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The Mediating Role of E-Health Literacy in the Relationship between Health Perception and Health Service Utilization

Sağlık Algısı ile Sağlık Hizmeti Kullanımı Arasındaki İlişkide E-Sağlık Okuryazarlığının Aracılık Rolü

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Abstract

This study was designed to determine the mediating role of e-Health literacy in the relationship between health perception and healthcare utilization. The research was conducted with 443 individuals residing in a central district of Ankara. Data were collected using a survey method with convenience sampling. The data collection form included demographic questions along with items from the Health Perception Scale, the e-Health Literacy Scale, and the Healthcare Utilization Scale. The construct validity of the scales was assessed using Confirmatory Factor Analysis (CFA). The reliability of the scales was evaluated based on Cronbach's Alpha (CA) and Composite Reliability (CR) coefficients. Differences in participant characteristics were analyzed using the independent samples t-test and one-way ANOVA. Relationships between variables were examined through Pearson and Spearman correlation tests. Mediation analyses were conducted using the Process Macro 4.1 software. The scales were found to be compatible with the study data, and reliable according to CA and CR coefficients. Significant positive relationships were identified between the Health Perception Scale, e-Health Literacy Scale, and Healthcare Utilization ($p<0.05$). It was determined that e-health literacy had a mediating effect on the relationship between health perception and healthcare utilization. The study identified that e-health literacy plays a mediating role in the relationship between health perception and healthcare utilization. This finding is anticipated to be valuable for researchers and other stakeholders. This study determined the levels of health perception, e-health literacy, and healthcare utilization, analyzed them with respect to participant characteristics, evaluated the relationships among these variables, and revealed the mediating role of e-health literacy in the relationship between health perception and healthcare utilization, a topic not previously covered in the literature.

Keywords: E-Health Literacy, Health Perception, Health Behavior, Healthcare Utilization.

Öz

Bu çalışma, sağlık algısı ile sağlık hizmetleri kullanımı arasındaki ilişkide e-Sağlık okuryazarlığının aracılık rolünü belirlemek amacıyla tasarlanmıştır. Araştırma, Ankara'nın merkezi bir ilçesinde ikamet eden 443 bireyle gerçekleştirilmiştir. Veriler, kolayda örnekleme yöntemiyle, anket tekniği kullanılarak toplanmıştır. Veri toplama formu; demografik soruların yanı sıra Sağlık Algısı Ölçeği, e-Sağlık Okuryazarlığı Ölçeği ve Sağlık Hizmetleri Kullanımı Ölçeği maddelerini içermektedir. Ölçeklerin yapı geçerliliği Doğrulayıcı Faktör Analizi (DFA) ile değerlendirilmiş; güvenilirlikleri ise Cronbach's Alpha (CA) ve Bileşik Güvenilirlik (CR) katsayıları temel alınarak incelenmiştir. Katılımcı özelliklerine göre farklılıklar bağımsız örneklem t-testi ve tek yönlü ANOVA ile analiz edilmiştir. Değişkenler arasındaki ilişkiler Pearson ve Spearman korelasyon testleri ile değerlendirilmiştir. Aracılık analizleri Process Macro 4.1 yazılımı kullanılarak gerçekleştirilmiştir. Bulgular, katılımcıların demografik ve sağlık özellikleri açısından çeşitli farklılıklar gösterdiğini; kronik hastalık varlığı, sigara kullanımı ve düzenli ilaç kullanımının sağlık hizmetleri kullanımında anlamlı etkiler yarattığını ortaya koymuştur. Korelasyon analizleri, sağlık algısı, e-sağlık okuryazarlığı ve sağlık hizmetleri kullanımı arasında pozitif ilişkiler olduğunu göstermiştir. Aracılık analizleri sonucunda ise e-sağlık okuryazarlığın, sağlık algısı ile sağlık hizmetleri kullanımı arasındaki ilişkide kısmi aracılık rolü üstlendiği belirlenmiştir. Çalışma sağlık algısı ve e-sağlık okuryazarlığının sağlık hizmetleri kullanımında belirleyici rol oynadığını göstermektedir. Bu doğrultuda, sağlık hizmeti sunumunda ve halk sağlığı politikalarında bireylerin e-sağlık okuryazarlık düzeylerini artırmaya yönelik eğitim ve rehberlik çalışmalarının önemi vurgulanmaktadır.

Anahtar Kelimeler: E-Sağlık Okuryazarlığı, Sağlık Algısı, Sağlık Davranışları, Sağlık Hizmeti Kullanımı.

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The Mediating Role of E-Health Literacy in the Relationship between Health Perception and Health Service Utilization

Health perception is a subjective concept that reflects individuals' personal beliefs and assessments regarding their overall health status. It represents an individual's self-evaluation of their health, indicating whether they perceive themselves as healthy or unhealthy. Health perception encompasses physical, cognitive, and social well-being (Carneiro et al., 2020; Souto et al., 2018). Since health perception predicts appropriate care utilization, it has become a crucial health determinant in decision-making and benefiting from healthcare services (Onyeneho et al., 2016, p. 2; Souto et al., 2018).

