The Relationship Between E-Health Literacy Level and Obtaining and Verifying Health Information from Digital Media Behaviours in Individuals with Type 2 Diabetes: A Public Hospital Example

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GRAPHICAL ABSTRACT

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ABSTRACT

Aim: This research was conducted to examine the relationship between the e-health literacy level and obtaining and verifying health information from digital media behaviours in individuals with type 2 diabetes.

Material and Methods: This cross-sectional study was conducted in a training and research hospital (n=251). Data were collected using the Descriptive Characteristics Form, e-Health Literacy Scale and Verifying Health Information from Digital Media Scale. Descriptive analyses, independent sample t-test, one-way ANOVA, and correlation analyses were used to evaluate the data.
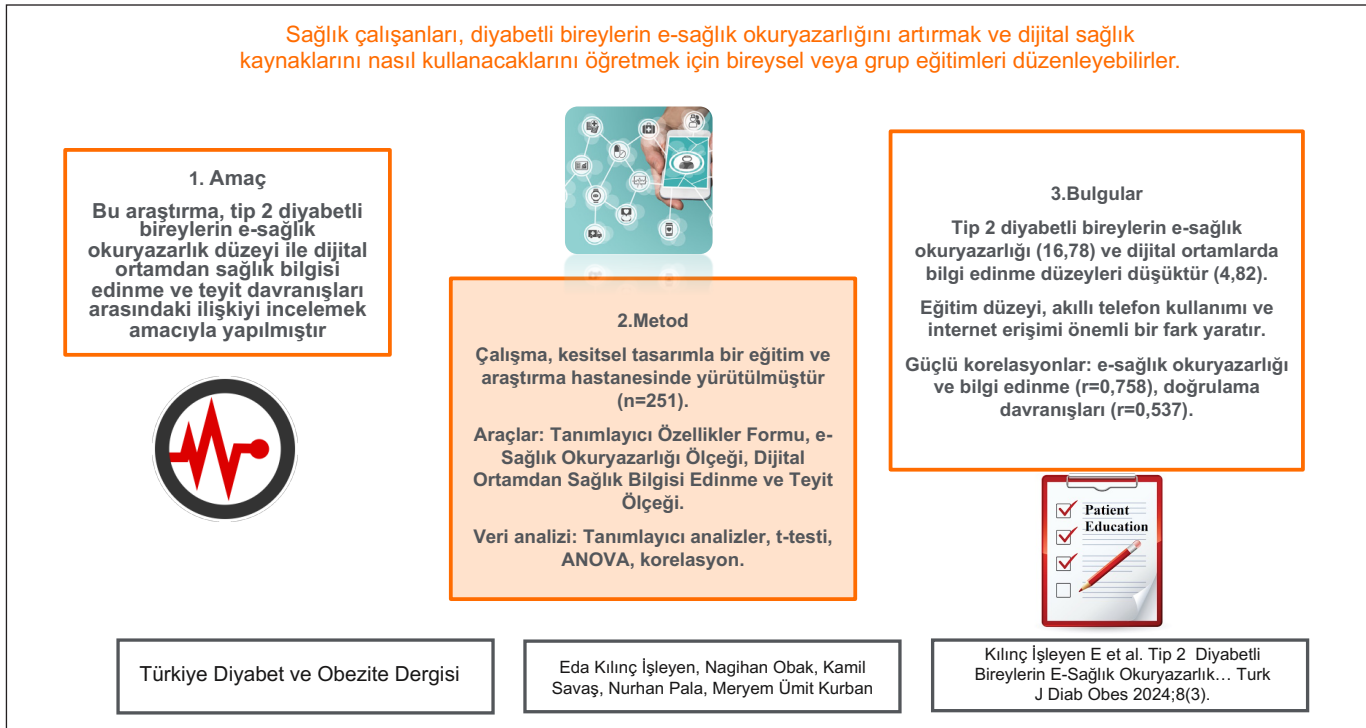
Results: The average age of individuals with type 2 diabetes in the hospital where this study was conducted is 61.17±12.40. In this study, the mean age of individuals with type 2 diabetes was 61.17±12.40. Type 2 diabetic individuals were found to have low e-health literacy (mean=16.78, SD=10.61), obtaining health information from digital media (mean=4.82, SD=2.70), and low confirmation level (mean=4.98, SD=2.62). A positive strong relationship was found between obtaining health information via e-health literacy (r=0.758), digital health information (r=0.759), and digital confirmation (r=0.537) (p<0.05). Diabetics with a bachelor's degree or higher (33.92±5.26) had higher e-health literacy and digital information obtaining and confirmation behavior scores than those with high school (25.36±8.26), secondary school (21.74±9.47) and primary school (13.15±8.95) education levels (p<0.05). Those with a smart phone (22.64±10.16) had higher e-health literacy and digital information obtaining and confirmation behavior scores than those without (8.21±1.65), those who use the internet every day (28.32±7.68) had higher e-health literacy and digital information obtaining and confirmation behavior scores than those who do not (8.05±0.47), and those with diabetes who think that the internet positively affects their health (30.06±6.62) had higher e-health literacy and digital information obtaining and confirmation behavior scores than those who do not (10.34±5.57) (p<0.05).

