literacy of the subjects (13). This questionnaire is one of the most important and most reliable global health literacy questionnaires. So far, its translation into several languages of the world has been validated. The questionnaire consists of two sections: reading comprehension and numerical ability test.

The numerical section measures the individual's ability to understand and act on the basis of the physician and health educator recommendations and need to calculate. This section has 5 explanations or prescriptions for prescribed medications, the time to refer to the physician and an example of the outcome of a medical examination. These descriptions are presented in the form of cards to the

subjects and questions are asked from the person. The individual score in this section is between 0 and 50.

In the reading comprehension section, the participants' ability to read and understand 3 texts are assessed which are under the heading of the preparation for the photograph of the upper gastrointestinal tract, the rights and responsibilities of the patient in the insurance forms, and the standard form of hospital consent. The individual score in this section is between 0 and 50. From the total scores of these two sections, the total health literacy score (from 0 to 100) was calculated. Finally, the level of functional health literacy of the subjects was divided into three levels of inadequacy (0-59), boundary (60-74) and adequate (75-100). The reliability of this questionnaire was obtained 0.79 in the numerical section and 0.88 in the reading section. Using a separate questionnaire completed by the patients, the knowledge level of diabetic patients was evaluated with 13 questions about the disease.

Content validity was used to determine the scientific validity of diabetes knowledge questionnaire. In this way, we used the published books and articles. Then, the questionnaire was provided to 10 expert professors to determine the content validity. To determine the reliability of the questionnaire, Cronbach's alpha test was used. For this questionnaire, the alpha value was 0.71.

The measure of knowledge evaluation was the number of correct answers given to the questions and for each correct answers 1 score and an unanswered answers 0 score were considered. To measure self-efficacy of patients, the standard self-efficacy

questionnaire of Sherer et al. (14) was used. This scale has 17 questions (from I totally disagree to I totally agree) based on the Likert scale. Each item received 1 to 5 points in Scale scoring. Questions 1, 3, 8, 9, 13, 15 were scored from right to left and the rest of the questions were scored in reverse order (from left to right). So the maximum score was 85 and a minimum score of 17 for each individual. Self-efficacy questionnaire measures individual's beliefs and ability to overcome different situations. The reliability coefficient of this test has been reported using Gutmann's half-way method (0.76) and Cronbach's alpha (0.79).

The classification of knowledge, health literacy and self-efficacy (good, moderate and weak) were such that scores less than 50 were considered as undesirable, scores 50 to 75 as marginal and scores higher than 75 as desirable knowledge, health literacy and self-efficacy.

Data were analyzed by SPSS version 18 using descriptive and analytical tests such as: independent t-test, one way ANOVA, Pearson correlation (to determine the relationship between knowledge, self-efficacy and health literacy) and analysis Regression (health literacy as a dependent variable and knowledge, self-efficacy and demographic variables as independent variables) at the significance level of >0.05 .

Results

The data showed that 28.3% of patients under study had less than 40 years old. 57.2% of patients were male and 42.8% were female. Also, 55.8% were married and 25.6% were single patients 26.1% of patients had diploma degree and 34.8% of diabetics suffered from the disease for 2-5 years (Table 1).

Table 1. Health literacy rate based on demographic characteristics of diabetic patients participating in the study

Variable	Sub groups	Diabetic
		Number (percent)
Age(year)	Under 40	39(28.3)
	40-50	20(14.5)
	50-60	31(22.5)
	Older than 60	48(34.8)
Sex	man	79(57.2)
	women	59(42.8)
Marital Status	single	34(24.6)
	married	77(55.8)
	widow	22(15.9)
	divorced	5(3.6)
Education Level	illiterate	34(24.6)
	Under the diploma	34(24.6)
	diploma	36(26.1)
	Higher than diploma	3(23.9)
History of disease (years)	Less than 2 years	40(29.0)
	2-5 years	48(34.8)
	5-10 years	22(15.9)
	More than 10 years	28(20.3)

