Original Article
Health Promotion/Health Education

AN EVALUATION OF HEALTH LITERACY SITUATIONS OF PATIENTS WITH TYPE 2 DIABETES

FİLİZ ASLANTEKİN*
MESUDE ULUŞEN**
BEKİR KAPLAN*
MERAL UYSAL***

SUMMARY: To analyze factors which effect diabetes health literacy (DHL) situations of patients with type 2 diabetes and their relations with sociodemographic variables.

Data were collected in a policlinic of a public hospital between 1 and 30 December 2010 through questionnaires from patients with type 2 diabetes who were older than 18 years and accepted to be interviewed. For each correct answer related to DHL situations, the variable was given 1 point and for others, 0 point was given. Thus, a scoring was made to evaluate DHL levels.

62,2% of participants were women, 81,4% were over 44, 23,8% were illiterate, 53,3% were unemployed, 32% had a monthly income equal to or below 700 TL. It was found that 38,8% of participants had difficulties in reading and writing skills. 61,1% of participants had type 2 diabetes for five years and longer, 21,5% did not show up regularly for control, 71,7% never attended educational meetings for diabetes, 93,5% did not know their HbA1c values, 16,9% changed potions without asking their doctors, and 33,9% wrongly interpreted usage instruction sample (3× 1 drug use). There was a significant difference between participants' DHL scores and education status ($p<0,001$). DHL averages of patients whose duration of illness was 5 to 14 years were significantly higher than those whose duration of illness was less than 4 years or more than 15 years ($p=0,036$). Estimated relative risk in regression model of being high in comparison to those having difficulty in at least one of reading or writing activities was 2,697 (95%GA: 1,208-6,022). The estimated relative risk of being high for DHL scores of those, whose duration of illness was 15 and more years, was equal to 5,437 (95%GA: 1,798-16,436) in comparison to patients who had been diseased for 4 or fewer years.

Factors such as education, reading and writing skills, area of settlement, and family support which have all been found to affect DHL scores should be given due attention in treatments of patients with type 2 diabetes.

Key words: Diabetes health literacy, type 2 diabetes

INTRODUCTION

In order for people to have qualified health care and carry responsibility for their own health, they should be able to recognize their health status, decide to which point they need to apply, and manage the process properly. In this regard, expected qualities on ideal conditions are to know where to get information, ask appropriate questions, comprehend given medical advice and treatment guidelines, and put them in practice (1). To carry out these processes, it is inevitable to

*From General Direct of Health Researches-Ministry of Health, Ankara, Turkey .
**From Departman of Midwifery, Health School, Amasya University, Amasya, Turkey.
***From Departmant of Lifelong Learning, Faculty of Education, Ankara University, Ankara, Turkey.

have literacy functions. In the studies conducted, a negative relation between a low literacy level and people's decision making process during their illnesses, their adjustment to drug use with self-management skills of their illnesses has been revealed (2-4). Recognition of the relation between health and literacy has promoted the measurement of health related literacy and the investigation of relation between low literacy and health status. It also fostered researches planned out with a vision aiming to reduce negative effects of low literacy through interpersonal active communication. In this connection, 'health literacy' has been defined over the last 30 years as a conduct within the relation between literacy and health which identifies a person's literacy capacity as a mediating factor in the process of health related decision making (5). In the definition made by World Health Organization (WHO), health literacy is defined in the context of accessibility as "the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health" (6). The term refers to personal, cognitive and social skills of individuals to gain access to, understand, and use information in order to promote and maintain good health (7).

A low literacy level in chronic diseases may result with serious problems in people's health-related decision making, understanding of the life style that diseases impose on them and adaptation to this life style. According to study findings, low literacy levels may affect the way in which patients understand advice related to their health negatively and limit their medical problem solving skills (8). Among chronic diseases, Type 2 diabetes requires a new lifestyle which starts from the moment of diagnosis and patients experience difficulties in adjusting to this new lifestyle (9,10).

