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Is health literacy clue on the self-efficacy of diabetes patients?

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Abstract

Aim: This research was conducted to evaluate the relationship between health literacy level and self-efficacy in patients with diabetes mellitus.

Materials and Methods: This cross-sectional study was conducted inpatient and outpatient clinic of internal medicine at the city hospital. The sample of the study consisted of 700 conscious patients diagnosed with diabetes mellitus for at least one year. The data of the study were collected using the Health Literacy Questionnaire-European Union Scale and Type 2 Diabetes Self-Efficacy Scale. Data were analyzed using regression analysis and correlation analyses.

Results: In this study, the level of health literacy general index was sufficient level, and the average of the self-efficacy scale was high. It was observed that health promotion and health service literacy level were effective in estimating the self-efficacy level of diabetes patients. As the health literacy level of patients for health service and health promotion increased, general self-efficacy level increased.

Conclusion: Health promotion and health service literacy level are effective in estimating the self-efficacy level of diabetes patients.

Introduction

Diabetes mellitus (DM) is a chronic metabolic disease that develops due to permanent damage to insulin secretion from the pancreas and/or its mechanism of action and leads to impaired protein, carbohydrate and fat metabolism [1, 2]. The incidence of this disease is increasing day by day due to several factors such as increasing income, sedentary lifestyle, obesity, and increasing life expectancy [3, 5].

DM is a disease that leads to retinal, renal, neural and vascular damage, dysfunction and organ failure when it is not managed well and causes a significant decrease in quality of life and an increase in morbidity and mortality risk [6, 7]. With these features, diabetes appears as a disease that affects the individual and society negatively and requires multidisciplinary approach and collaboration for its management [8, 9]. The management of DM includes medical nutrition therapy, exercise, medical treatment, follow-up, and patient education [10]. The aim of the treatment is to prevent the complications and improve the quality of life by achieving metabolic control. In this context, personalized follow-up, treatment and care is recommended for the individual to continue his/her daily life as a healthy individual. Personalized disease management is possible if the patient assumes responsibility for his/her own health in addition to monitoring and treatment performed by healthcare professionals [11, 12]. In addition, health literacy (HL) is a decisive factor in the successful maintenance of the individual's own health management.

HL is defined as the level of knowledge, motivation and competence that will enable individuals to access, understand and use the necessary health information in their daily lives in order to make decisions about and improve their health, prevent diseases, improve and maintain quality of life [13]. Baker (2006) states that characteristics such as written and oral information on health services, literacy skills, and cultural factors affect self-care and disease control [14]. In the literature, it is reported that HL level is decisive for acquiring new disease-specific information, improving self-sufficiency and self-care behaviors, and increasing the impact of the patient on glycemic control [15-17]. HL has a positive contribution to the biochemical results of diabetes (HbA1c, fasting blood glucose) [15, 18, 19]. Although the effects of HL on good glycemic control have been documented, most of the evidence is from high-income countries [20]. There are limited studies on this subject in developing countries. This study was conducted to investigate the relationship between HL and self-efficacy

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in individuals with DM. The primary output of the study is to estimate the self-efficacy level of the patient from the level of health literacy, and the secondary output is to determine the relationship between the level of health literacy and the level of self-efficacy.

Materials and Methods

The study was approved by Eskisehir Osmangazi University Ethics Committee (Decision date: 26.09.2018. Decision number: 25403353-050.99-E.99004) was obtained for the ethical evaluation of the study. This cross-sectional study was conducted inpatient and outpatient clinic of internal medicine at the city hospital in the western part of Turkey between 05.12.2018 and 21.06.2019. The sample of the study consisted of patients aged 18 years and older, conscious, literate and willing to participate in the study, who were followed and treated for at least 1 year due to DM. Patients who were illiterate, had DM diagnosis less than 1 year, and were younger than 18 years of age were excluded from the study.

Before starting the research, the sample size was determined using power analysis. In the calculation of the sample, the results of the study of Schillinger et al. (2002) were taken as reference, and the sample number was 779 units, with an error of 80%, alpha 0.05, beta 0.80 [19]. After the sample number reached 700 people in the study, power analysis was performed again at the 95% confidence interval using the "G. Power-3.1.9.2" program and it was seen that the number of data was sufficient.