Conclusion: The e-health literacy level and obtaining and verifying health information from digital media behaviours are low. Diabetics with a bachelor's degree or higher, who are employed, who have a smartphone, and who use the internet every day have higher e-health literacy scores and obtaining and verifying health information from digital media behavior scores.

Keywords: Type 2 diabetes, Electronics, Health literacy, Consumer health information, Public health

Tip 2 Diyabetli Bireylerin e-Sağlık Okuryazarlık Düzeyi ile Dijital Ortamdan Sağlık Bilgisi Edinme ve Teyit Davranışları Arasındaki İlişki: Bir Kamu Hastanesi Örneği

GRAFİKSEL ÖZET

Sağlık çalışanları, diyabetli bireylerin e-sağlık okuryazarlığını artırmak ve dijital sağlık kaynaklarını nasıl kullanacaklarını öğretmek için bireysel veya grup eğitimleri düzenleyebilirler.

1. Amaç

Bu araştırma, tip 2 diyabetli bireylerin e-sağlık okuryazarlık düzeyi ile dijital ortamdan sağlık bilgisi edinme ve teyit davranışları arasındaki ilişkiyi incelemek amacıyla yapılmıştır

2.Metod

Çalışma, kesitsel tasarımla bir eğitim ve araştırma hastanesinde yürütülmüştür (n=251).

Araçlar: Tanımlayıcı Özellikler Formu, e-Sağlık Okuryazarlığı Ölçeği, Dijital Ortamdan Sağlık Bilgisi Edinme ve Teyit Ölçeği.

Veri analizi: Tanımlayıcı analizler, t-testi, ANOVA, korelasyon.

3.Bulgular

Tip 2 diyabetli bireylerin e-sağlık okuryazarlığı (16,78) ve dijital ortamlarda bilgi edinme düzeyleri düşüktür (4,82).

Eğitim düzeyi, akıllı telefon kullanımı ve internet erişimi önemli bir fark yaratır.

Güçlü korelasyonlar: e-sağlık okuryazarlığı ve bilgi edinme (r=0,758), doğrulama davranışları (r=0,537).

Türkiye Diyabet ve Obezite Dergisi

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ÖZ

Amaç: Bu araştırma, tip 2 diyabetli bireylerin e-sağlık okuryazarlık düzeyi ile dijital ortamdan sağlık bilgisi edinme ve teyit davranışları arasındaki ilişkiyi incelemek amacıyla yapılmıştır.

Gereç ve Yöntemler: Bu kesitsel çalışma bir eğitim ve araştırma hastanesinde yürütülmüştür (n=251). Veriler Tanımlayıcı Özellikler Formu, e-Sağlık Okuryazarlığı Ölçeği ve Dijital Medyadan Sağlık Bilgilerinin Doğrulanması Ölçeği kullanılarak toplanmıştır. Verileri değerlendirmek için tanımlayıcı analizler, bağımsız örneklem t-testi, tek yönlü ANOVA ve korelasyon analizleri kullanılmıştır.

Bulgular: Bu çalışmanın yürütüldüğü hastanedeki tip 2 diyabetli bireylerin yaş ortalaması 61,17±12,40'tır. Tip 2 diyabetli bireylerin e-sağlık okuryazarlık (Ortalama= 16,78, SS= 10,61) dijital ortamdan sağlık bilgisi edinme (Ortalama =4,82, SS= 2,70) ve teyit düzeyi düşük (Ortalama= 4,98, SS= 2,62) bulunmuştur. e-sağlık okuryazarlığı ile sağlık bilgisi alma (r=0,758), dijital sağlık bilgi (r=0,759) ve dijital onay (r=0,537) arasında pozitif güçlü bir ilişki bulunmuştur (p<0,05). Eğitim düzeyi lisans ve üzeri olan diyabetlilerin (33,92±5,26) eğitim düzeyi lise (25,36±8,26), ortaokul (21,74±9,47) ve ilkokul olanlara (13,15±8,95) göre e-sağlık okuryazarlığı ile dijital ortamda bilgi edinme ve teyit davranış puanı daha yüksektir (p<0,05). Akıllı telefonu olanların (22,64±10,16) olmayanlara (8,21±1,65) göre, her gün internet kullananların (28,32±7,68) kullanmayanlara (8,05±0,47) göre ve internetin sağlığını pozitif etkilediğini düşünen diyabetlilerin (30,06±6,62) düşünmeyenlere (10,34±5,57) göre e-sağlık okuryazarlığı ile dijital ortamda bilgi edinme ve teyit davranış puanı daha yüksektir (p<0,05)