Health perception is significantly associated with healthcare-seeking behaviors, health-related responsibilities, and the utilization of available healthcare services. It is a guiding factor in the planning, demand, and use of healthcare services (Kaleta et al., 2009; Şenol et al., 2010). Since healthcare utilization is an individual behavior, for a person to seek and benefit from healthcare services, they or their family must perceive an illness's presence or potential risk (Andersen & Newman, 2005).

The World Health Organization (WHO) has identified health literacy as crucial in promoting and improving health. Health literacy is defined as the degree to which individuals have the capacity to acquire, process, and understand essential health information and services to make appropriate health decisions (Ratzan & Parker, 2004). Low health literacy has been associated with disparities in health-related outcomes, weaker knowledge levels, and reduced ability to interpret health messages. Research has demonstrated that low health literacy is linked to poorer general health status, higher morbidity and mortality rates, increased hospital admissions and emergency care utilization, higher healthcare expenditures, and lower overall healthcare utilization (Berkman et al., 2011; Loer et al., 2020). Adequate health literacy is critical at both the individual and societal levels to achieve positive health outcomes (Bautista, 2015).

With the increasing use of digital technology, particularly the internet, for accessing health information, e-health literacy has become highly significant in contemporary healthcare. E-health literacy differs from traditional health literacy, which involves acquiring and utilizing health information through digital technologies. It encompasses an individual's ability to effectively access, manage, and utilize health information via various digital platforms, including computers, tablets, mobile phones, the internet, and social media (Bautista, 2015). E-health literacy is defined as the ability to search for, find, comprehend, and evaluate health information from electronic sources and apply the acquired knowledge to address or resolve a health-related issue. It integrates multiple literacy domains, including traditional, health, information, scientific, media, and computer (Norman & Skinner, 2006, pp. 1-2). With advancements in mobile technologies, health messages, health information, and healthcare services are increasingly being delivered via the internet, allowing individuals to access them anytime and anywhere. This development reduces health inequalities, eliminates various barriers, and enables information seekers to search for comprehensive health-related content while maintaining anonymity (Niu et al., 2021).

Although the internet provides fast and easy access to all types of information, it does not always guarantee accuracy. The lack of regulatory oversight on online health information and the ability of individuals without sufficient expertise to publish content can lead to patients encountering misinformation, resulting in incorrect self-diagnosis and inappropriate treatment choices. Sometimes, online health information may be misleading, inaccurate, or of poor quality. Accessing accurate health information and making informed evaluations are crucial, as the information obtained directly influences individuals' health-related decisions. Therefore, individuals with higher levels of e-health

literacy can access reliable health information, make more informed decisions, and take a more active role in managing their health (Can et al., 2014; Deniz, 2023).

In the literature, health perception, health literacy, and health service utilization are shown to be closely interconnected concepts. Various studies have demonstrated that individuals' health perceptions strongly influence their help-seeking behaviors, health responsibilities, and use of health services (Connelly et al., 1989; Krakau, 1991; Kim et al., 1999; Kaleta et al., 2009). According to Andersen and Newman's model of health service utilization, individuals' perceptions of their own health constitute a fundamental factor shaping their health service–seeking behaviors. Moreover, numerous studies have revealed that health literacy plays a critical role in health outcomes, health behaviors, and the utilization of health services (Andersen & Newman, 2005; Berkman et al., 2011; Murphy et al., 2010; Jackson et al., 2020; Kino & Kawachi, 2019). With the increasing availability of digital health information, e-health literacy has emerged as a key concept that enhances individuals' ability to analyze health information and make informed decisions; it has been found to influence health behaviors, help-seeking behaviors, and psychosocial health-related variables (Bautista, 2015; Norman & Skinner, 2006; Niu et al., 2021; Marzo et al., 2022; Huang et al., 2020). Research conducted in Turkey further indicates that meaningful relationships exist between health literacy and health perception, and that e-health literacy affects both health behaviors and the use of health services (Mollaoğlu et al., 2021; Şahin & Kerkez, 2023; Yılmaz & Çetin, 2022; Arpacıoğlu & Özdemir, 2020). Additionally, several studies have demonstrated that e-health literacy serves as a mediating factor in various relationships (Ceylan et al., 2022; Günlü, 2021; Zhang et al., 2024). These findings underscore the need for a more in-depth examination of the interactions among health perception, e-health literacy, and health service utilization. In this context, the present study aims to contribute to the literature by investigating the mediating role of e-health literacy in the effect of health perception on health service utilization.

Method

Research Aim and Design

This study was designed to determine the mediating role of e-Health literacy in the relationship between health perception and healthcare utilization. The study is quantitative, descriptive, and cross-sectional, employing a relational survey method to analyze associations between variables.