This research independent variables; Health literacy level of patients, dependent variables; self-efficacy general and sub-dimensions scores in type 2 DM patients.

Data collection forms: (Individual Identification Form, Health Literacy Survey-European Union Scale and Self-efficacy Scale in Type 2 Diabetics) were applied by the researchers using face-to-face interview technique in a quiet room in the related clinics and polyclinics of the hospital.

Individual identification form: Developed by the researchers, this form contains 17 questions including information about the sociodemographic characteristics, personal habits, disease, treatment, and laboratory results of the patients.

Health Literacy Survey – European Union (HLS-EU-Q47): Developed by Sorensen et al., the scale evaluates the degree of difficulty or convenience of a function in the process of accessing, understanding, evaluating and using the information obtained in three areas (health services, disease prevention and health promotion) and consists of 47 questions [13]. Turkish validity and reliability studies of HLS-EU-Q47 were conducted by Health and Social Workers Union and Cronbach's alpha reliability coefficients for HLS-EU-Q47 and its sub-dimension were determined as follows: general health index $\alpha = 0.97$, health service index $\alpha = 0.91$, disease prevention index $\alpha = 0.92$, and health improvement index $\alpha = 0.93$ [21]. HL level was evaluated under four categories according to the obtained index values: 0-25 points, insufficient; 26-33 points, problematic-limited; 34-42 points, adequate; 43-50 points, excellent HL level [21].

Self-Efficacy Scale in Type 2 Diabetics: It is a scale developed by Van Der Bijl, Poelgeest-Eeltink and Shortridge-Baggett (1999) for the management of the disease in patients with type 2 DM. It was developed in accordance with the Western culture to measure how much DM patients perceive their own strength in performing care activities [22]. In the Turkish validity and reliability study of the scale, internal consistency was 0.89, and inter-item correlation was 0.91 [23]. The sub-dimensions of the 20-item scale are diet and foot control, medical treatment, and physical exercise. The lowest score that can be obtained from the scale is 20 and the highest score is 100.

Statistical analysis

The analysis of the data obtained from the research was evaluated using the IBM Statistical Package for Social Science (SPSS) 25.0 package program. Continuous data were given as mean and standard deviation, min-max and categorical data as numbers and percentages (%). Shapiro Wilk test was used to check whether the data were normally distributed or not. Within the scope of the research, "simple linear regression" analysis was used to investigate the effect of health literacy general and sub-dimensions mean score, which is the independent variables, on the self-efficacy scale general score, which is the dependent variable. The Pearson Correlation analysis was used to determine the relationship dependent (diet and foot control index, medical treatment index, physical exercise index, self-efficacy scale general index) and independent variables (health service index, disease prevention index, health promotion index, general health index) Statistical significance $p<0.05$ value was accepted as the criterion.

Results

The mean age of the patients was 61.80 ± 10.49 years, 74.3% were married, 71.4% were primary school graduates, and 74.1% had income equal to their expenses. 74.4% of the patients had a diagnosis of diabetes for 6 years or more, while 87.9% had another chronic disease accompanying diabetes. It was determined that 80.3% of the patient's received information about DM disease management from healthcare professionals (Table 1).

The mean HLS-EU-Q47 HL level of the patients was 35.76 ± 7.20 points. When the sub-dimensions of HLS-EU-Q47 scale were examined; health service index was adequate level, disease prevention index was problematic/limited level, and health improvement index was problematic/limited level. It was determined that the patients scored a minimum of 45, a maximum of 100, and an average of 76.38 ± 10.17 points out of 20 items in the self-efficacy scale. When the subscale scores of the self-efficacy scale were examined; the mean diet and foot control score was 43.18±7.19, mean medical treatment subscale score was 21.87±3.02, and mean physical exercise subscale score was 11.32±3.33 (Table 2).

In the regression analysis conducted to investigate the effect of health service HL index, disease prevention HL index, health promotion HL index score on self-efficacy scale overall score, the significance level corresponding to the F value obtained was examined, and the model established was found to be significant [F=75.400, $p<0.001$].

Table 1. Demographic and medical characteristics of patients (n=700).

