SCIE DOI: 10.14744/scie.2018.77200
South. Clin. Ist. Euras. 2018;29(3):151-156

Original Article

The Relationship Between Health Literacy, Diabetic Control, and Disease-Specific Complications in Patients with Type 1 Diabetes Mellitus

İrfan Esen,[1] Hakan Demirci,[2] Metin Güçlü,[1]
Selin Aktürk Esen,[3] Engin Ersin Şimşek[4]

[1]Department of Internal Medicine, University of Health Sciences Bursa Yüksek İhtisas Training and Research Hospital, Bursa, Turkey
[2]Department of Family Medicine, University of Health Sciences Bursa Yüksek İhtisas Training and Research Hospital, Bursa, Turkey
[3]Department of Internal Medicine, Gürsu Cüneyt Yıldız State Hospital, Bursa, Turkey
[4]Department of Family Medicine, University of Health Sciences Kartal Dr. Lütfi Kırdar Training and Research Hospital, İstanbul, Turkey

Submitted: 17.08.2018
Accepted: 04.09.2018

Correspondence: Hakan Demirci, SBÜ Bursa Yüksek İhtisas Eğitim ve Araştırma Hastanesi, Aile Hekimliği Kliniği, Bursa, Turkey

E-mail: drhakandemirci@hotmail.com

Keywords: Cardiovascular disease; hemoglobin A1c; health literacy; nephropathy; neuropathy; retinopathy.

ABSTRACT

Objective: The aim of this study was to investigate the relationship between health literacy, diabetic control, and diabetic complications in patients with type1 diabetes mellitus (DM).

Methods: This was a descriptive study. A total of 106 patients with type 1 DM who were between 18 and 65 years of age and who could speak and understand Turkish and had no cognitive disease were included in the study. The Turkish version of the European Health Literacy Survey Questionnaire (HLS-EU-Q47) was used to assess health literacy. The retinopathy status and levels of hemoglobin A1c, fasting blood sugar, and urine albumin of the patients were obtained from the hospital files.

Results: Overall health literacy was inadequate in 10.4%, problematic in 54.7%, adequate in 20.8%, and excellent in 14.2% of the participants. Retinopathy was found to be statistically significantly higher in the problematic+inadequate group than in the adequate+excellent group in the overall health literacy evaluation (24.6% and 5.4%, respectively). There was no significant difference in the frequency of neuropathy, nephropathy, or cardiovascular disease in the health literacy groups.

Conclusion: The present study demonstrated that low health literacy in patients with type 1 DM was associated with increased retinopathy. Physicians should keep the positive effects of education in mind in order to better control the disease and prevent complications.

INTRODUCTION

Type 1 diabetes mellitus (DM) is a chronic, autoimmune disorder and constitutes approximately 10% of the patients with DM. It occurs due to pancreatic beta cell damage and requires lifelong insulin therapy.[1] In the case of poor disease control, various micro- and macro-vascular complications can develop in diabetic patients.[2] These complications are determinants of morbidity and mortality.[3–5]

Communication between health care providers and diabetic patients, disease awareness among patients, and self-care of patients are very important in the management of diabetes.[6] Patients should receive accurate information to achieve desired hemoglobin A1c (HbA1c) levels, to reduce the risk of hypoglycemia, and to improve the quality of life. Educational programs developed for self-management of patients should be presented to all diabetic patients.[7] Educational programs to provide better glycemic control

and to improve the quality of life should include self-monitoring of blood glucose, carbohydrate count, and pre-meal insulin dose adjustment.[8,9] However, studies on this topic are limited. Implementation of formal educational programs based on evidence and follow-up of the results are key points for successful diabetes treatment.

The concept of health literacy emerged in the literature in the early 1990s.[10] The World Health Organization defines health literacy as personal characteristics and social resources that enable individuals and communities to access, understand, evaluate, and use information to make health-related decisions.[11] Health literacy can be summarized as an individual's ability to understand and interpret the provided medical information and to behave appropriately based on this information.[12] The positive impact of health literacy in chronic diseases has been revealed in many studies.[13–16]

There are various studies on the relationship between health literacy and DM, and conflicting results were obtained in some studies.[17–19] HbA1c is an important determinant in glycemic control. In some studies, no relationship was found between HbA1c and health literacy,[20–22] whereas in other studies, there was a relationship between high HbA1c level and low health literacy.[23,24] Low health literacy can further lead to poor outcomes caused by DM.[25,26] The aim of the present study was to investigate the relationship between health literacy, diabetic control, and diabetic complications in patients with type 1 DM.