Table 2. Health literacy level in diabetic patients

Variable	Diabetic Patients Group	
	Number (percent)	
Health literacy	Inadequate	73(52.9)
	Marginal	11(8.0)
	Adequate	54(39.1)

The mean score of health literacy in diabetic patients was 45.23 ± 21.43 , the mean score of knowledge was 66.39 ± 23.37 and the mean score of self-efficacy was obtained 31.09 ± 34.21 . These findings indicate a moderate level of knowledge and undesirable

self-efficacy and health literacy level. Also, the results showed that the health literacy level of 52.9% of patients was inadequate, 8% were at boundary level and 39.1% were adequate (Table 2).

Table 3. Correlation matrix between knowledge, self-efficacy and health literacy in diabetic patients

variable	knowledge	self-efficacy	health literacy
knowledge	1		
self-efficacy	P=0/001* R=0/370	1	
health literacy	P=0/001* r=0/474	P=0/001* r=0/711	1

There was a direct and significant relationship between knowledge and health literacy of diabetic patients; thus, patients who had a higher knowledge of their illness had higher levels of health literacy. Also, there was a direct and significant relationship between health literacy and self-efficacy, so that patients with higher self-efficacy had more health literacy (Table 3).

Table 4. Regression analysis results between knowledge and self-efficacy with health literacy in diabetic patients

Variable	standard error (β)	standard error coefficient (B)	Significance level	Determination Coefficient (R2)
knowledge	0/447	0/353	0/001*	0/480
self-efficacy	0/058	0/029	0/578	

The linear regression analysis was used to assess the predictive value of health literacy by self-efficacy and knowledge. Generally, the predictive power in this study was 0.480, which was a significant predictor of knowledge in regression analysis (Table 4).

There was a significant relationship between age, knowledge, self-efficacy and health literacy, so that patients who were less than 40 years old had higher knowledge of their disease ($p = 0.12$). They reported higher self-efficacy ($p = 0.001$) and had adequate health literacy ($p = 0.001$). There was a significant relationship between knowledge of the disease and sex; as women had higher awareness than men ($p = 0.026$).

There was a significant relationship between knowledge, self-efficacy and health literacy of patients with education level and marital status of them ($p = 0.001$). Patients with higher diploma education had higher knowledge and self-efficacy and adequate health literacy level. Also, those who were married had higher levels of knowledge and self-efficacy and adequate health literacy ($p = 0.001$). There was a significant relationship between self-efficacy and health literacy with history of disease, so that patients with a history of 2 to 5 years had higher self-efficacy and adequate health literacy. There was no significant relationship between other demographic variables with knowledge, health literacy and self-efficacy (Table 5).

Discussion

Health literacy is one of the most important global issues. According to the WHO report, it has an important role in determining health inequalities in different parts of the world (1, 15).

The results showed that the majority of patients in this study had inadequate health literacy. Rafiezadeh et al. reported in their study that 79% of diabetic patients had borderline health literacy (15). In the study of Charoghchian khorasani et al. (1), the level of health literacy was found to be inadequate

Table 5. Determination of the relationship between knowledge, self-efficacy and health literacy in diabetic patients with demographic variables