Characteristics	mean±sd	(min-max)	
Age (year)	61.80 ± 10.49	(18-88)	
		n	%
Gender	Female	528	75.4
	Male	172	24.6
Educational status	Literacy	67	9.6
	Primary school	500	71.4
	Secondary school	57	8.1
	High school	51	7.3
	University	25	3.6
Marital status	Single	180	25.7
	Married	520	74.3
Income status	Income less than expenses	34	4.9
	Income equal to expenses	519	74.1
	Income more than expenses	147	21.0
The presence of the chronic disease	No	155	22.1
	Yes, one disease	236	33.7
	Yes, two disease	215	30.7
	Yes, 3 and more	94	13.4
DM diagnosed age group	1-5 year	179	25.6
	6-10 year	196	28.0
	11-15 year	84	12.0
	16 year and more	241	34.4
Receive training from healthcare professionals about DM	Yes	562	80.3
	No	138	19.7
Use other resources about DM	Yes	540	77.1
	No	160	22.9

*Percentages were evaluated out of n.

When the beta coefficient and significance values of the dependent variables were examined, it was determined that 0.248 units increase in the health service index, 0.383 units increase in the health promotion index of the patients resulted in an increase in mean self-efficacy score by one unit [(p=0.002), (p<0.001), respectively] It was determined that the disease prevention index HL score was not effective in estimating the general self-efficacy level (Table 3).

According to the results of the correlation analysis conducted to demonstrate the relationship between HLS-EU-Q47 index scores and self-efficacy scale scores, there was a statistically significant, positive and moderate relationship between self-efficacy scale general index score and health service index score, disease prevention index, health promotion index, general health index (r=0.488, r=0.420, r=0.477, r=0.488, p<0.001). There was a statistically significant, positive and weak relationship between diet and foot control index score and health service index score, disease prevention index, health promotion index, general health index (r=0.285, r=0.301, r=0.331, r=0.334, p<0.001). There was a statistically significant, positive and moderate correlation between medical treatment index score and health service index score, general health index (respectively r=0.430, r=0.400, p<0.001). There was a statistically significant, positive and moderate correlation between medical treatment index score and health service index score, disease prevention index, health promotion index, general health index (respectively r=0.285, r=0.301, r=0.331, r=0.334, p<0.001) (Table 4).

Discussion

In this study, level of basic health literacy on diabetes patients and the effect of basic health literacy on self-efficacy level was evaluated. In the present study, it was determined that the general and health services HL level of the patients was adequate level, and the disease prevention and health promotion HL level of the patients was problematic-limited level. According to these results, the level of health literacy of type 2 DM patients was adequate level in subjects which are drug use, following doctor's recommendations, applying to a health institution, calling an ambulance in an emergency, understanding and applying the health information in the media. On the other hand, it was determined that the disease prevention HL including issues such as healthy behaviors, health screenings, vaccination, stress management, control examinations was limited/problematic. The literacy level of knowing and practicing health-promoting activities such as exercise, weight control, home and workplace arrangements was limited/problematic. The fact that 74.4% of the patients had type 2 diabetes for more than 6 years is likely to positively affect the level of literacy related to health services. Because during this period, patients have

Table 2. Distribution of health outcomes of patients (n=700).

HLS-EU-Q47				
	n	min.	max.	ort±ss
General health index	700	10.42	50.00	35.76 ± 7.20
Health service index	700	2.22	50.00	33.04 ± 8.58
Disease prevention index	700	9.38	50.00	28.74 ± 7.82
Health promotion index	700	8.16	48.94	32.50 ± 7.20
Self-Efficacy Scale in Type 2 Diabetics				
General index	700	45.00	100.00	76.38 ± 10.17
Diet and foot control index	700	26.00	60.00	43.18 ± 7.19
Medical treatment index	700	10.00	25.00	21.87 ± 3.02
Physical exercise index	700	5.00	15.00	11.32 ± 3.33

*Descriptive Statistical Analysis (Min.-max., Mean, Standard Deviation).

Table 3. Distribution of HLS-EU-Q47 general index score on general self-efficacy of patients (n=700).

HLS-EU-Q47 subscale	Beta	t	p	95%Confidence interval for B		R^2	F	p (Model)
				Lower	Upper			
Health service index	0.248	3.161	<0.001	0.094	0.402			
Disease prevention index	-0.129	-3.424	0.001	-0.056	0.203	0.245	75.400	<0.001
Health promotion index	-0.095	-2.534	0.011	0.237	0.529			

*Simple Linear Regression Analysis.