MATERIAL AND METHODS

The study was conducted in the internal medicine outpatient clinics and endocrinology and metabolic disease outpatient clinics of the hospital. A total of 106 patients with type 1 DM, between 18 and 65 years old, who could speak and understand Turkish, and who had no cognitive disease were included in the study. The study was approved by the ethics committee of the hospital (decision 2011-KAEK-25 2018/01-09). Written informed consent was obtained from all participants in accordance with the Declaration of Helsinki.

The Turkish version of the European Health Literacy Survey Questionnaire (HLS-EU-Q47) was used to assess health literacy.[27] Participants were asked questions in the context of a 47-item health literacy questionnaire, and their responses were recorded. The answers for the 47 questions were ranked as 1 = very difficult, 2 = quite hard, 3 = quite easy, and 4 = very easy. Survey questions were divided into subgroups and assessed as follows: health care: questions 1–16, disease prevention: questions 17–31, and health improvement: questions 32–47. At the end of the scoring, 0–25 points were insufficient, 25–33 points were problematic, 33–42 points were sufficient, and 42–50 points were excellent.

Participant's marital, educational, occupational, and economic status and monthly monetary income levels and duration of diabetes were noted. Their retinopathy status, HbA1C, fasting blood sugar, and urine albumin levels were obtained from the patient's files. Patients who did not have a retinopathy examination within the last 1 year and who had no HbA1c, fasting blood sugar, and albuminuria values within the last 3 months were excluded from the study. To identify the presence of distal symmetric polyneuropathy, symptoms of neuropathy (paresthesia, dulled sensation, and pain) were asked to the patients. Vibration perception on the distal plantar faces of the toes and metatarsal joints and 10 g of microfibrillated pressures were applied. The presence of microvascular complications was determined according to the guidelines of the American Diabetes Association.[28]

Statistical analysis

The normal distribution suitability of variables was examined by Shapiro–Wilk test. Continuous variables are expressed as median (minimum–maximum) values. Categorical variables are expressed as n (%). Pearson's chi-square or Fisher's exact test was used in the analyses to compare disease incidence among sufficient and insufficient health literacy groups. Mann–Whitney U test was used to compare health literacy with diabetes age and HbA1c. The internal consistency of the health literacy scale was examined by the Cronbach's α coefficient. The reliability coefficients of the health literacy scale and subscales were found to be α=0.92 for health care, α=0.91 for disease prevention, α=0.93 for health improvement, and α=0.97 for general health. The SPSS program was used for statistical analysis (released 2012, IBM SPSS statistics for Windows, version 21.0; IBM Corp., Armonk, NY, USA). A p-value of <0.05 was considered statistically significant.

RESULTS

A total of 106 (63 female and 43 male) patients with type 1 DM with a mean age of 32 years were studied. The mean disease duration was 11 years, mean HbA1c level was 8.75%, and mean fasting blood glucose level was 219 mg/dl. Tables 1 and 2 summarize the socio-demographic characteristics of the volunteers.

Diabetic retinopathy was found in 17.9%, diabetic neuropathy in 6.6%, and diabetic nephropathy in 32.1% of the volunteers. Of the patients, 4.7% had cardiovascular disease, and 31% had additional diseases (e.g., bronchial asthma and psoriasis) other than diabetes and diabetic complications (Table 2).

Table 3 shows the results of HLS-EU-Q47. Overall health literacy was insufficient in 10.4% of the patients, problematic in 54.7%, sufficient in 20.8%, and excellent in 14.2%.