The research aims to test the following hypotheses:

- H_1: There is a positive and significant relationship between health perception and healthcare utilization.
- H_2: E-Health literacy plays a significant mediating role in the relationship between health perception and healthcare utilization.

Population and Sample

The study population consisted of 413,994 individuals residing in a central district of Ankara, according to the 2022 census data. The sample size was calculated as 384 based on a 5% margin of error, a 95% confidence interval. However, the study was conducted with 443 participants who met the inclusion criteria.

The inclusion criteria for participation in the study were as follows:

- Being 18 years or older
- Voluntary participation in the research
- Utilization of healthcare services

Data Collection Instruments

The data collection form consisted of four sections. The first section included 10 questions related to participants' demographic characteristics. The second section featured the Health Perception Scale, developed by Diamond et al. (2007) and adapted into Turkish by Kadıoğlu and Yıldız (2012). The scale follows a 5-point Likert format (1 = Strongly Disagree, 5 = Strongly Agree) and consists of 15 items across four dimensions, with a total score ranging from 15 to 75. Items 1, 5, 9, 10, 11, and 14 are positively worded, while items 2, 3, 4, 6, 7, 8, 12, 13, and 15 are negatively worded and reverse-coded.

The third section included the e-Health Literacy Scale, developed by Norman and Skinner (2006) and adapted into Turkish by Tamer Gencer (2017). This scale is also structured in a 5-point Likert format (1 = Strongly Disagree, 5 = Strongly Agree), consisting of 8 items with a total score ranging from 8 to 40.

The fourth section featured the Healthcare Utilization Scale, developed by Uğrak et al. (2024). This scale consists of 4 items, using a 5-point Likert format (1 = Strongly Disagree, 5 = Strongly Agree), with a total score ranging from 1 to 5. The necessary permissions were obtained from the original developers of the scales prior to their use in this study.

Data Collection

The study was conducted in a central district of Ankara between February 1 and March 30, 2024. Data were collected using convenience sampling, with survey forms administered face-to-face to participants. All participants were informed about the study and provided written informed consent prior to participation.

Data Analysis

The data analyses were conducted using SPSS 29 and AMOS 24 software. The compatibility of the scales with the research data was evaluated using Confirmatory Factor Analysis (CFA). The reliability of the scales was examined based on Cronbach's Alpha (CA) and Composite Reliability (CR) coefficients. The normality of the data was assessed through skewness and kurtosis values (Tabachnick & Fidell, 2013). For group differences, independent samples t-tests and ANOVA tests were employed. When variance homogeneity was not met in ANOVA, Welch's test results were reported. In multiple comparison tests, Bonferroni-adjusted findings were provided.

In the t-test, effect size (Cohen’s d) was evaluated using the following thresholds: <0.20 (small), 0.50 (medium), and >0.80 (large). In the ANOVA test, effect size (Eta squared, η^2) was evaluated using the thresholds <0.01 (small), 0.06 (medium), and >0.14 (large) (Cohen, 1988; Tomczak & Tomczak, 2014).

Additionally, effect sizes were calculated for significant differences in group comparisons. Relationships between variables were analyzed using Pearson and Spearman correlation tests. Mediation analyses were conducted using Process Macro 4.1. A significance level of $p < 0.05$ was considered statistically significant.

Ethical Considerations

This study was conducted with the approval of the Çankırı Karatekin University Health Sciences Ethics Committee, granted during its meeting No. 11 on January 18, 2024.

Study Limitations

The limitations of this study include the restriction of participants to a specific region and the use of convenience sampling for data collection.

Results

The mean age of the participants was 42.78±12.48 years, with 278 individuals (62.8%) being female. Three hundred eighty participants (85.8%) were married, while 134 individuals (30.2%) had completed primary education. Regarding monthly income, 146 participants (33.0%) had an income between 20,000 and 40,000 TL. The mean number of children was 2.09±1.473, and the most common occupation was housewife, reported by 199 participants (44.9%). Among the participants, 274 individuals (61.9%) were non-smokers, 307 (69.3%) did not have any chronic disease, and 322 participants (72.7%) did not use medication regularly (Table 1).

Table 1

Descriptive Findings on Participant Characteristics

Characteristics		**n**	**%**
Age (Mean ± SD)	42,78±12,48		
Gender	Female	278	62,8
	Male	165	37,2
Marital Status	Single	63	14,2
	Married	380	85,8
Educational Level	Primary Education	134	30,2
	High School	132	29,8
	Associate Degree	78	17,6
	Bachelor's Degree	78	17,6
	Postgraduate	21	4,7
Monthly Income Level	Up to 14,000 TL	103	23,3
	14,000 TL – 20,000 TL	105	23,7
	20,000 TL – 40,000 TL	146	33,0
	40,000 TL and above	89	20,1
Number of Children (Mean ± SD)	2,09±1,473		
Occupation	Housewife	199	44,9
	Public Sector Employee	98	22,1
	Private Sector Employee	60	13,5
	Retired	26	5,9
	Other	60	13,5
Smoking Status	No	274	61,9
	Quit	43	9,7
	Currently Smoking	126	28,4
Chronic Disease Status	No	307	69,3
	Yes	136	30,7
Regular Medication Use	No	322	72,7
	Yes	121	27,3