Sonuç: Bu çalışmanın yürütüldüğü hastanedeki tip 2 diyabetli bireylerin e-sağlık okuryazarlık düzeyi ile dijital ortamdan sağlık bilgisi edinme ve teyit düzeyi düşüktür. Eğitim düzeyi lisans ve üzeri olan, çalışan, akıllı telefonu olan, her gün internet kullanan diyabetlilerin e-sağlık okuryazarlık düzeyi ile dijital ortamda bilgi edinme ve teyit davranış düzeyi diğer gruplara göre daha yüksektir.

Anahtar Sözcükler: Tip 2 diyabet, Elektronik, Sağlık okuryazarlığı, Sağlık bilgisi kullanma, Halk sağlığı

INTRODUCTION

The rapid advancement of the digital age has brought significant changes to the field of health. In particular, the widespread use of the internet and the development of mobile technologies have dramatically transformed how individuals access health information (1). To increase the demand for health services and relieve the burden on health systems, digital health applications have become important tools that facilitate individuals' access to health information (2). In this context, e-health literacy emerges as a critical concept, referring to individuals' ability to access, understand, and use health information in digital environments (3,4). Type 2 diabetes is a chronic disease that is common worldwide and directly affects the quality of life of individuals (5). Globally, diabetes mellitus, a chronic, progressive disease, is a public health problem (6). According to the International Diabetes Federation (IDF), there were 537 million adults with type 2 diabetes throughout the world in 2021. Of all European countries, Türkiye has the highest prevalence of diabetes (14.5%) (7).

The lifelong treatment process required for individuals with diabetes makes continuous and accurate access to health information essential. At this point, digital health platforms and e-health literacy play a crucial role in disease management and healthcare-seeking behaviors of individuals with type 2 diabetes (8). According to research by the Turkish Statistical Institute, 68.8% of internet users in our country searched for health-related information on the internet in the first three months of 2018 (9). The high rate of health

information search on the internet and the ease of access to health-related information on the internet have made e-health literacy important. E-health literacy is the ability to search, find, understand, and evaluate health-related information from electronic sources and to use or apply the information obtained to solve a health problem (10). Low e-health literacy poses a significant threat to both individual health and public health because the application of false and misleading information on the internet can cause significant health problems. Individuals with low e-health literacy levels may be at risk of exposure to misinformation (11). Individuals with type 2 diabetes can obtain information from many digital environments to manage their health. A closer examination of their preferences for obtaining health information in digital environments reveals that users tend to rely more on websites than on social media for health-related information (8,10,11). In studies conducted in Korea and Taiwan, the e-health literacy of individuals with diabetes was found to be at a moderate level (8,11). Low e-health literacy in individuals with type 2 diabetes may make it difficult for individuals to effectively use e-health technologies and services (10). In Neter and Brainin's study, it was stated that individuals with high health literacy tend to obtain information by using digital health resources more effectively and to check the accuracy of this information (12). In a study conducted in Swedish society by Sundell et al. it suggested that low health literacy levels of individuals also reduced health information seeking behavior in digital environments (13). Yao et al. stated in their study that diabetes patients exhibit information seeking and sharing

behaviors in online health communities (14). However, no study has been found examining the relationship between e-health literacy and obtaining health information from digital environments and verification behaviors in individuals with diabetes. Digital platforms, especially social media and forums are full of unverified health information. Individuals with diabetes with low e-health literacy may be negatively affected by this information pollution and may adopt misguided health practices. This study may guide the patient education and guidance functions of digital health platforms to be more effective. Digital content customized specifically for individuals with diabetes can be developed.

MATERIAL and METHODS

Aim and Hypothesis

This research was conducted to examine the relationship between the e-health literacy level and obtaining and verifying health information from digital media behaviours in individuals with type 2 diabetes.

$H1_1$: Individuals with type 2 diabetes have low electronic health literacy levels.

$H2_1$: Individuals with type 2 diabetes have low obtaining and verifying health information from digital media behaviours.