In order for a patient with diabetes to carry out daily diabetes management successfully, he or she needs to possess essential knowledge, skills and positive attitudes (11). However, if negative diabetes outcomes are experienced in a case where individual educations for diabetes are given and extensive care is provided, it is necessary to investigate the service and characteristics of people who get that service. In this respect, evaluation of the effect of health literacy levels of diabetes patients on diabetes control may present health care personnel with significant information on how to control the disease. The objective of this study is to evaluate health literacy situations of patients with type 2 diabetes and factors affecting health literacy.

MATERIALS AND METHODS

In this descriptive study, health literacy situations of patients with type 2 diabetes and variables affecting these situations have been evaluated. A questionnaire prepared to collect data was administered to patients with type 2 diabetes over 18, who received care from Ankara Numune Education and Research Hospital, Endocrinology and Metabolic Diseases Policlinic between the dates 1 and 30 December 2010 and accepted to be interviewed. Meetings were carried out in 23 workdays through face to face communication. In this study, the questionnaire used evaluates sociodemographic information and health literacy. For assessing health literacy, below situations which had been selected from related literature to define health literacy status were asked:

Showing up regularly for checkups, attending educational meetings, visiting the hospital on their own (people in situations of dependency excluded), keeping a diabetes diary, reading scientific publications on the disease, being a member of a diabetes association, keeping abreast of regulations, comprehending medication instruction (explaining 3x1 prescription), tobacco and alcohol using habits and quitting tobacco and alcohol after diagnosis, medication adherence, adherence to diet, changing the dosage without asking the doctor, physical activity (bodily activity each time for at least 20-30 minutes 3 days a week), foot care, having an eye test once every year, getting an influenza vaccine, carrying a diabetes identity card, knowing their last Hba1c value.

For those who exhibit behaviors in accordance with these situations – i.e. those who show up regularly for checkups, attend educational meetings, visit the hospital on their own (people in situations of dependency excluded), keep a diabetes diary, read scientific publications on the disease, become members of a diabetes association, keep abreast of regulations, comprehend medication instruction (explain 3x1 prescription), have no habit of tobacco or alcohol use, quit tobacco and alcohol after the diabetes diagnosis if they used them, adhere to their medication, adhere to their diets, does not change the dosage of medicines without asking their doctors, get physical exercise, take care of their feet, have an eye test once every year, get an influenza vaccine, carry a diabetes identity card, know their last Hba1c value –, a scoring is done by assigning 1 point for each affirmative variable and 0 point for others to evaluate Diabetes Health Literacy. A participant can get a minimum of 0 points and a maximum of 19

points in this scoring system. Descriptive statistics (mean, median, and standard deviation) for analyses where SPSS 18.0 statistics program was implemented, a Mann Whitney U test and a Kruskal-Wallis test for one variable analysis, and logistic regression test for multivariate analysis were used. $p<0,05$ is accepted as statistically significant. A written consent for the research was taken from the ministry of Health in 26.10.2012.

FINDINGS

The average age of 306 patients interviewed was $54,43 \pm 11,81$. Some of their sociodemographic characteristics are presented in Table 1.

62,2% of participants were women; 81,4% were over 44; 23,8% were illiterate; 33,6% were primary school graduates; 82,4% were married; 53,3% were unemployed; and 97,7% had social security. 32% of participants had an income equal to or less than 700 ¨ while 41% said their economic situation was bad. 61,1% of participants stated that they had had diabetes for 4 or more years (Table 1).

While 71,2 % of participants identified their reading and writing levels as good, 38,8% pointed out they had difficulties in reading and writing skills considerably, 48,7% stated they did not have a habit of reading newspapers, 58,1% indicated they did not read books, and 18,2% expressed they used computers.

While 61,1% of participants had had diabetes for 5 or more years, 55,7% had another chronic disease in addition to diabetes. As 87,3% of patients stated that they used medication for their diseases, 77,2% took anti-diabetic drugs and 47,7% used hypertension drugs. 70% was hospitalized within the last year and 31,5% of them was hospitalized due to diabetes. 20,2% developed a complication of diabetes and 58,1% of those experiencing complication stated that it had been preventable (Table 2).