Confirmatory Factor Analysis (CFA) was conducted to assess the fit of the scales with the research data, and the findings are presented in Table 2. According to the fit index values, the CFA model was found to be compatible with the data ($\chi^2/df = 2.163 < 5$; GFI = 0.988 > 0.900; AGFI = 0.986 > 0.850; NFI = 0.984 > 0.900; RFI = 0.981 > 0.900; RMR = 0.063 < 0.080; SRMR = 0.039 < 0.080). The factor loadings of the scale items were found to be statistically significant ($p < 0.05$), and based on Cronbach's Alpha (CA) and Composite Reliability (CR) coefficients, the scales were determined to be reliable. These findings indicate that the scales are consistent with the research data.

Table 2

Confirmatory Factor Analysis and Reliability Findings

Expressions	β	95% CI(β) Lower	Top	P	CA	CR	Average (SS)
Locus of Control							
Being healthy is largely a matter of luck	0.707	0.627	0.779	<0.001	0.838	0.837	13.45 (5,050)
No matter what I do, whether I'm going to be healthy or sick, what's going to happen will happen.	0.601	0.506	0.691	<0.001			
If I am healthy, it is a blessing from God.	0.602	0.488	0.706	<0.001			
Being healthy is a matter of luck	0.806	0.736	0.866	<0.001			
No matter what I do, I can't change my health.	0.831	0.773	0.880	<0.001			
Precision							
I often get confused about what I need to do to stay healthy.	0.857	0.798	0.907	<0.001	0.844	0.850	11.59 (4,027)
I would like to be healthier, but I can't yet do what I need to do.	0.780	0.705	0.843	<0.001			
There is so much different information on types of foods that protect health that I don't know what to do	0.775	0.708	0.836	<0.001			
I can't understand everything I read about healthy eating	0.644	0.564	0.718	<0.001			
Importance of Health							
I think about my health a lot	0.722	0.600	0.829	<0.001	0.868	0.871	10.77 (3,116)
I am willing to spend more money on things that are healthy for me.	0.877	0.804	0.944	<0.001			
My health is the most important consideration in my life	0.890	0.825	0.948	<0.001			
Self Awareness							
If I exercise and eat right, I will stay healthy.	0.791	0.708	0.861	<0.001	0.889	0.892	11.00 (3,107)
Whether I am healthy or not is up to me.	0.828	0.764	0.884	<0.001			
I can be as healthy as I want	0.945	0.895	0.994	<0.001			
Health Perception Scale					*0.853*	*0.959*	*46.83 (10,482)*
E-Health Literacy Scale							
I know what health resources are available online.	0.822	0.771	0.869	<0.001	0.949	0.943	24.44 (8,800)
I know where to find helpful health resources online.	0.862	0.822	0.895	<0.001			
I know how to find helpful health resources online	0.892	0.860	0.919	<0.001			
I know how to use the internet to find answers to my health questions.	0.713	0.566	0.885	<0.001			
I know how to use the health information I find on the Internet to help me.	0.863	0.826	0.895	<0.001			
I have the skills I need to evaluate health resources I find online.	0.863	0.820	0.902	<0.001			
I can distinguish high-quality from low-quality health resources on the Internet.	0.761	0.698	0.817	<0.001			
I feel confident in using information from the internet when making health-related decisions.	0.786	0.737	0.832	<0.001			
Healthcare Utilization							
I have been seeing my family doctor very often in the last six months.	0.627	0.531	0.716	<0.001	0.766	0.769	2.41 (1,071)
I have been to the emergency room very frequently in the last six months.	0.667	0.568	0.756	<0.001			
I have been admitted to the hospital very frequently in the last six months.	0.728	0.640	0.808	<0.001			
I have spent a lot of money on healthcare in the last six months.	0.674	0.575	0.762	<0.001			
χ 2/ df : 2.163 GFI: 0.988 AGFI: 0.986 NFI: 0.984 RFI: 0.981 RMR: 0.063 SRMR: 0.039							

The findings of the difference analysis regarding participant characteristics are presented in Table 3. According to these findings:

- No significant difference was found based on gender and marital status ($p > 0.05$).
- In the Health Perception Scale, the mean score of private sector employees is higher than the mean score of public personnel. In the e-Health Literacy Scale, the mean scores of housewives, public sector employees, private sector employees, and individuals in other occupations were higher than those of retirees. These differences were found to have a moderate effect size.
- A significant difference was found in Healthcare Utilization based on smoking status ($p < 0.05$). The mean score of individuals who currently smoke was higher than that of non-smokers and former smokers. This difference was found to have a moderate effect size.
- A significant difference was also observed in Healthcare Utilization based on the presence of chronic disease ($p < 0.05$). The mean score of individuals with a chronic disease was higher than those without a chronic disease. This difference was determined to have a moderate effect size.
- A significant difference was found in Healthcare Utilization based on regular medication use ($p < 0.05$). The mean score of individuals who regularly use medication was higher than that of those who do not use medication regularly. This difference was determined to have a moderate effect size.