$H3_1$: There is a positive relationship between the electronic health literacy and obtaining and verifying health information from digital media behaviours in individuals with type 2 diabetes

Study Design, Setting and Participants

The study was conducted cross-sectional in a training and research hospital in Türkiye, between January 2024 and June 2024. The universe of the study consisted of type 2 diabetic patients who were hospitalized for treatment in the Internal Medicine I and II Clinics of this hospital between the specified dates. In the study, a two-way hypothesis was established to examine the relationship between the behaviors of diabetic patients to obtain health information in the digital environment, e-health literacy and health service request postponement and the sample size was calculated using the G*Power 3.1.9.7 program (15). Since there is no similar study in the literature, a reference source could not be used. In the analysis, Exact was selected from the test family and "correlation: Bivariate normal model" was selected from the statistical test. The correlation value was taken as the basis and the required sample size was calculated as at least 202 with a 5% margin of error (α=0.05, h0 correlation value 0 and 95% power (1-β=0.95) for the correlation analysis. The inclusion criteria for the study were 1) being over 18 years

of age, 2) being diagnosed with type 2 diabetes, 3) being a native Turkish speaker and 4) agreeing to participate in the study. The exclusion criteria for the study were 1) being diagnosed with gestational or type 1 diabetes, 2) not having a diagnosis of cognitive or major psychiatric disease. A total of 251 type 2 diabetic individuals meeting these criteria constituted the study sample.

Instruments

The data collection included a descriptive characteristics form, the e-Health Literacy Scale (e-HLS), the Obtaining and Verifying Health Information from Digital Media Scale (OVHIDMS).

Descriptive Characteristics Form: The descriptive characteristics form was prepared considering the literature and is composed of questions about age, gender, education, marital status, profession and sociodemographic structures of health workers and their attitudes towards older people (8,10,11).

e-Health Literacy Scale (e-HLS): This scale was developed by Norman and Skinner in English. Turkish validity and reliability studies were performed by Uskun et al. (16,17). The scale was developed to measure individuals' knowledge and skills in finding, evaluating, and using health information from electronic sources. The scale is unidimensional and contains eight items. The scale is a 5-point Likert scale (1= Strongly agree and 5= Strongly disagree). The lowest score on the scale is 8 and the highest score is 40. A higher score on the scale indicates a good level of eHealth literacy. Cronbach's alpha was 0.97 for the scale. The goodness of fit indices are as follows: $x^2/sd= 4.645$, RMSEA=0.096, CFI=0.990, SRMR=0.024, GFI=0.964, AGFI=0.900, and NFI=0.987. This study found Cronbach's alpha to be 0.92 for the scale.

Obtaining and Verifying Health Information from Digital Media Scale (OVHIDMS): The scale, developed in Turkish by Çömlekçi and Bozkanat, was created to determine the behaviors of individuals in obtaining health information and confirming information in digital environments (18). The scale developed as a result of the research consists of 3 sub-dimensions and 10 items in total (Obtaining Health Information-3 items, minimum 3 points maximum 15 points, Digital Health Information-3 items, minimum 3 points maximum 15 points, Digital Confirmation-4 items, minimum 4 points maximum 20 points). The scale is a 5-point Likert type (1=never, 5=always). The first sub-dimension describes situations where users prefer non-interactive environments instead of social media environments when searching for health information on the web (Sample item: I obtain health information from newspaper websites). The averages of the relevant items must be

taken to calculate the scale. A decrease in the score obtained from the scale indicates that the participant's preference for obtaining health information from digital environments decreases; an increase in the score indicates that the participant's preference for obtaining health information from digital environments increases. The second sub-dimension represents Digital Health Information Acquisition (Sample item: I obtain health information in digital environments via Twitter). This factor describes the situation in which a user accesses health information via social media platforms such as Instagram, YouTube or Twitter. The averages of the relevant items must be taken to calculate the scale. A decrease in the score obtained from the scale indicates that the participant's preference for obtaining health information from digital environments decreases; an increase in the score indicates that the participant's preference for obtaining health information from digital environments increases. The third sub-dimension is the "Digital Confirmation" factor. It clarifies the methods by which users confirm the health information they obtain in digital media (Sample item: I obtain health information from health professionals - doctors, scientists - via digital platforms). A decrease in the score obtained from the scale indicates that the participant's digital health information confirmation habits decrease; an increase in the score indicates that the participant's digital health information confirmation habits increase. All items of the scale should not be used together. A decrease in the score obtained from the scale indicates that the participant's preference for obtaining health information from digital environments decreases, and an increase in the score indicates that the participant's preference for obtaining health information from digital environments increases. Cronbach's alpha was 0.76 for the scale. The goodness of fit indices are as follows: $x^2/sd= 4.36$, RMSEA=0.078, CFI=0.95, GFI=0.95, AGFI=0.92, and NFI=0.93. This study found Cronbach's alpha to be 0.85 for the scale.