As we evaluated health behaviors that an individual with diabetes must exhibit to maintain diabetes management effectively, 21,5% stated they did not show up for checkups regularly; 71,7% never attended an educational meeting on diabetes; 22,5% could not come to hospital alone; 93,5% did not know their HbA1c values; 90,6% used medication regularly; 16,9% changed medication dosage without asking the doctor; and 33,9% misstated 3 1 medication instruction when asked about it. 44,6% of participants expressed they could not follow their diets; 53,7% did no exercises; 74,3% did not take care of their feet; 36,5% did not have an eye test once every year; 81,1% did not get an influenza vaccine; 61,4% still smoked cigarettes; 51,9% did not read sources of information on diabetes; 23,1% did not keep abreast of social security institution's regulations on diabetes; 88,6% did not

Table 1: Distribution of some socio-demographic characteristics of participants (Ankara, 2011)

Features		Number	Percent
Sex	Female	191	62,2
	Male	116	37,8
Age Groups (year)	≤44	57	18,6
	45-54	103	33,6
	55-64	82	26,7
	≥65	65	21,1
Educational background	Illiterate	71	23,8
	Only Literate	30	9,8
	Primary School Graduate	103	33,6
	Primary Education Graduate	43	14,0
	Lycee Graduate	38	12,4
	High School/University Graduate	22	7,2
Marital status (n=306)	Married	252	82,4
	Single/Widow/Divorced	54	17,6
Working status (n=306)	I do not have a job	163	53,3
	I have a permanent job	126	41,2
	I do piecework at home	11	3,6
	I work whenever I find a job	6	1,9
Social security (n=306)	Social security institution	280	91,5
	Green card	19	6,2
	Not available	7	2,3
Income status (n=291)	≤700	93	32,0
	701-1400	121	41,6
	≥1401	77	26,5
Income status perception (n=305)	Good	47	15,4
	Medium	133	43,6
	Bad	125	41,0
Residential area	City Center	260	84,7
	Town/Village	47	15,3
Duration of disease (n=306)	≤4	119	38,9
	5-10 years	84	27,5
	11-14 years	56	18,3
	≥15	47	15,4

Table 2: Distribution of some characteristics of participants related to their diseases (Ankara, 2011).

Features		Number	Percent
Duration of diabetes (years) (n=306)			
	≤ 4	119	38,9
	5-10 years	84	27,5
	11-14 years	56	18,3
	≥15	47	15,4
Status of having another chronic disease			
	No	136	44,3
	Yes	171	55,7
Status of Taking Medicines Continuously			
	No	39	22,7
	Yes	268	87,3
	Medicine for Diabetes	207	77,2
	Insulin	121	45,1
	Hypertension	128	47,7
	Cholesterol	120	44,7
	All	36	13,4
	Other	30	11,1
Status of admission to hospital in the last 1 year			
	No	215	70,0
	Yes	92	30,0
	Due to Diabetes	29	31,5
	Other Reasons	63	68,5
Status of having any complications due to diabetes			
	No	245	79,8
	Yes	62	20,2
Being preventable status of the complication			
	No	26	41,9
	Yes	36	58,1

keep a diabetes identity card; 85,6% did not keep a diabetes diary; and 96,7% was not a member of a diabetes association (Table 3).

The average of participants' diabetes health literacy points was 9,05, the minimum being 1 point and the maximum 18 points. The average of women's diabetes health literacy (9,53 ± 2,86) was significantly higher (p=0,006) than men's (8,75 ± 2,69) in intergroup comparison.

There was a significant difference (p<0,001) between participants' diabetes health literacy and education status. After a dual rating between groups was performed, it was found that the scores of illiterate participants were lower than the scores of primary school graduates (p<0,001). At the same time, the scores of high school graduates and above were detected to be higher than the scores of illiterate participants (p<0,001), literate participants (p<0,001), and primary school graduates (p<0,001).

The average diabetes health literacy score of married participants (9,23 ± 2,654) was found to be significantly higher (p=0,030) than that of non-married participants (8,26 3,199).