As a result of the correlation analyses, the following significant relationships were identified:

- Participants' age exhibited a positive correlation with the Certainty subdimension and Healthcare Utilization while demonstrating a negative significant correlation with the e-Health Literacy Scale.
- The number of children in the participants was positively correlated with the Locus of control subdimension, certainty subdimension, health perception scale, and healthcare utilization, whereas a significant negative correlation was observed with the e-health literacy scale.
- Participants' educational level showed a positive correlation with the Importance of Health subdimension, Self-Awareness subdimension, and e-Health Literacy Scale, while a negative significant correlation was detected with the Locus of Control subdimension and Certainty subdimension.
- Participants' income level positively correlated with the Importance of Health subdimension, Self-Awareness subdimension, and e-Health Literacy Scale.

Table 3

Difference Analysis Findings Regarding Participant Characteristics

	Health Perception Scale	**E-Health Literacy Scale**	**Healthcare Utilization**
Gender			
Woman	46.94±10.473	24.69±8.559	2.47±1.091
Male	46.66±10.527	24.05±9.206	2.32±1.033
t	0.273	0.724	1,456
P	0.785	0.469	0.146
Effect Size	-	-	-
Marital Status			
Single	46.27±11.523	26.33±8.707	2.59±1.132
Married	46.93±10.313	24.14±8.788	2.39±1.059
T	-0.464	1,840	1,386
P	0.643	0.066	0.166

Table 3 (continued)

	Health Perception Scale	E-Health Literacy Scale	Healthcare Utilization
Occupation			
Housewife [1]	47.18±10.882	23.85±8.995	2.44±1.087
Public personnel [2]	44.18±9.371	26.74±7.885	2.28±1.079
Private Sector Employee [3]	50.28±10.692	25.47±8.272	2.45±1.148
Retired [4]	50.19±7.558	17.58±8.125	2.61±0.819
Other [5]	45.15±10.53	24.65±8.843	2.43±1.031
F/W	4,431	6,365	0.619
P	**0.002**	**<0.001**	0.649
Effect Size	0.039	0.055	-
Difference	2<3	4<1; 4<2; 4<3; 4<5	-
Smoking Status			
No [1]	46.43±9.682	24.22±8.232	2.28±0.931
I left [2]	45.98±12.937	22.47±9.530	2.06±1.176
I am still using [3]	48.02±11.204	25.63±9.616	2.84±1.197
F/W	1,035 [W]	1,966 [W]	12,444 [W]
P	0.359	0.145	**<0.001**
Effect Size	-	-	0.066
Difference	-	-	1<3; 2<3
Chronic Disease Status			
No	46.54±10.146	24.74±8.485	2.31±1.046
Yes	47.51±11.214	23.80±9.475	2.64±1.095
T	-0.895	1,031	-3,000
P	0.371	0.303	**0.003**
Effect Size	-	-	0.309
Regular Medication Use			
No	46.65±10.141	24.77±8.541	2.33±1.061
Yes	47.35±11.370	23.60±9.441	2.64±1.069
t	-0.627	1,241	-2,721
p	0.531	0.215	**0.007**
Effect Size	-	-	0.290

The correlation analysis findings among the study variables are presented in Table 4. According to these findings:

- Positive significant correlations were found among the subdimensions of the Health Perception Scale.
- Positive significant correlations were observed between the subdimensions of the Health Perception Scale and the overall Health Perception Scale.
- Positive significant correlations were identified among the Health Perception Scale, e-Health Literacy Scale, and Healthcare Utilization ($p < 0.05$).
- When the e-Health Literacy Scale was controlled, the positive significant correlation between the Health Perception Scale and Healthcare Utilization remained significant, but the correlation strength decreased ($r = 0.244$; $p < 0.001$). This finding indicates that the e-Health Literacy Scale has a mediating effect on the relationship between the Health Perception Scale and Healthcare Utilization.