Variable	Sub groups	knowledge			self-efficacy			health literacy		
		Mean	Standard deviation	p-value	Mean	Standard deviation	p-value	Mean	Standard deviation	p-value
Age(year)	Under 40	72/65	20/24	0/012	51/20	28/76	0/001	47/58	13/26	0/001
	40-50	71/41	22/48		39/48	36/56		46/16	19/35	
	50-60	62/97	17/61		23/16	31/55		46	14/26	
	Older than 60	60/88	18/65		15/88	27/67		42/21	16/14	
Sex	Man	62/44	19/46	0/026	34/69	32/85	0/138	45/91	15/52	0/216
	Women	67/93	21/54		37/45	33/51		45/07	14/82	
Marital Status	Single	68/18	22/04	0/001	34/10	34/64	0/001	46/82	16/17	0/001
	Married	70/15	19/57		44/32	29/98		47/82	14/05	
	Widow	54/70	16/10		31/08	33/42		36/28	14/66	
	Divorced	48/60	20/31		11/18	24/99		37/40	21/49	
Education level	Illiterate	56/09	16/21	0/001	17/85	30/79	0/001	35/85	14/39	0/001
	Under the diploma	62/85	16/26		15/93	23/15		42/23	17/11	
	diploma	73/78	20/48		33/29	35/81		51/11	11/83	
	Higher than diploma	71/86	22/90		57/01	25/78		52/39	12/25	
History of disease (years)	Less than 2 years	62/98	21/69	0/623	31/06	33/66	0/015	48/08	9/94	0/001
	2-5 years	66/36	18/94		51/70	29/16		49/28	18/57	
	5-10 years	65/86	19/94		10/61	22/94		44/52	17/62	
	More than 10 years	64/89	19/30		23/63	32/86		41/13	15/05	

in 68.5% of diabetic patients. In their study on diabetic patients, Khosravi et al. reported that 23.6% of subjects had borderline health literacy and 35% had inadequate health literacy. Seyedshohadaee et al., in their study on diabetic patients at the Diabetes Research Center, reported that 58% of the patients in the study had inadequate and borderline health literacy. Karimi et al. reported the health literacy level of the participants in their study at the moderate and borderline

level, while Mahmoudi et al. reported the level of health literacy of diabetic patients to be very inadequate.

The findings of this study showed that patients had moderate knowledge and low self-efficacy. In the studies of Reisi et al. (19) and Rahimi et al. (20), Knowledge of patients was reported at a low level, which is not consistent with the results of the present study. In line with the results of this study, Goudarzi et al (21), Haji-Arabi et al (22) and

Amini et al. (23) reported moderate levels of knowledge in type 2 diabetic patients.

Rafiezadeh et al. (15) and Goudarzi et al. (21) reported moderate self-efficacy in the target group. In Rahimi et al. study, Self-efficacy was low in 47.6% of diabetic patients and good in 52.4% of patients.

The treatment and prevention of diabetes is largely dependent on the individual's will to perform self-care behaviors. Improving self-efficacy plays an important role in committing self-care behaviors and better control of diabetes (24).

In the present study, there was a significant relationship between age, knowledge, self-efficacy and health literacy; so that patients who were less than 40 years had higher knowledge of their disease, reported higher self-efficacy and had adequate health literacy. With increasing the age and duration of the disease, the individual's motivation and ability to perform control-related behaviors of the disease and the prevention of its complications is reduced. This can also affect the self-efficacy of the individual (24). Rafiezadeh et al. reported that there was no significant relationship between the age of diabetics and their level of health literacy, which contradicts the results of this study.

In the present study, there was a significant relationship between knowledge of disease and sex; as women had higher knowledge of the disease than men. There were no significant relationship between health literacy and sex in studies conducted by Rafiezadeh et al. (15) and Mosher et al. (25) which contradicts the results of this study.

Also, there was a significant relationship between knowledge, self-efficacy and health literacy of patients with education level and marital status; so that patients with higher

diploma had higher knowledge, self-efficacy and adequate health literacy. In line with the results of this study, there was a significant relationship between education and health literacy in Rafiezadeh et al. study (15).

In the study of Toci et al., It was found that among people with higher education, health literacy increases significantly (26). However, in the study of Rafiezadeh et al. (15), there was a significant relationship between health literacy and job, so that unemployed people had lower health literacy. The findings obtained from Kooshyar et al. study showed that there was a significant relationship between health literacy and employment.