Table 1. Socio-demographic characteristics of participants

	n=106
Age (years), median (min–max)	32 (18–55)
Gender, n (%)	
Female	63 (59.40)
Male	43 (40.60)
Marital status, n (%)	
Single	41 (38.70)
Married	60 (56.60)
Divorced	5 (4.70)
Education status, n (%)	
Illiterate	1 (0.90)
Primary school	28 (26.40)
Secondary school	10 (9.40)
High school	41 (38.70)
University	26 (24.50)
Job, n (%)	
Housewife	25 (23.60)
Worker	23 (21.70)
Professional occupation	13 (12.30)
Artisan	8 (7.50)
Student	8 (7.50)
Unemployed	8 (7.50)
Craftsman	7 (6.60)
Officer	4 (3.80)
Retired	3 (2.80)
Farmer	2 (1.90)
Other	5 (4.70)
Health insurance, n (%)	
Social security institution	93 (87.70)
Special insurance	1 (0.90)
None	12 (11.30)
Monthly monetary income, n (%)	
None	18 (17)
500–1000 TL	9 (8.50)
1000–2000 TL	49 (46.20)
2000–4000 TL	25 (23.60)
>4000 TL	5 (4.70)

TL: Turkish Lira.; Min: Minimum; Max: Maximum.

When the subgroups were examined, health care health literacy was insufficient in 7.5% of the patients, problematic in 32.1%, sufficient in 37.7%, and excellent in 22.6%. Disease prevention health literacy was insufficient in 19.8% of the patients, problematic in 44.3%, sufficient in 21.7%, and excellent in 14.2%. Finally, health improvement health literacy was insufficient in 27.4% of the patients, problematic in 36.8%, sufficient in 19.8%, and excellent in 16%.

Table 2. Participant's fasting blood glucose and HbA1c values and presence of diabetic complications

	n=106
Duration of diabetes (years), median (min–max)	11 (1–32)
Retinopathy, n (%)	19 (17.90)
Neuropathy, n (%)	7 (6.60)
Nephropathy, n (%)	34 (32.10)
Cardiovascular disease, n (%)	5 (4.70)
Additional disease, n (%)	33 (31.10)
HbA1c, median (min–max)	8.75 (5.70–15)
Proteinuria, n (%)	
No microalbuminuria, n (%)	76 (71.70)
Microalbuminuria, n (%)	17 (16)
Overt proteinuria, n (%)	13 (12.30)
Fasting blood glucose median (min–max)	219 (55–583)

Min: Minimum; Max: Maximum.

The relationship between retinopathy and health literacy is shown in Table 4 and Fig. 1. Retinopathy was found to be statistically significantly higher in the "problematic+insufficient" group than in the "sufficient+excellent" group in the overall health literacy evaluation (24.6% and 5.4%, respectively) (p=0.014). In the health literacy subgroup analysis, the frequency of retinopathy was found to be significantly higher in the "problematic+insufficient" group according to the assessment based on health improvement (p=0.044).

Calculation of sample size was based on the presence of retinopathy for the health literacy subgroups. The percentage of retinopathy was found to be 26% for the insufficient health literacy group and 5.40% for the sufficient health literacy group; insufficient health literacy group of n=50 and sufficient health literacy group of n=28 formed a total of 78 patients in a pilot study. Calculated by G*Power 3.1 (http://www.gpower.hhu.de/), the achieved power was found to be 73%. We also calculated the target sample size that was needed to achieve at least 80% power with retinopathy proportions obtained from a pilot study. As a result, priori power analysis was conducted using a medium effect size (Cramer's V=0.28) based upon findings of a pilot study. Using this effect size, V=0.28, a total sample size of 78 (n=56 for the limited health literacy group and n=21 for the adequate health literacy group) participants was estimated for a power of 0.80 and α of 0.05. Finally, 106 people were included in the study when the limitations of the study were taken into consideration.