Procedure

Data collection was conducted face-to-face in the patient rooms of the clinics. Since all authors (five experts) received/completed nursing and medical education, they easily collected data from individuals with diabetes. While some of the researchers among the authors have conducted many studies on individuals with diabetes, one of the researchers is a specialist in internal medicine. A total of 251 individuals with type 2 diabetes participated in the study. Before administering the data collection tools, informed consent was obtained from each participant. Data collection took 30 minutes per individuals with type 2 diabetes.

Statistical Analysis

The data obtained were analyzed using the IBM Statistical Package for the Social Sciences (SPSS) version 22.0. Descriptive statistics, such as mean, standard deviation, and percentage, were employed to present data on descriptive characteristics and scores from the e-HLS and OVHIDMS. Since the data collected with the e-HLS (Skewness/Kurtosis: 0.701/-1.008), and OVHIDMS (Skewness/Kurtosis: 0.885/0.942) followed a normal distribution, parametric tests were used for data analysis. The study utilized an independent samples t-test to assess differences in mean scores of scales across sociodemographic groups. Additionally, one-way ANOVA was employed to examine differences among multiple groups. Bonferroni test was used in pairwise subgroup comparisons of variables with significance between groups as a result of Anova analysis. Pearson correlation analysis was conducted to explore relationships between the scales. Statistical significance set at $p<0.05$.

Ethical Consideration

This study adhered to the principles of the Declaration of Helsinki. Approval was obtained from the Uşak University Non-Interventional Research Ethics Committee (Date: 14.12.2023/Decision number: 259-259-26). Informed consent was obtained from all participating health professionals before the study commenced. Additionally, permission was granted by the hospital where the study was conducted (Date: 27.11.2023/Number: E-45786011-599-230185080). Permission to use the scales for data collection was also obtained via email from the researchers who developed them.

RESULTS

Participant Characteristics

The average age of individuals with type 2 diabetes in this study was 61.17±12.40. 56.60% of the participants were female, 90.00% were married, 80.10% were unemployed, 25.10% were smokers, and 7.20% were alcohol drinkers. Participants had been diabetic for an average of 10 years and 40% used both oral medication and insulin, 60.20% of the participants developed complications related to diabetes, 59.40% of the participants had a smartphone and 31% used the internet every day (Table 1).

The Mean Scores of e-HLS, and OVHIDMS

Individuals with type 2 diabetes were found to have low e-health literacy (mean= 16.78, SD= 10.61), low level of health information obtain from digital media (mean= 4.82, SD= 2.70) and low level of confirmation (mean= 4.98, SD= 2.62) (Table 2). Hypotheses $H1_1$ and $H1_2$ were confirmed.

Table 1: Demographic characteristics of the individuals with type 2 diabetes

Characteristics	Findings (n=251)	Characteristics	Findings (n=251)
Age (year± SD) (Min-Max)	61.17±12.40 (28.0-89.0)	**Year of treatment (year±SD) (Min-Max)**	7.70±5.56 (1.0-30.0)
Gender, n (%)		**Medication types, n (%)**	
Female	142.0 (56.6)	Oral medication	98.0 (39.00)
Male	109.0 (43.4)	Insulin	51.0 (20.30)
Marital status, n (%)		Oral + Insulin	102.0 (40.60)
Married	226.0 (90.0)	**Complication, n (%)**	151.0 (60.20)
Unmarried/divorced/dead	25.0 (10.0)	**Frequency of going to diabetes control, n (%)**	
Education level, n (%)		None	17 (6.80)
Primary school degree	174.0 (69.30)	Quarterly	174 (69.30)
Middle school degree	39.0 (15.50)	Once every six months or once a year	42 (16.70)
High school degree	25.0 (10.00)	Once a year	15 (6.00)
Bachelor's degree and above	13.0 (5.20)	Every two to three years	3 (1.20)
Working, n (%)		**Chronic disease other than diabetes, n (%)**	191.0 (76.10)
Not working	91.0 (36.30)	**Do you have a smartphone? Yes, n (%)**	149.0 (59.40)
Retired	110.0 (43.80)	**Frequency of internet use, n (%)**	
Working	50.0 (19.90)	Every day	80.0 (31.90)
Income, n (%)		Most days of the week	33.0 (13.10)
Income less than expenses	108.0 (43.00)	A few days of the week	20.0 (8.00)
Income equals expenses	128.0 (51.00)	Never	118.0 (47.00)
Income more than expenses	15.0 (6.00)	**Do you think the internet has a positive effect on your health? n (%)**	
Smoking, n (%)		No	82.0 (32.70)
I have never smoked	120.0 (47.80)	I'm undecided	107.0 (42.60)
I quit smoking	68.0 (27.10)	Yes	62.0 (24.70)
Smoking	63.0 (25.10)	**How important is it that you can access health resources online? n (%)**	
Alcohol, n (%)		Not important	94.0 (37.50)
I have never drunk alcohol	166.0 (66.10)	Undecided	98.0 (39.00)
I quit drinking alcohol	67.0 (26.70)	Important	59.0 (23.50)
I drink alcohol	18.0 (7.20)		
Diabetes duration (year±SD) (Min-Max)	10.07±6.86 (1.0-35.0)		