The average diabetes health literacy score of those who work in a permanent job (9,88 ± 2,83) was significantly higher (p<0,001) than the average score of participants who were unemployed or did not work in a permanent job (8,45 ± 2,59).

The average diabetes health literacy score of participants who lived in cities (9,38 ± 2,477) was found to be significantly higher (p<0,001) than that of participants who lived in rural areas (7,17 ± 3,541).

Significant differences (p=0,001) were noticed in the relation between income status and diabetes health literacy scores. The average diabetes health literacy score (10,01 ± 2,854) of those who had an income equal to or more than 1 401.00 ₺ was significantly higher (p<0,001) than the average score of those who had an income equal to or less than 700.00 ₺ (8,49 ± 2,701).

The average health literacy score of those who admitted to understand documents they read (10,48 ± 2,675) was significantly higher (p<0,001) than that of participants who admitted not to understand documents usually (8,83 ± 2,130).

The average score of those who stated that they read and wrote easily (9,88 2,651) was significantly higher (p<0,001) than the average score of those who had difficulty in at least one of reading and writing activities (8,44 ± 2,605).

The average score of participants who got family support for their diseases (9,38 ± 2,562) was significantly higher (p<0,001) than the average score of those who did not get family support (7,91 ± 3,008).

The average score of participants, whose duration of disease was 5 to 14 years, was significantly higher (p=0,036) than the score of those whose duration of disease was less than 4 years or more than 15 years.

No significant relation was found between participants' diabetes health literacy scores and their ages with the situation of hospital admission within a last year.

Table 3: Distribution of answers given to questions about diabetes health literacy (Ankara, 2011).

Questions Evaluating Diabetes Health Literacy		N	%
Status of going for your medical checkups regularly	Yes	241	78,5
	No	66	21,5
Status of participating in training meeting	Yes	87	28,3
	No	220	71,7
Status of going to the hospital by yourself	Yes	238	77,5
	No	69	22,5
Status of knowing/remembering the HbA1c value	Yes	20	6,5
last measured	No	287	93,5
Status of taking your medicines in regular hours	Yes	278	90,6
	No	30	9,4
Status of making a change in the potion of medicine	Yes	52	16,9
without consulting to the doctor	No	255	83,1
Status of expressing the instruction of "3x1" written	Yes	203	66,1
on the medicines correctly	No	104	33,9
Status of adapting yourself to	Yes	143	55,4
the recommended diet (n=258)	No	115	44,6
Status of doing physical activities	Yes	142	46,3
	No	165	53,7
Status of doing pedicure (such as washing feet with warm water,	Yes	79	25,7
drying feet and applying Vaseline) every day	No	228	74,3
Status of having an eye checkup at least once a year	Yes	195	63,5
	No	112	36,5
Status of being vaccinated against flu	Yes	58	18,9
	No	249	81,1
Status of smoking (n:88)	Still smoking	54	17,59
	Quitting after being diagnosed	34	11,08
	Non smoker	219	71,33
Status of drinking alcohol (n:34)	Still drinking	20	6,51
	Quitting after being diagnosed	14	4,56
	Never drinking	273	88,93
Status of reading documents regarding diabetes (n=236)	Yes	114	48,1
	No	123	51,9
Status of following the legislation regarding diabetes	Yes	236	76,9
	No	71	23,1
Status of having an ID Card showing you're diabetic with you	Yes	35	11,4
	No	272	88,6
Status of having a diary of diabetes (n:236)	Yes	34	14,4
	No	202	85,6
Status of being a member of an association or	Yes	10	3,3
an organization/association regarding diabetes	No	297	96,7

The state of participants' having high health literacy scores and some of their sociodemographic characteristics have been analyzed with logistic regression model. As variables – such as age, gender, education status, marital status, employment status, income status, area of living, family support and hospital admission within a last year – have been monitored, the estimated relative risk of being high for diabetes health literacy scores of those who read and wrote easily was 2,697 in comparison to the scores of those who had difficulty in at least one of reading or writing activities (95%GA: 1,208-6,022). The estimated relative risk of being high for the

Table 4: Evaluation of Scores According to Some Sociodemographic Characteristics (Ankara, 2011).