Table 3. Health literacy scores and distribution of subgroups

	Insufficient		Problematic		Sufficient		Excellent	
	n	%	n	%	n	%	n	%
Overall health literacy (Q 1–47)	11	10.40	58	54.70	22	20.80	15	14.20
Health care health literacy (Q 1–16)	8	7.50	34	32.10	40	37.70	24	22.60
Disease prevention health literacy (Q 17–31)	21	19.80	47	44.30	23	21.70	15	14.20
Health improvement health literacy (Q 32–47)	29	27.40	39	36.80	21	19.80	17	16

Table 4. Relationship with health literacy and retinopathy

	Retinopathy		p
	No (n=87)	Yes (n=19)	
Overall HL, n (%)			
Insufficient+problematic	52 (75.40)	17 (24.60)	0.014[a]
Sufficient+excellent	35 (94.60)	2 (5.40)	
Health care HL, n (%)			
Insufficient+problematic	32 (76.20)	10 (23.80)	0.201[a]
Sufficient+excellent	55 (85.90)	9 (14.10)	
Disease prevention HL, n (%)			
Insufficient+problematic	53 (77.90)	15 (22.10)	0.138[a]
Sufficient+excellent	34 (89.50)	4 (10.50)	
Health improvement HL, n (%)			
Insufficient+problematic	52 (76.50)	16 (23.50)	0.044[a]
Sufficient+excellent	35 (92.10)	3 (7.90)	

[a]: Chi-square test. HL: Health literacy.

In the overall health literacy assessment, the HbA1c ratio was significantly higher in the "problematic + insufficient" group than in the "sufficient + excellent" group (8.9% and 7.8%, respectively) (p=0.009). However, there was no relationship between health literacy and age or duration of diabetes (Table 5).

There was no significant difference in the frequency of neuropathy, nephropathy, cardiovascular disease, and additional disease between the "problematic + insufficient" and "sufficient + excellent" groups in the general health literacy (p=0.417, p=0.705, p=0.656, and p=0.504, respectively).

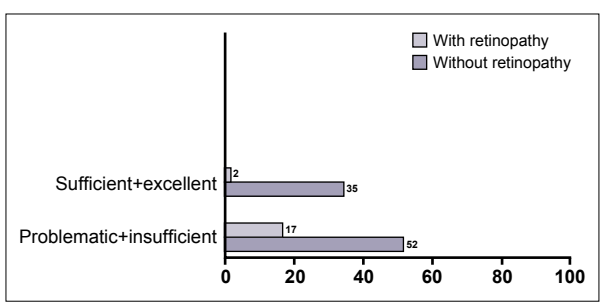

Figure 1. The frequency of retinopathy in general health literacy.

Table 5. Comparison of age, duration of diabetes, and HbA1c levels among health literacy groups

	Health literacy		p
	Insufficient+ problematic (n=69)	Sufficient+ excellent (n=37)	
Age	31 (18–55)	32 (18–48)	0.635[a]
Duration of diabetes	11 (1–32)	11 (1–25)	0.902[a]
HbA1c	8.90 (5.70–15)	7.80 (6–14.80)	0.009[a]

Data are expressed as median (minimum–maximum). [a]: Mann–Whitney U test.

DISCUSSION

Overall health literacy was insufficient in 10.4% of the patients, problematic in 54.7%, sufficient in 20.8%, and excellent in 14.2%. Retinopathy was found to be statistically significantly higher in the "problematic + insufficient" group than in the "sufficient + excellent" group in the overall health literacy evaluation (24.6% and 5.4%, respectively). There was no significant difference in the frequency of neuropathy, nephropathy, and cardiovascular disease in the health literacy groups.

In the present study, we found health literacy to be 54.7% problematic and 10.4% insufficient in patients with type 1 DM. Souza et al.[29] found that functional health literacy below adequate was 56.6% in patients with DM. Protheroe et al.[30] noted that 60.5% have low health literacy among patients with DM in the United Kingdom. Mohammadi et al.[31] reported that inadequate health literacy was 70.0% in Iranian diabetic patients. Hussein et al.[32] showed that 44.5% of patients with type 2 DM had inadequate health literacy. It is difficult to make a complete comparison if the scales used are different. However, it is observed that health literacy among patients with DM is low. Since low

health literacy is associated with poor prognosis, it can be said that these patients need training in addition to drug treatment for the management of the disease.