Table 4

Correlation Analysis Findings

		1	2	3	4	5	6
1. Locus of Control	r	1					
	p						
2. Precision	r	0,440	1				
	p	<0,001					
3. Importance of Health	r	0,182	0,231	1			
	p	<0,001	<0,001				
4. Self Awareness	r	0,141	0,279	0,412	1		
	p	0,003	<0,001	<0,001			
5. Health Perception Scale	r	0,747	0,747	0,596	0,594	1	
	p	<0,001	<0,001	<0,001	<0,001		
6. E-Health Literacy Scale	r	0,082	0,139	0,289	0,423	0,304	1
	p	0,086	0,003	<0,001	<0,001	<0,001	
7. Healthcare Use	r	0,160	0,232	0,237	0,363	0,344	0,447
	p	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001

The mediation analysis findings are presented in Table 5. In the first regression model, Health Perception was found to have a significant effect on e-Health Literacy (B = 0.255 [CI: 0.180 - 0.330]; β = 0.303). In the second regression model, Health Perception significantly influenced Healthcare Utilization (B = 0.023 [CI: 0.014 – 0.032]; β = 0.229), and e-Health Literacy also had a significant effect on Healthcare Utilization (B = 0.045 [CI: 0.035 - 0.056]; β = 0.377). The total effect of Health Perception on Healthcare Utilization was significant (B = 0.035 [CI: 0.026 – 0.044]; β = 0.344). The direct effect of Health Perception on Healthcare Utilization was also significant (B = 0.023 [CI: 0.014 – 0.032]; β = 0.229). The indirect effect of Health Perception on Healthcare Utilization (B = 0.012 [CI: 0.007 - 0.016]; β = 0.115) was significant. These findings confirm that e-Health Literacy has a mediating effect on the relationship between Health Perception and Healthcare Utilization.

Table 5

Mediation Analysis Findings

	E-Health Literacy					Healthcare Use				
	B	β	SE	LLC	ULCI	B	β	SE	LLC	ULCI
Health Perception	0.255*	0.303*	0.038	0.180	0.330	0.023*	0.229*	0.004	0.014	0.032
E-Health Literacy	-		-	-	-	0.045*	0.377*	0.005	0.035	0.056
Constant	12,500*	-	1,828	8,908	16,093	0.193	-	0.213	-0.225	0.612
			$R2 = ^{0.092}$					$R2 = ^{0.247}$		
			F=44.858; p<0.001					F=72.359; p<0.001		
Total Impact (Health Perception – Health Services Use)						0.035*	0.344*	0.004	0.026	0.044
Direct Effect (Health Perception – Health Services Use)						0.023*	0.229*	0.004	0.014	0.032
Indirect Effect (Health Perception – Health Services Use)						0.012*	0.115*	0.002	0.007	0.016

*p<0.05; B: Unstandardized Regression Coefficient; β: Standardized Regression Coefficient; SE: Standard Error; LLCI: Lower Confidence Interval (B); ULCI: Upper Confidence Interval (B)

Discussion

This study aimed to examine the mediating effect of e-Health Literacy in the relationship between Health Perception and Healthcare Utilization. For this purpose, the participants' Health Perception, e-Health Literacy, and Healthcare Utilization were analyzed in terms of their demographic characteristics.

The findings related to the health perception levels of the participants in this study were evaluated within the scope of the existing literature. No statistically significant differences were found in health perception levels based on gender and marital status. Consistent with the findings of this study, previous research has also indicated that individuals' health perceptions do not significantly differ by gender or marital status. For instance, in a study conducted by Mollaoğlu et al. (2021)on hemodialysis patients and in the study by Şahin et al. (2023, p. 9), no statistically significant differences in health perception levels were found based on gender. Similarly, the studies by Ersin et al. (2021, p. 2005) and Şahin and Kerkez (2023, p. 339) also reported no significant differences in health perception levels based on gender and marital status. Additionally, Yigitalp et al. (2021) conducted a study on different ethnic groups and found no significant differences in health perception scores based on gender or marital status. However, Goodwin and Engstrom (2002, p. 328) and Mollaoğlu et al. (2021, p. 5) conducted studies on the general population and found that older individuals and men had higher levels of health perception. Similarly, Jang et al. (2005, p. 1616) reported that male participants had significantly higher health perception levels. On the other hand Arpacıoğlu and Özdemir (2020, p. 371), in their study conducted on the general population, found no significant differences in health perception levels based on gender. However, they reported that single participants had higher levels of health perception. The findings of Arpacıoğlu and Özdemir (2020, p. 371) and Jang et al. (2005, p. 1616) differ from the present study and general literature findings. This discrepancy is likely due to differences in the populations and locations where these studies were conducted.

When the health perception levels of the participants in this study were evaluated in terms of occupational status, it was found that private sector employees had higher health perception levels. In a study conducted by Arpacıoğlu and Özdemir (2020, p. 371), individuals with a professional occupation also had higher health perception levels. However, in the Mollaoğlu et al. (2021) study, no significant differences in health perception levels based on occupation were found. Similarly, Yigitalp et al. (2021, p. 6) and (Şahin et al., 2023, p. 9) also reported no significant differences in health perception levels across different occupational groups. Although this study found that private sector employees had higher health perception levels than public sector employees, these findings appear inconsistent with the existing literature.