Features		N	Mean SS	Median	p
Age	54 aged and below	160	9,06 ± 2,90	10	0,968
	55 aged and over	147	9,03 ± 2,64	9	
Sex	Male	191	8,75 ± 2,69	9	0,006
	Female	116	9,53 ± 2,86	9,5	
Educational Background	Illiterate	71	7,65 ± 2,54	7	<0,001*
	Literate	30	8,43 ± 3,14	8,5	
	Primary Education	146	9,11 ± 2,21	9	
	Lycee and higher	60	10,85 ± 3,41	11	
Marital Status	Married	252	9,23 ± 2,654	9,00	0,030
	Other	54	8,26 ± 3,199	8,00	
Working Status	Having a regular job	126	9,88 ± 2,83	10	<0,001
	Other	180	8,45 ± 2,59	8,5	
Income Status	700 TL and below	93	8,49 ± 2,701	8,00	0,001*
	Between 701-1400 TL	121	9,11 ± 2,546	9,00	
	1401 TL and above	77	10,01 ± 2,854	10,00	
Residential Area	City	260	9,38 ± 2,477	9,00	<0,001
	Rural	47	7,17 ± 3,541	7,00	
Status of understanding the document you read	I don't generally understand	77	8,83 ± 2,130	9,00	<0,001
	I generally understand	116	10,48 ± 2,675	10,00	
Status of general reading	Reading and writing easily	168	9,88 ± 2,651	10,00	<0,001
	Having a difficulty at least in one	68	8,44 ± 2,605	8,50	
Family Support	Yes	237	9,38 ± 2,562	9,00	<0,001
	No	57	7,91 ± 3,008	7,00	
Status of Admission to the Hospital in the last one year	Yes	92	9,58 ± 2,77	9,50	0,045
	No	215	8,82 ± 2,76	9,00	
Duration of Diabetes	≤4	119	8,50 ± 2,32	9,00	0,036*
	5-10 years	84	9,50 ± 3,00	9,50	
	11-14 years	56	9,66 ± 3,32	9,00	
	≥15	47	8,96 ± 2,51	9,00	

diabetes health literacy scores of those who had had diabetes for 15 or more years was 5,437 in comparison to the scores of those who had had diabetes for 4 or fewer years (95%GA: 1,798-16,436) (Table 5).

DISCUSSION

In our study, which was carried out in a public hospital, the average of participants' "Diabetes Health Literacy" scores was found to be 9,05 ± 2,77. Although a breakpoint has not been determined in the evaluation of questionnaire scores, the average score of participants form an opinion that diabetes health literacy is on a medium level. There are not many studies that indicate health literacy situations of diabetes patients in the literature. Schillinger *et al.* (12) ascertain in their study that health literacy levels of a high portion of patients with Type 2

Table 5: Analyzing the state of patients' having high health literacy scores with logistic regression model.

Features		N	TRR	%95 Confidence Interval	
Sex	Female (Ref)	123			
	Male	104	0,933	0,342	2,544
Age (year)	54 aged and below (Ref)	132			
	55 aged and over	95	1,239	0,625	2,458
Educational Background	Literate (Ref)	26			
	Primary School	101	0,960	0,315	2,921
	Secondary School	41	1,910	0,534	6,829
	Lycee	38	1,706	0,421	6,909
	High School/University	21	4,288	0,789	23,311
Marital Status	Married (Ref)	195			
	Other	32	0,490	0,185	1,296
Working Status	Having a regular job (Ref)	115			
	Other	112	0,883	0,325	2,400
Income Status	700 TL and below (Ref)	62			
	Between 701-1400 TL	95	0,956	0,450	2,032
	1401 TL and above 70	1,499	0,609	3,689	
Residential Area	City (Ref)	204			
	Rural	23	0,723	0,255	2,051
Status of Reading or Writing	Having a difficulty at least in one (Ref)	163			
	Reading and Writing Easily	64	2,697	1,208	6,022
Status of Having Family Support	No (Ref)	40			
	Yes	183	1,609	0,701	3,694
Admission to the Hospital in the last one year	No	161			
	Yes	62	1,193	0,583	2,441
Duration of Diabetes	≤4 (Ref)	89			
	5-10 years	69	1,810	0,862	3,797
	11-14 years	40	2,432	0,983	6,012
	≥15	25	5,437	1,798	16,439