Diabetic retinopathy was found to be statistically significantly higher in the "problematic + insufficient" health literacy group than in the "sufficient + excellent" health literacy group, which is one of the most striking results of the present study. In the health improvement health literacy subgroup analysis, a significant retinopathy rate was found in the group with "problematic + insufficient" health literacy. It is thought that this is caused by poor health literacy leading to poor disease control. In a study, it was found that 50.8% of diabetic patients knew that routine eye examinations are required and only 19% of the patients had information about diabetic retinopathy.[33] Rani et al.[34] found that 25% of the population in the urban area and 67% of the population in the rural area did not have diabetic retinopathy screening. The present study and other studies show that patients with diabetes do not have adequate knowledge about their current illnesses due to low health literacy. Low health literacy in the community makes it difficult to make progress against diseases and complications. Increasing levels of health literacy should be one of the leading targets in the struggle against diabetes.

In the present study, patients with "problematic + insufficient" general health illiteracy were found to have higher HbA1c levels, and this was statistically significant. However, no relationship between health literacy and age or duration of diabetes was established. Mounce et al.[35] found no difference between low and high health literacy patients in terms of HbA1c and proteinuria levels. These conflicting results may be due to different populations in different cultures and geographies. In addition, health care providers in different geographical regions may be an essential factor for the levels of health literacy of the patients. Furthermore, health literacy questionnaire forms used in studies may be different. In the present study, we used HLS-EU-Q47, which is more comprehensive than other health literacy surveys and applicable to various populations. The reliability of the survey also strengthens the relationship between elevated HbA1c and low health literacy.

In conclusion, the present study showed that low health literacy in patients with type 1 DM was associated with increased retinopathy. Physicians should keep in mind the positive effects of education in controlling a disease and the prevention of its complications.

Ethics Committee Approval

The study was approved by the ethics committee of the hospital (decision 2011-KAEK-25 2018/01-09).

Informed Consent

Written informed consent was obtained from all participants.

Peer-review

Internally peer-reviewed.

Authorship Contributions

Concept: İ.E., H.D.; Design: İ.E., H.D.; Data collection &/or processing: İ.E., M.G., S.A.E.; Analysis and/or interpretation: M.G., S.A.E., E.E.Ş.; Literature search: İ.E., H.D., E.E.Ş.; Writing: İ.E., H.D., M.G., S.A.E., E.E.Ş.; Critical review: İ.E., H.D.

Conflict of Interest

None declared.

REFERENCES

1. van Belle TL, Coppieters KT, von Herrath MG. Type 1 diabetes: etiology, immunology, and therapeutic strategies. Physiol Rev 2011;91:79–118. [CrossRef]
2. Harada M, Fujihara K, Osawa T, Yamamoto M, Kaneko M, Matsubayashi Y, et al. Effects of treatment-achieved HbA1c on incidence of micro-/macrovascular complications in patients with diabetes mellitus. Diabetes 2018;67:444. [CrossRef]
3. Garcia MJ, McNamara PM, Gordon T, Kannel WB. Morbidity and mortality in diabetics in the Framingham population. Sixteen year follow-up study. Diabetes 1974;23:105–11. [CrossRef]
4. Huang ES, Laiteerapong N, Liu JY, John PM, Moffet HH, Karter AJ. Rates of complications and mortality in older patients with diabetes mellitus: the diabetes and aging study. JAMA Intern Med 2014;174:251–8. [CrossRef]
5. Packer M. Heart Failure: The Most Important, Preventable, and Treatable Cardiovascular Complication of Type 2 Diabetes. Diabetes Care 2018;41:11–13. [CrossRef]
6. Speight J, Amiel S, Bradley C, Heller S, James P, Oliver L, et al. The dose adjustment for Normal Eating (DAFNE) Trial. Improvements in HBA1c still apparent and quality of life benefits well-maintained at 4-year follow-up. Diabet Med 2007;24:95, Abstract P224.
7. DAFNE Study Group. Training in flexible, intensive insulin management to enable dietary freedom in people with type 1 diabetes: dose adjustment for normal eating (DAFNE) randomised controlled trial. BMJ 2002;325:746. [CrossRef]
8. Powers MA, Bardsley J, Cypress M, Duker P, Funnell MM, Fischl AH, et al. Diabetes self-management education and support in type 2 diabetes: a joint position statement of the American Diabetes Association, the American Association of Diabetes Educators, and the Academy of Nutrition and Dietetics. Clin Diabetes 2016;34:70–80
9. Saffari M, Ghanizadeh G, Koenig HG. Health education via mobile text messaging for glycemic control in adults with type 2 diabetes: a systematic review and meta-analysis. Prim Care Diabetes 2014;8:275–85. [CrossRef]
10. Dodson S, Good S, Osborne R. Regional Office for South-East Asia. Health literacy toolkit for low- and middle-income countries: a series of information sheets to empower communities and strengthen health systems. WHO; 2015. Available at: http://apps.searo.who.int/PDS_DOCS/B5148.pdf?ua=1. Accessed Sep 6, 2018.
11. Çopurlar KC, Kartal M. What is Health Literacy? How to Measure It? Why is It Important? TJFM&PC 2016;10:42–7.
12. Sørensen K, Pleasant A. Understanding the conceptual importance of the differences among health literacy definitions. Stud Health