X: Mean, **SD:** Standard Deviation, **Min:** Minimum, **Max:** Maximum

Table 2: The mean scores of e-HLS and OVHIDMS

Scores	Findings (n=251)	
e-HLS (score±SD) (Min-Max)	16.78±10.61	(8.0-40.0)
OVHIDMS (score±SD) (Min-Max)		
Obtaining Health Information	**4.17±2.18**	**(3.0-13.0)**
Digital Health Information	**4.82±2.70**	**(3.0-12.0)**
Digital Confirmation	**4.98±2.62**	**(4.0-20.0)**

SD: Standard Deviation, **Min:** Minimum, **Max:** Maximum

The total Cronbach alpha value of e-HLS was found to be 0.97 for the Turkish scale, while it was found to be 0.92 in our study. The small number of scale items or the application of the scale to a different group may have caused a lower Cronbach alpha value than the Turkish scale. However, since the total Cronbach alpha value of e-HLS in this study was greater than 0.70, we can say that the result is reliable (19). The Cronbach alpha value of the OVHIDMS scale was found to be higher than the Turkish version.

Table 3: The relationship between the e-HLS and OVHIDMS mean scores

		e-HLS	Obtaining Health Information	Digital Health Information	Digital Confirmation
e-HLS	r	1	0.758**	0.759**	0.537**
	p		<0.001	<0.001	<0.001
Obtaining Health Information	r	0.758**	1	0.507**	0.639**
	p	<0.00	1	<0.001	<0.001
Digital Health Information	r	0.759**	0.507**	1	0.457**
	p	<0.001	<0.001		<0.001
Digital Confirmation	r	0.537**	0.639**	0.457**	1
	p	<0.001	<0.001	<0.001	

r: correlation, Pearson correlation, $p < 0.001$**

The Relationship Between e-HLS, and OVHIDMS Mean Scores

As a result of this study, a positive strong relationship was found between receiving health information (r=0.758), digital health information (r=0.759) and digital consent (r=0.537) through e-HLS (p<0.05). Hypothesis $H1_3$ was confirmed (Table 3).

The Comparison of the Mean Scores on e-HLS, and OVHIDMS between Descriptive Characteristics

Diabetic patients with a bachelor's degree or higher education had higher e-HLS scores and digital information obtaining and verification behavior scores than diabetic individuals with other levels of education (p<0.05). Employed diabetic patients had higher e-HLS scores and digital information obtaining and verification behavior scores than unemployed diabetic patients (p<0.05). Diabetic patients who have a smartphone, use the internet every day, and think that the internet positively affects their health had higher e-HLS scores and digital information obtaining and verification behavior scores than other diabetic patients (p<0.05) (Table 4).

DISCUSSION

As a result of this study, the e-health literacy and the ability of individuals with type 2 diabetes to obtain and verify health information from digital media were found to be low. Similarly, a study conducted on diabetic patients in Turkey also revealed that their e-health literacy levels were low (20). In studies conducted in Korea and Taiwan, the e-health literacy of individuals with diabetes suggested to be at a moderate level (8,11). Low e-health literacy in individuals with type 2 diabetes may make it difficult for individuals to effectively use e-health technologies and services (10). In our study, it was determined that as the e-health literacy level of individuals with diabetes decreases, their health information obtaining and verifying behavior from digital environ-

ments also decreases. In Neter and Brainin's study, it was stated that individuals with high health literacy tend to obtain information by using digital health resources more effectively and to check the accuracy of this information (12). In a study conducted in Swedish society by Sundell et al, it suggested that low health literacy levels of individuals also reduced health information seeking behavior in digital environments (13). Yao et al stated in their study that diabetes patients exhibit information seeking and sharing behaviors in online health communities (14).