diabetes is in a low level. In a study by Kim *et al.* (9), it is found out that 77% of diabetes patients do have an adequate health literacy level. Gazmararian *et al.* (13) state that patients who are treated in public hospitals have a low health literacy level whereas in private hospitals elders' health literacy levels are found to be low. In a study which has been done in our country on health literacy (14), patients' level of understanding medical forms and prescribing information in accordance with medical institutions they apply to was evaluated and it was determined that those who received care from private hospitals had a higher level of comprehension in comparison to those who received care from public hospitals. Considering that our study was carried out in a public hospital, it bears a resemblance to the studies in the literature in that patients did not have high scores in general. The reason for health literacy not being high in public hospitals can be explained with the fact that these institutions generally provide care for lower socioeconomic groups whose educational opportunities are limited.

Schillinger *et al.* (12) state that inadequate health literacy levels are more frequent among females in contrast to males. In our study, females constitute a majority of participants (62,8%) and their average diabetes health literacy score (9,53 ± 2,86) was significantly higher than males' (8,75 ± 2,69) (p=0,006). This difference may have resulted from the fact that although females' habit of reading books and newspapers is poor, in terms of access to information from different channels they have distinct opportunities. This is because in our country women are traditionally more open to social relations than men and they use verbal communication ways more often.

There is a highly important relation between diabetes management and education level as well as education level and health literacy. In Batkın and Çetinkaya's study (15), it was found that those who possess a higher level of education have a higher level of information on diabetes complications. A study by Ishiakawa *et al.* (16), which evaluates health literacy situation of diabetes patients, have found a positive relation between health literacy scores and higher education levels. Scillinger *et al.* (12) state in their study, which compares diabetes outcomes with health literacy, that 66% of participants who are high school graduates or less have inadequate or poor health literacy and as the education level increases, adequacy level of health literacy increases at the same time. In the studies done on type 2 diabetes patients, it has been found that low levels of education are connected with poor health literacy (16,17). In our study, 23,1% of participants were illiterate, 9,8% were merely literate and 33,6% were primary school graduates. Participants' diabetes health literacy scores decrease as education level goes down. Accordingly, having a cognitive base effects health literacy positively and basic literacy and accumulation of knowledge provide convenience for patients to understand and use health related concepts.

Diabetes Mellitus type 2 usually emerges in patients after the age of 40 and leads to partial absence of insulin and insulin resistance in peripheral tissues. (18,19) Inadequate health literacy is more common among elderly patients. Schillinger *et al.* (12) state in their study that patients with inadequate health literacy tend to be older in contrast to patients with adequate health literacy. In the studies done with patients, it has been indicated that old age has a connection with poor health literacy in terms of sociodemographic factors (16,17). In our study, 81,4% of participants were 44 years old and above and we could not find a significant relation between diabetes health literacy scores and age despite the literature. This situation can be explained with the fact that our study has been carried out in a limited group with different measuring instruments and different scopes.

In the study by Ishiakawa *et al.* (16), health literacy scores are found to be usually high for those who have a high economic status. In Schillinger *et al.*'s study (12), there stands out a relation between low health literacy and bad economic situation. In other studies done on type 2 diabetes patients, a tendency to link low economic status with low health literacy is found in terms of sociodemographic factors (16,17). In this study, as we look at participants' income status, we see that approximately 32% had an income equal to 700₺ or less and 41% defined their income status as bad. There was a significant difference between income status and diabetes health literacy scores as those whose incomes were below minimum wage had lower diabetes health literacy scores. This situation makes us think that limited resources of patients might be a reason for their low health literacy levels.