Technol Inform 2017;240:3–14.
13. Mackey LM, Doody C, Werner EL, Fullen B. Self-management skills in chronic disease management: what role does health literacy have? Med Decis Making 2016;36:741–59. [CrossRef]
14. Chiauzzi E, Rodarte C, DasMahapatra P. Patient-centered activity monitoring in the self-management of chronic health conditions. BMC Med 2015;13:77. [CrossRef]
15. Miller TA. Health literacy and adherence to medical treatment in chronic and acute illness: a meta-analysis. Patient Educ Couns 2016;99:1079–86. [CrossRef]
16. Poureslami I, Nimmon L, Rootman I, Fitzgerald MJ. Health literacy and chronic disease management: drawing from expert knowledge to set an agenda. Health Promot Int 2017;32:743–54.
17. Kim SH, Lee A. Health-literacy-sensitive diabetes self-management Interventions: A Systematic Review and Meta-Analysis. Worldviews Evid Based Nurs 2016;13:324–33. [CrossRef]
18. Bailey SC, Brega AG, Crutchfield TM, Elasy T, Herr H, Kaphingst K, et al. Update on health literacy and diabetes. Diabetes Educ 2014;40:581–604. [CrossRef]
19. Fransen MP, von Wagner C, Essink-Bot ML. Diabetes self-management in patients with low health literacy: ordering findings from literature in a health literacy framework. Patient Educ Couns 2012;88:44–53. [CrossRef]
20. Gerber BS, Pagcatipunan M, Smith EV Jr, Basu SS, Lawless KA, Smolin LI, et al. The assessment of diabetes knowledge and self-efficacy in a diverse population using Rasch measurement. J Appl Meas 2006;7:55–73.
21. Morris NS, MacLean CD, Littenberg B. Literacy and health outcomes: a cross-sectional study in 1002 adults with diabetes. BMC Fam Pract 2006;7:49. [CrossRef]
22. Kim S, Love F, Quistberg DA, Shea JA. Association of health literacy with self-management behavior in patients with diabetes. Diabetes Care 2004;27:2980–2. [CrossRef]
23. van der Heide I, Wang J, Droomers M, Spreeuwenberg P, Rademakers J, Uiters E. The relationship between health, education, and health literacy: results from the Dutch Adult Literacy and Life Skills Survey. J Health Commun 2013;18:172–84. [CrossRef]
24. Brega AG, Ang A, Vega W, Jiang L, Beals J, Mitchell CM, et al; Special Diabetes Program for Indians Healthy Heart Demonstration Project. Mechanisms underlying the relationship between health literacy and glycemic control in American Indians and Alaska Natives. Patient Educ Couns 2012;88:61–8. [CrossRef]
25. Schillinger D, Grumbach K, Piette J, Wang F, Osmond D, Daher C, et al. Association of health literacy with diabetes outcomes. JAMA 2002;288:475–82. [CrossRef]
26. Levin-Zamir D, Baron-Epel OB, Cohen V, Elhayany A. The Association of Health Literacy with Health Behavior, socioeconomic indicators, and self-assessed health from a national adult survey in Israel. J Health Commun 2016;21:61–8. [CrossRef]
27. HLS-EU Consortium. Comparative report of health literacy in eight EU member states. The European Health Literacy Survey HLS-EU; 2012. Available at: http://ec.europa.eu/chafea/documents/news/Comparative_report_on_health_literacy_in_eight_EU_member_states.pdf, Accessed Sep 6, 2018.
28. American Diabetes Association. Standards of medical care in diabetes—2013. Diabetes Care 2013;36:S11–66. [CrossRef]
29. Souza JG, Apolinario D, Magaldi RM, Busse AL, Campora F, Jacob-Filho W. Functional health literacy and glycaemic control in older adults with type 2 diabetes: a cross-sectional study. BMJ Open 2014;4:e004180. [CrossRef]
30. Protheroe J, Whittle R, Bartlam B, Estacio EV, Clark L, Kurth J. Health literacy, associated lifestyle and demographic factors in adult population of an English city: a cross-sectional survey. Health Expect 2017;20:112–9. [CrossRef]
31. Mohammadi Z, Tehrani Banihashemi A, Asgharifard H, Bahramian M, Baradaran HR, Khamseh ME. Health literacy and its influencing factors in Iranian diabetic patients. Med J Islam Repub Iran 2015;29:230.
32. Hussein SH, Almajran A, Albatineh AN. Prevalence of health literacy and its correlates among patients with type II diabetes in Kuwait: A population based study. Diabetes Res Clin Pract 2018;141:118–25.
33. Tajunisah I, Wong P, Tan L, Rokiah P, Reddy S. Awareness of eye complications and prevalence of retinopathy in the first visit to eye clinic among type 2 diabetic patients. Int J Ophthalmol 2011;4:519–24.
34. Rani PK, Raman R, Sharma V, Mahuli SV, Tarigopala A, Sudhir RR, et al. Analysis of a comprehensive diabetic retinopathy screening model for rural and urban diabetics in developing countries. Br J Ophthalmol 2007;91:1425–9. [CrossRef]
35. Mounce LT, Steel N, Hardcastle AC, Henley WE, Bachmann MO, Campbell JL, et al. Patient characteristics predicting failure to receive indicated care for type 2 diabetes. Diabetes Res Clin Pract 2015;107:247–58. [CrossRef]