Current research suggests that low e-health literacy in these individuals may negatively affect their ability to manage diabetes (10,20). It is also stated that diabetes patients with low e-health literacy struggle to obtain and apply disease-related information, which negatively impacts their treatment adherence and overall health status (21).

In our study, as the level of education of diabetic individuals increases, e-health literacy and health information seeking and confirmation behavior from digital environments increase. In the systematic review conducted by Caruso et al., it was found that diabetic individuals with higher levels of education tend to use digital health technologies more frequently and with greater ease (21). Highly educated individuals are better equipped to understand, interpret and integrate health information into their daily lives, enabling them to utilize digitally presented health information more effectively (13). Individuals with higher levels of education generally possess better research and critical thinking skills. This enables them to be more discerning and inquisitive when seeking health information from digital environments. Thus, they are more careful to verify the information they find and to get information from reliable sources (22). Additionally, individuals with higher levels of education are generally more familiar with technology and therefore more comfortable using e-health platforms and digital tools. These individuals can more effectively manage the process-

Table 4: The comparison of the mean scores on the OVHIDMS and e-HLS between descriptive characteristics

Characteristics	e-HLS	Obtaining Health Information	Digital Health Information	Digital Confirmation
Gender				
Female	16.27±10.43	4.07±2.04	4.95±2.80	4.96±2.57
Male	17.44±10.85	4.31±2.34	4.66±2.56	5.01±2.70
t- test	-0.862 p=0.390	-0.843 p=0.400	0.863 p=0.389	-0.160 p=0.873
Education level				
Primary school degree	13.15±8.95	3.66±1.61	3.75±1.75	4.37±1.48
Middle school degree	21.74±9.47	4.48±2.60	6.61±2.84	4.92±1.61
High school degree	25.36±8.26	5.44±2.39	7.28±2.96	5.84±3.15
Bachelor's degree and above	33.92±5.26	7.76±2.65	9.15±2.15	11.76±5.19
ANOVA	38.075 p=<0.001*	22.738 p=<0.001*	53.433 p=<0.001*	53.816 p=<0.001*
Working				
Not working	14.53±9.68	3.75±1.67	4.45±2.47	4.52±1.63
Retired	13.60±9.76	3.88±1.90	3.71±1.62	4.70±2.40
Working	27.84±5.83	5.60±2.90	7.96±2.67	6.44±3.83
ANOVA	46.470 p=<0.001*	14.774 p=<0.001*	66.649 p=<0.001*	10.382 p=<0.001*
Income				
Income less than expenses	15.23±10.18	3.88±1.88	4.09±2.08	4.48±1.85
Income equals expenses	17.08±10.82	4.30±2.39	5.09±2.79	5.21±2.96
Income more than expenses	25.33±7.60	5.20±2.00	7.86±3.37	6.73±3.36
ANOVA	6.331 p=<0.002**	2.849 p=0.060	15.748 p=<0.001*	6.012 p=<0.003
Medication types				
Oral medication	19.13±9.94	4.22±2.05	5.87±3.02	5.38±3.14
Insulin	13.62±9.89	3.80±1.93	3.94±1.93	4.58±2.04
Oral + Insulin	16.09±11.16	4.32±2.40	4.26±2.37	4.80±2.28
t- test	5.023 p=<0.007**	0.998 p=0.370	13.582 p=<0.001*	1.992 p=0.139
Complication				
No	21.31±11.05	4.84±2.63	5.98±3.05	5.74±3.44
Yes	13.78±9.19	3.74±1.69	4.06±2.13	4.49±1.74
t- test	5.856 p=<0.001*	4.01 p=<0.001*	5.842 p=<0.001*	3.788 p=<0.001*
Chronic disease other than diabetes				
No	22.13±9.34	4.18±1.97	6.46±2.82	5.28±2.96
Yes	15.09±10.45	4.17±2.25	4.31±2.45	4.89±2.51
t- test	4.659 p=<0.001*	0.016 p=<0.987	5.709 p=<0.001*	0.998 p=0.319
Do you have a smartphone?				
No	8.21±1.65	3.04±0.40	3.12±0.97	4.16±1.23
Yes	22.64±10.16	4.95±2.53	5.99±2.88	5.55±3.13
t- test	-14.200 p=<0.001*	-7.501 p=<0.001*	-9.648 p=<0.001*	-4.236 p=<0.001*
Frequency of internet use				
Every day	28.32±7.68	5.80±2.73	7.15±2.84	6.26±3.73
Most days of the week	21.00±7.96	4.48±2.26	6.03±2.70	5.42±3.08
A few days of the week	15.10±7.81	4.10±1.74	4.15±1.92	4.70±1.49
Never	8.05±0.47	3.00±0.09	3.03±0.36	4.05±0.55
ANOVA	211.637 p=<0.001*	37.855 p=<0.001*	74.480 p=<0.001*	13.405 p=<0.001*
Do you think the internet has a positive effect on your health?				
No	10.34±5.57	3.35±1.07	3.32±1.19	4.46±2.00
I'm undecided	14.01±8.58	3.57±1.40	4.18±2.07	4.36±1.77
Yes	30.06±6.62	6.32±2.89	7.91±2.66	6.75±3.63
ANOVA	144.415 p=<0.001*	58.199 p=<0.001*	101.058 p=<0.001*	21.850 p=<0.001*