Patients with low health literacy experience substantial difficulties in reading medical documents. As patients come across documents in many cases such as hospital admission and drug use during their diseases, it is a basic necessity for them to understand documents they read. In this regard, average health literacy score of those who admitted to usually understand documents they read was significantly higher than those who confessed not to usually understand them (p<0,001).On the other hand, studies attest that even in the case of patients' literacy, they might have low health literacy. In White *et al.*'s study **(20)** done with 200 diabetes patients, it was determined that although 77% of patients had 9th level reading and writing skills, they still misinterpreted nutrition labels widely.

As we evaluated behaviors effecting health literacy with paired comparisons, we detected that diabetes health scores increased as education status

increased. Moreover, we found out that those who were married, lived in the city, were employed, had a higher income, could use reading and writing skills without difficulty, read diabetes related documents and got family support had higher Diabetes Health Literacy Scores. However, it has been detected that in paired comparisons, factors of age and hospital admission within a last year did not have an effect on health literacy.

Although correlation is examined in analytical studies, in our descriptive study correlation is evaluated through multivariable analysis (logistic regression) to give an idea. In multivariable logistic regression analysis which was done by checking variables such as age, gender, marital status, education status, employment status, income status, place of living, getting family support and hospitalization within a last year, it was determined that having a high diabetes health literacy score was only positively related to having fluent reading and writing skills and being a diabetes patient for 15 or more years. In this regard, two principle factors affecting the case of having a high diabetes health literacy score were fluency in reading and writing and duration of diabetes (≥15 years). As having fluent reading and writing skills might provide better outcomes in people's access to, perception and analysis of knowledge, it could presumably enhance health literacy scores positively. In terms of the duration of disease, which was another effective element, it has been discovered that those whose duration of disease was between 5 and 10 or 11 and 14 years had higher diabetes health literacy scores. Accordingly, it has been derived that a longevity of duration of disease effects health literacy situation. During the time spent with disease, increases in individual's experiences with health personnel or of his own, his sharings with other patients, his sensitivity - as disease turns into a part of his life - contribute to enhancement and competency of issue-related knowledge presumably. Nonetheless, due to the fact that risks of complications increase as the disease progresses, longevity of the disease may have negative effects in terms of complications and health status despite its positive influence in attaining knowledge. From another perspective, this finding proves that those who are newly diagnosed with type 2 diabetes or who have it for 15 or fewer years need to improve their health literacy. A finding in this direction puts forth an alternative perspective for health personnel. From the moment patients are diagnosed to improve their health literacy, diabetes related interactions need to be augmented and within this process an approach peculiar to patient is required in collaboration with him. Patients who do not have reading and writing skills should be considered and with participatory education models personalized learning atmospheres should be created. People's learning about their diseases and having training parallel to their treatment are of utmost importance for preventing complications emerging in the long run and maintaining the quality of life.

RESULT

Diabetes care is a complex concept whose quality is determined by inputs and interactions of patient, care provider, health system, and levels of family and society. For this reason, in evaluating diabetes outcomes, patient's situation has to be dealt together with all the variables affecting the process. Issues –such as patient's proper use of medicine prescribed, understanding messages conveyed, self-expression – related to communication, empowerment, and self-management should especially be given sensitive consideration. Health literacy situation which expresses a patient's competency is an element that has to be taken into account. Giving information with methods suitable for a patient's health literacy level to provide functionality in disease management or improving a patient's health literacy will enhance the success of diabetes management.

Identifying health literacy levels as an indicator of health behaviors is an important factor for solution to maintain and restore good health of diabetes patients and to prevent type 2 diabetes, which has turned into an epidemic today. The facts that studies related to diabetes health literacy are usually conducted in America and Europe with different cultures and societies, health questionnaires to be used are dissimilar, this study was first to be made in Turkey in this area, different measuring instruments were implemented, and it was done in a small group all result in inadequacy of our study to generalize findings. Nevertheless, it still adds a new perspective to health literacy situations of diabetes patients as a first and only study in Turkey in this area.

REFERENCES

1. Rudd RE, Kirsch IS, Yamamoto K. Literacy and Health in America. Princeton, NJ: Center for Global Assessment, Policy Information Center, Research and Development, Educational Testing Services, 2004.