Tip 1 Diyabetes Mellitus Hastalarında Sağlık Okuryazarlığı ve Diyabet Kontrolü ve Hastalığa Özgü Komplikasyonlar Arasındaki İlişki

Amaç: Tip 1 diyabetes mellitus hastalarında sağlık okuryazarlığının diyabet kontrolü ve hastalığa özgü komplikasyonlarla ilişkisini araştırmak amaçlandı.

Gereç ve Yöntem: Bu araştırma tanımlayıcı bir çalışmadır. On sekiz–altmış beş yaş aralığında olan Türkçe konuşan ve herhangi bir bilişsel rahatsızlığı olmayan 106 tip 1diyabetes mellitus hastası araştırmaya dahil edildi. Avrupa Sağlık Okuryazarlığı Araştırması Anket soruları kişilerin sağlık okuryazarlığı düzeylerini ölçmede kullanıldı. Katılımcıların retinopati muayeneleri, HbA1c sonuçları, açlık kan şekeri sonuçları ve albuminüri seviyeleri hasta dosyalarından elde edildi.

Bulgular: Toplamda sağlık okuryazarlığı %10.4 katılımcıda yetersiz, %54.7 katılımcıda problemli, %20.8 katılımcıda yeterli ve %14.2 katılımcıda mükemmeldi. Retinopati sıklığı, sağlık okuryazarlığı problemli ve yetersiz olan grupta yeterli ve mükemmel olan gruba oranla daha sıktı (%24.6 ve %5.4). Sağlık okuryazarlığı gruplarında nöropati ve nefropati ve kardiyovasküler hastalıklar arasında fark yoktu.

Sonuç: Çalışma sonucunda tip 1 diyabetes mellitus hastalarında sağlık okuryazarlığının artmış retinopati riski ile ilişkili olduğu görüldü. Hekimler hastalık kontrolü ve korunmasında eğitimin önemini akılda tutmalıdırlar.

Anahtar Sözcükler: HbA1c; kardiyovasküler hastalıklar; nefropati; nöropati; retinopati; sağlık okuryazarlığı.