The results of Rafiezadeh et al. Study (15) indicated that there was a significant relationship between self-efficacy and education; so that those with under diploma education showed higher self-efficacy than other groups and patients who had higher education than the bachelor's degree which did not match the results of this study. However, Khezerloo et al. (28) showed that self-efficacy of patients is directly related to their level of education; as their level of education increased, self-efficacy increased as well. Also, Rahimi et al. (24) showed a significant relationship between age and education level with self-efficacy of patients, thus, with increasing age, self-efficacy of patients decreased and with increasing education levels, self-efficacy also increased. Borhani et al. (29) also confirmed this finding in their study.

There was a direct and significant relationship between the knowledge and health literacy of diabetic patients, so that patients with a higher knowledge of their disease had higher levels of health literacy. There was also a direct and significant

relationship between knowledge and self-efficacy, so that patients with higher knowledge of diabetes also reported higher self-efficacy. In their study, Reisi et al. (19) reported that more knowledgeable people about diabetes and self-care methods had higher self-efficacy. Also, there was a direct and significant relationship between health literacy and self-efficacy, so that patients with higher self-efficacy had more health literacy. In line with the findings of this study, Reisi et al (19), Denison et al. (30) reported a positive and significant relationship between health literacy of diabetics and self-efficacy. McCleary-Jones et al (31) also concluded that diabetic patients with higher levels of health literacy had higher self-efficacy in doing self-care behaviors.

In general, knowledge and self-efficacy were able to predict 48% of variances for health literacy and only the knowledge construct was significant. Tahery et al. and McCleary-Jones et al (31) also pointed to a significant relationship between health literacy and self-efficacy.

In fact, if patients are expected to have a range of reading, hearing, analysis, decision-making skills, and the ability to use these skills in their health-related situations, they should have adequate knowledge of their health status and Causes of the disease and related issues. Inadequate health literacy is associated with a lower level of health status individual report, inappropriate use of medication, and not following the instructions of the physician and less health knowledge (32). People with low health literacy are less aware of their health status and receive fewer preventive services, and unfortunately chronic illnesses are less controlled.

Despite the importance of identifying

people with inadequate health literacy, health system staff often have poor performance in this regard. In relation to inadequate health literacy patients, methods should be used such as using simple and understandable expressions, using images, taking feedback after providing information to the individual, and limiting the information provided to each person at each visit (33). This confirms a significant statistical relationship between health literacy and self-efficacy and if people believe that they can use all their skills in their health-related situations appropriately, their health literacy will certainly increase. In addition, there was a significant relationship between knowledge and self-efficacy of patients. It is obvious that when people have a higher knowledge of their disease and their health conditions, they can take appropriate action in different situations and occasions.

Currently, investigating the concept of health literacy takes into account skills such as reading, writing, understanding health information and following simple health messages, which is the same as functional health literacy. However, functional health literacy is only one of the general domains of health literacy and if in the concept of health literacy, fields like: psychology, sociology and culture are also taken into consideration and concentrate on how to speak and listen, this concept will be more transparent and more informed.

However, the findings of the present study can be used to change and improve healthcare environments that sometimes have a high dependence on written materials. Thus, health staff should not be confined to providing information in written form; since effective communication with patients and getting feedback from them will be more

effective. A cross-sectional study and a small sample size are among the limitations of this study.

Conclusion

Low self-efficacy of patients and inadequate health literacy should be considered as a warning to politicians and health care providers. Since limited health literacy can prevent proper understanding of health messages and recommendations, it is essential for health staff to use effective methods of transmitting information to patients. For this purpose, level of health literacy and related skills should be evaluated before providing information to patients in health systems and according to their level of information, educational planning is needed to empower and enhance patients' self-efficacy in order to enable patients to understand and apply their health-related information. Also, education and cultural development in order to raise the level of health literacy and improve the pattern of receiving health services, requires close coordination and cooperation between the health system, the media and health educators.

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Conflict of interest

The authors state that there are no conflicts of interest in this study.

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