Table 4. The relationship between HLS-EU-Q47 index score and Self-Efficacy Scale Score of patients (n=700).

		Health service index	Disease prevention index	Health promotion index	General health index
Self-efficacy scale general index	r	.448	0.420	0.477	0.488
	p	<0.001	<0.001	<0.001	<0.001
Diet and foot control index	r	.285	0.301	0.331	0.334
	p	<0.001	<0.001	<0.001	<0.001
Medical treatment index	r	.430	0.354	0.323	0.400
	p	<0.001	<0.001	<0.001	<0.001
Physical exercise index	r	.359	0.309	0.446	0.405
	p	<0.001	<0.001	<0.001	<0.001

*Pearson Correlation Analysis.

come to a point where they have acquired, understood and applied information about treatment-related health services. However, the low basic literacy level of patients in promoting health and preventing diseases made us think that the content of the education given to patients on this subject should be reconsidered. Because 80.3% of the sample group stated that they received training on disease management from a healthcare professional. However, it should not be forgotten that; In this study, the basic health literacy level of the patients was questioned, and diabetes-related health literacy was not evaluated. Diabetes nurses are expected to focus on diabetes and management when planning patient training, however, in addition to healthy behaviors, stress management, vaccination programs, home-workplace arrangements, increasing patient's knowledge levels in issues such as health screenings will contribute positively to diabetes-related outcomes. In the literature, while the HL level of patients with type 2 diabetes was adequate level in some of studies [24, 25], it was limited/problematic HL level in some of studies [26-28]. When the results of the studies were evaluated, it was thought that the level of health literacy was not high in type 2 DM patients.

In the current research, health promotion and health service literacy level are effective in estimating the self-efficacy level of diabetes patients. As the health literacy level of patients for health care, health promotion and prevention of disease increases, their general self-efficacy, medical treatment, exercise, diet and foot control self-efficacy levels increase. In a study by Shiyanbola, Unni, Huang, & Lanier (2018) with mostly female patients with type 2 diabetes, it was found that disease compliance increased as self-efficacy increased, the perception of threat decreased as disease compliance increased, and health anxiety decreased as HL increased [29]. Studies conducted in patients with diabetes reported that self-care behaviors develop as HL level increases [16, 17, 20, 30, 31] and individuals with low HL have difficulty in understanding the explanations about their health and disease conditions, understanding and managing the treatment and care process, and complying to treatment [32]. In the study of Kim, Love, Quistberg, & Shea, (2004), it was found that at the end of the education given to individuals with adequate and limited HL level, exercise and drug compliance scores of individuals with adequate HL levels increased more, whereas behaviours of diet, foot care and blood glucose level monitoring increased more in individuals with limited HL level [33]. In the light of this information, it can be said that HL is important for implementing the necessary follow-up and treatment so that the patient can continue his/her daily life as a healthy individual, providing effective care, preventing complications by achieving metabolic control, and improving the quality of life.

Conclusion

In this study, health promotion and health service literacy level are effective in estimating the self-efficacy level of diabetes patients. As the HL level of patients for health care, health promotion and prevention of disease increases, general self-efficacy, medical treatment, exercise, diet and foot control self-efficacy levels increase. In addition to patient follow-up, treatment and care performed by healthcare professionals in the management of diabetes, it is important that patients are knowledgeable about disease management, know the services offered and how to access these services and they can reflect the acquired knowledge

onto their own care practices. In order to achieve this aim, the HL level of the patients should be taken into consideration in the trainings conducted by diabetes nurses, individualized training programs should be prepared and regular participation of the patients in these programs should be ensured.

Conflict of interest

The authors declared no conflict of interest.

Author contributions

Study conception and design: GÖ, AÖ; Data collection: GÖ; Data analysis and interpretation: GÖ, AÖ; Drafting of the article: AÖ

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Ethics approval

The study was approved by Eskisehir Osmangazi University Ethics Committee (Decision date: 26.09.2018. Decision number: 25403353-050.99-E.99004) was obtained for the ethical evaluation of the study.

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