2. Coulter A, Ellins J. Effectiveness of strategies for informing, educating and involving patients. British Medical Journal 2007; 335:24-26.

3. Pignone M, DeWalt D, Sheridan S, Berkman N, Lohr KN. Interventions to improve health outcomes for patients with low literacy. Journal of General Internal Medicine 2005; 20:185-192.

4. Rootman R, Malone R, Bryant B, Horlen C, DeWalt D, Pignone M. The Relationship Between Literacy And Glycemic Control n A Diabetes Disease-Management Program. Abstract, Diabetes Educ 2004;30:263-273.

5. Baker DW. The meaning and measure of health literacy. Journal of General Internal Medicine 2006;21:878-883.

6. WHO http://who.int/about/definition/en/print.html. E.T.04. 08.2011, 1998

7. Nutbeam D. "Health literacy as public health goal: a challenge for contemporary health education and communication strategies into the 21st century" Health Promotion International, 2000;15 (3).

8. Aleksandra J, Vesna B, Jelena M. Functional Health Literacy among Primary Health-Care Patients: data from Belgrade pilot study. Journal of Public Health 2009;31:490-495

9. Kim SP, Love F, Quistberg DB, Shea JA. Association of Health Literacy With Self-Management Behavior in Patients with Diabetes. Diabetes Care 2009;27:2980-2982.

10. Demirtaş A, Akbayrak N. Tip 2 Diyabetes Mellitus'lu Hastaların, Hastalıklarına Uyum ve Kabullenme Kriterlerinin Belirlenmesi. Anatol J Clin Investig 2009;3:10-18.

11. Gergely M. Effective Diabetes Education. IDF Bulletin 1992; 37:9-10. (cited in: Kartal et al. Tip 2 Diyabetli Hastaların Bakım ve Tedaviye Yönelik Tutumları ve Tutumu Etkileyen Faktörler. TAF Prev Med Bull 2008; 7:223-230)

12. Schillinger D, Grumbach K, Piette J, Wang F, Osmond D, Daher C, Palacios J, Sullivan GD, Bindman AB. Association of health literacy with diabetes outcomes. JAMA 2002; 288:475-82.

13. Gazmararian JA, Baker DW, Williams MV, Parker RM, Scott TL, Green DC, Fehrenbach SN, Ren J, Koplan JP. Health Literacy Among Medicare Enrollees in a Managed Care Organization. JAMA 1999; 281:545-551.

14. Yılmaz F, Çolak YM, Ersoy K. Sağlık Okuryazarlığının ve Hasta Hekim İletişimi Üzerine Etkilerinin Değerlendirilmesi. Sağlık ve Toplum Dergisi 2009;19:1.

15. Batkın D, Çetinkaya F. Diabetes Mellitus Hastalarının Ayak Bakımı ve Diabetik Ayak Hakkındaki Bilgi, Tutum ve Davranışları. Sağlık Bilimleri Dergisi 2005;14:6-12.

16. Ishikawa H, Takeuchi T, Yano E. Measuring Functional, Communicative, and Critical Health Literacy Among Diabetic Patients. Diabetes Care 2008;31:874-879.

17. Paasche-Orlow MK, Parker RM, Gazmararian JA, Nielsen-Bohlman LT, Rudd RR. The prevalence of limited health literacy. J Gen Intern Med 2005;20:175-184.

18. American Diabetes Association. Standards of medical care in diabetes. Diabetes Care 2006; 29:S4-42.

19. American Diabetes Association. Standards of medical care in diabetes. Diabetes Care 2008;31:S12-54.

20. White J, Pharm D, Davis S, Cooppan R, Davidson MB, Mulcahy K, Manko G, Nelinson D. Clarifying the Role of Insulin in Type 2 Diabetes Management. Clin Diabetes 2003; 21:14-21.

Correspondence:
Filiz Aslantekin
Sağlık Bakanlığı
Sağlık Araştırmaları Genel Müdürlüğü
Cumhuriyet Mah. Bayındır 1 Sokak No: 13
06430 Sıhhiye/Ankara/TURKIYE.
e-mail: aslantekinfiliz@yahoo.com