F: One-way ANOVA, Bonferroni, **t:** Independent sample t-test *<0.001, **<0.01

es of seeking health information, participating in online health communities, and verifying this information (14). As a result, as the level of education increases, the e-health literacy and digital health information seeking behaviors of individuals with diabetes also increase. This is associated with adopting a more conscious, inquisitive and technology-compatible approach.

Our study found that employed diabetic patients with higher income levels possess high e-health literacy and digital health knowledge. High-income individuals generally have better access to technology, enabling them to utilize more advanced and up-to-date digital devices, fast internet connections, and paid health applications. This facilitates easier access to e-health platforms and allows them to use these resources more effectively (22). High-income and employed individuals are generally better educated, which enhances their ability to understand complex health information and use it correctly. Furthermore, their work lives may cultivate habits of continuously seeking, evaluating, and applying information (13).

In our study, individuals who did not have any complications related to diabetes or any other chronic disease other than diabetes were found to have higher e-health literacy and information acquisition levels from digital health resources. Another study found that diabetics with high health literacy had lower rates of chronic complications (23). Individuals without diabetes complications may be more successful in managing their diabetes. Individuals without complications may constantly seek information to maintain their health status, which may increase their e-health literacy. A study found a statistically significant decrease in the health literacy of individuals with diabetic complications (24). Individuals without chronic diseases other than diabetes can focus exclusively on diabetes in their health management. A study found that diabetics without other chronic conditions have higher health literacy scores (25). This enables them to search for and track health information more effectively than those managing multiple chronic diseases. Concentrating on a single health condition allows individuals to explore their health information in greater depth (26,27).

In our study, diabetics who have a smartphone and use the internet frequently have higher e-health literacy and levels of obtaining and verifying information from digital health sources. Studies have also found that diabetics who have internet access and use it frequently have higher e-health literacy (8,28). Smartphones allow users to remain constantly connected to the internet. This allows individuals to access their health information anytime and anywhere. Constant access increases opportunities to seek and verify informa-

tion (28). For example, a diabetic can track their blood sugar levels through an app on their smartphone and seek health information based on that data (22). In Kim et al.'s study, those who use the internet as a source of health information, those who use the internet for 91 minutes or more per day, and those who think that the internet is beneficial have higher e-health literacy scores (11). Smartphone owners are generally more familiar with technology and more able to use the internet effectively. This enhances their capacity to search, evaluate, and utilize health information. Especially among individuals who use the internet for health-related information, there tends to be an inclination toward learning how to effectively manage their health conditions using such information. Individuals who use the internet regularly may generally have a higher level of education. Education increases individuals' ability to understand and use complex information, increasing e-health literacy (2,29).

As a result of this study, it was found that the e-health literacy level of individuals with type 2 diabetes in obtaining health information from digital media and confirming it was low. In our study, it was determined that as the e-health literacy level of individuals with diabetes decreased, their health information obtaining and confirmation behavior in digital media also decreased. Diabetics with a bachelor's degree or higher, those who are employed, those who have a smartphone, use the internet every day, and those who think that the internet positively affects their health had higher e-health literacy scores and digital information obtaining and confirming behavior scores. In light of this information, interventions aimed at increasing electronic health literacy can improve disease management of individuals with type 2 diabetes and positively affect health outcomes.

e-health literacy education is a multi-stakeholder responsibility, with nurses and other institutions being important parts of this process. Successful addressing of this issue is possible with an integrated approach at all levels of healthcare delivery. National strategies and policies can be created to promote eHealth literacy education. In addition, public awareness campaigns can be organized to improve digital health literacy. Health professionals can organize individual or group trainings to teach individuals with diabetes how to use digital health resources. In these trainings, websites, mobile applications, and digital health tools that provide reliable health information can be introduced. Health professionals can guide patients to access accurate information by recommending reliable digital health resources.

Author's Contributions

Conflict of Interest

Financial Disclosure

Ethical Approval

Peer Review Process

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