In this study, no significant differences were found in health perception levels based on the presence of chronic disease. Consistent with these findings, the studies conducted by Ersin et al. (2021, p. 2005) and Şahin et al. (2023, p. 9) on the general population also reported no significant differences in health perception levels based on the presence of chronic diseases. The findings of this study align with the results of Ersin et al. (2021, p. 2005) and Şahin et al. (2023, p. 9). However, in a study on the general population, Arpacıoğlu and Özdemir (2020, p. 371) found that individuals with medical conditions had lower health perception levels. This discrepancy may be because the Arpacıoğlu and Özdemir (2020, p. 371) study focused on health conditions that directly affect overall health status rather than specifically considering chronic diseases.

In this study, no significant differences were found in health perception levels based on smoking status. Consistent with this finding, Ersin et al. (2021, p. 2005) also reported no significant differences in health perception levels according to smoking behavior. Similarly, in a study conducted with university students, Oral and Cetinkaya (2020, p. 832) found no significant differences between health perception and smoking status.

The e-health literacy levels of the participants in this study were evaluated within the framework of the existing literature. No significant differences were found in e-health literacy levels based on gender and marital status. However, in a study on university students, Huang et al. (2020, p. 5) found that functional e-health literacy levels were higher among males. Similarly, Zibrik et al. (2015, p. 351) reported that e-health literacy levels were higher among men, aligning with the findings of , Huang et al. (2020, p. 5). In a study on immigrants, Bergman et al. (2021, p. 8) found that women had a higher risk of having lower e-health literacy levels. When examining the health literacy literature, studies by Mollaoğlu et al. (2021), Şahin and Kerkez (2023, p. 339), and Yigitalp et al. (2021, p. 6) reported no significant differences in health literacy levels based on gender and marital status. A review of the literature suggests that there is no consistent pattern regarding e-health literacy levels by gender. Men's higher e-health literacy levels may be attributed to their greater inclination toward technology. Supporting this inference, Uzunhasanoğlu et al. (2024) found that female university students exhibited higher mental health literacy, further reinforcing that men's higher engagement with technology may contribute to their higher e-health literacy levels.

In this study, retired participants were found to have lower e-health literacy levels compared to other occupational groups. This finding is likely due to the challenges associated with technology use that increase with aging. Consistent with this result, Bergman et al. (2021, p. 8) and Rasekaba et al. (2022, p. 12) reported that older individuals have a higher risk of low e-health literacy than younger individuals. Additionally, older adults are often associated with lower levels of digital health literacy, limited use of technology and electronic devices, and reduced confidence in using technology.

This study found no significant differences between e-health literacy levels and medication use among participants. Consistent with this finding, Yigitalp et al. (2021, p. 6) also reported no significant differences between health literacy levels and medication use in their study. This study found no statistically significant differences in health literacy levels based on smoking status. However, Yigitalp et al. (2021, p. 6) found that individuals who smoke had significantly higher health literacy levels compared to non-smokers and former smokers.

In this study, the findings related to healthcare utilization were discussed within the scope of the literature based on participant characteristics. The results indicated that individuals with chronic diseases had significantly higher levels of healthcare utilization compared to those without chronic diseases. Consistent with this finding, Uğrak et al. (2016) reported that individuals with chronic diseases had higher outpatient and inpatient healthcare utilization levels. Similarly, McPhail (2016, p. 143) found that the presence and number of chronic diseases significantly increased healthcare utilization and costs.

This study found a low-level positive correlation between health perception and e-health literacy. Consistent with this finding, Deniz (2023, p. 178) conducted a study on the general population and identified a positive correlation between health perception and e-health literacy. Similarly, Mollaoğlu et al. (2021, p. 1) found a positive correlation between health perception and health literacy levels among hemodialysis patients, while Yigitalp et al. (2021, p. 7) reported a similar relationship in a study conducted with different ethnic groups. Yılmaz and Çetin (2022, p. 65) also found a positive correlation between health perception and health literacy, aligning with the findings of this study. Additionally, Şahin et al. (2023, p. 9) conducted a study on university staff and found a positive correlation between health perception and health literacy. The findings of this study, along with the existing literature, consistently indicate a positive correlation between health perception and health literacy.

This study found a low-level positive correlation between health perception and healthcare utilization. Consistent with this finding, Connelly et al. (1989, p. 99) and Krakau (1991, p. 9) also identified a positive relationship between health perception and healthcare utilization. Additionally, Kim et al. (1999, p. 355) found that individuals who perceived their health as poor had higher levels of healthcare

utilization. Spitzer and Shaikh (2022, p. 9), in a study using data from 15 European countries, demonstrated that excessive confidence and insecurity in health perception significantly influenced healthcare utilization behaviors. However, Arpacıoğlu and Özdemir (2020, p. 371) reported no statistically significant difference between health perception and healthcare-seeking behavior. Based on these findings, it can be inferred that health-seeking behaviors do not always result in actual healthcare utilization. Additionally, individuals with higher health perceptions may be more likely to use healthcare services more frequently.

This study found a positive correlation between e-health literacy levels and healthcare utilization. A limited number of studies have investigated the relationship between these two variables. Kumar (2023, p. 32) found that e-health literacy positively influenced healthcare utilization among low-income groups, particularly in preventive healthcare services. Similarly, Kino and Kawachi (2019) reported that health literacy significantly impacted individuals' utilization of dental healthcare services. Chen et al. (2013, p. 70) found that higher health literacy levels positively impacted preventive healthcare utilization among older adults. Additionally, Jackson et al. (2020, p. 115) found that health literacy levels influenced outpatient healthcare utilization in cystic fibrosis patients. A study conducted with adult HIV patients (Murphy et al., 2010, p. 28) determined that health literacy positively affected healthcare utilization. Lee and Nam (2018, p. 77) found that low e-health literacy levels affected the duration of healthcare services received. Furthermore, Gürkan and Ayar (2020, p. 286) identified that e-health literacy influenced health behaviors in a study conducted with high school students.

Ceylan et al. (2022, p. 161) found that their trust in vaccines decreased as parents' e-health literacy levels increased. This phenomenon is thought to stem from the nature of the e-health literacy scale, which reflects individuals' perceived abilities to access health information online, as well as the self-reported nature of the survey responses. In contrast Marzo et al. (2022, p. 6) conducted a study across multiple countries and found that individuals who supported vaccination under the National Immunization Schedule had significantly higher digital health literacy scores than those who opposed vaccination. Marzo et al. (2022, p. 6) and Ceylan et al. (2022) reported that individuals with high e-health literacy levels were more likely to support and receive routine vaccinations, including the COVID-19 vaccine. Similarly, a study conducted in the United States found that higher digital health literacy (DHL) levels were positively associated with willingness to receive the COVID-19 vaccine (WHO, 2020).

In this study, e-health literacy was found to mediate the relationship between health perception and healthcare utilization. A review of the literature revealed that there are limited studies examining the mediating effects of e-health literacy. No studies were found that directly align with the objective of this research. However, existing studies suggest that e-health literacy mediates in various health behavior-related contexts. Günlü (2021) studied COVID-19 patients and found that e-health literacy mediated the relationship between COVID-19 awareness and hope levels. Similarly, Zhang et al. (2024) found that health literacy mediated the relationship between patients' social support levels and lifestyle behaviors. Additionally, Guo et al. (2021, p. 76) determined that e-health literacy played a mediating role in shaping health behaviors. Although there is insufficient empirical evidence in the literature regarding the mediating effect of e-health literacy on the relationship between health perception and healthcare utilization, the theoretical framework suggests that e-health literacy and health literacy mediate health behavior-related interactions. These findings support the present study's findings, indicating that e-health literacy is a mediator in healthcare-related decision-making processes.

Conclusion

This study aimed to examine the mediating role of e-health literacy in the relationship between health perception and healthcare utilization. Additionally, within the scope of this study, individuals' health perception, healthcare utilization, and e-health literacy levels were evaluated. Within this framework, the following conclusions were reached:

Health perception did not differ by gender or marital status. This finding is generally supported by numerous studies in the literature. However, in terms of occupational status, there is no overall consistency between this study's findings and those in the literature. It was determined that individuals' chronic disease status did not affect their health perception, a finding consistent with the literature. When individuals' e-health literacy levels were examined in relation to patient characteristics, inconsistencies with the literature were observed. However, a positive correlation between health perception and e-health literacy was found, which aligns with previous studies. Despite variations in findings, both this study and the broader literature identified a positive relationship between health perception and healthcare utilization. Additionally, this study determined that e-health literacy plays a mediating role between health perception and healthcare utilization. Although no direct findings in the literature fully support this study's results, the mediating role of e-health literacy in health behaviors suggests consistency with this finding. However, further research on this subject is recommended.

In light of these findings, health perception and e-health literacy appear to be important factors influencing the utilization of health services. Therefore, educational programs and awareness-raising initiatives aimed at improving individuals' e-health literacy levels are crucial in the context of healthcare delivery and public health policies. Providing guidance on the effective use of digital health resources, in particular, can enhance individuals' ability to accurately evaluate health information and make informed health decisions. Furthermore, future research could examine more comprehensively how different age groups, socioeconomic statuses, and education levels affect the relationship between e-health literacy and health service utilization. Such studies would offer valuable insights for healthcare system planning and for enabling individuals to utilize health services more effectively.

Compliance with Ethical Standards

Ethical Approval

This study was conducted with the approval of the Çankırı Karatekin University Health Sciences Ethics Committee, granted during its meeting No. 11 on January 18, 2024.

Informed Consent

Informed consent was obtained from all individual participants involved in the study.

Author Contributions

The author confirms being the sole contributor of this work and approved it for publication.

Declaration of Conflicting Interests

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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