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Research Article

THE IMPACT OF DIGITAL HEALTH LITERACY ON DIETARY CHOICES IN CHRONIC DISEASE PATIENTS

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Abstract

Background: Health literacy and nutrition are crucial for managing diseases and protecting the health of individuals with chronic conditions.

Aim: This study aimed to determine the digital healthy diet literacy and health literacy of individuals with chronic diseases in a city center in eastern Türkiye.

Methods: This descriptive study was conducted with 451 volunteer participants living in a city center in eastern Türkiye between July and December 2022. Data were collected through face-to-face surveys using "Descriptive Characteristics Form," "Health Literacy Instrument-Short Form," and "Digital Healthy Diet Literacy Instrument." Data were analyzed using number, percentage, and mean, t-test for independent groups, Kruskal-Wallis test, and correlation analysis.

Results: The mean age of the participants was 39.28 ± 13.61 years, and 54.3% were female. The mean score for the Health Literacy Instrument-Short Form was 28.36 ± 6.05, and the mean score for the Digital Healthy Diet Literacy Instrument score was 26.11 ± 11.51. A negative, statistically significant, weak relationship was found between the participants' ages and the mean scores for the Health Literacy Instrument-Short Form and Digital Healthy Diet Literacy Instrument. Additionally, a weak positive and statistically significant relationship was observed between the Health Literacy Instrument-Short Form and Digital Healthy Diet Literacy Instrument ($P < 0.05$).

Conclusion: The health literacy and digital healthy diet literacy levels of individuals with chronic diseases were found to be at a medium level, with a positive relationship between health literacy and digital healthy diet literacy levels.

Keywords: Chronic illness, digital healthy diet, health literacy, nursing

Introduction

Although health is a universal concept, it is an ambiguous term that can mean different things to different people and cultures. According to the World Health Organization (WHO), health is defined as "a state of complete physical, mental and social well-being"[2] and is a necessary right for individuals to lead productive lives in socioeconomic terms. Health is often noted to be directly and indirectly influenced by many interrelated factors

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such as environmental conditions, lifestyle, genetic characteristics, and the structure of health services to which one has access.Health literacy (HL) refers to the cognitive and social ability of individuals to obtain, understand, and use the information they need to protect and improve their health, as well as to make decisions about their own health status.[4-6] Proper HL is considered a critical factor in helping people access and utilize the health services they need, make shared decisions related to treatment, provide support for their health, and thrive in positive health.[7] In this information age, developments in digital technologies have facilitated access to information about health and nutrition through the internet, smartphone applications, and online nutrition consultancy. Digital healthy diet literacy (DHDL) refers to the ability to find, understand, evaluate, and apply healthy nutrition information from web-based sources. It plays a significant role in developing healthy eating habits and improving general health. Studies have found that individuals with low HL have poorer health, incur higher healthcare costs, and require more healthcare services. Additionally, it has been observed that these individuals experience delays in seeking medical care when symptoms arise, have a poor understanding of their medical condition, do not comply with medical recommendations or instructions, and are unable to develop a healthy lifestyle or perform self-care activities. For a healthy diet, it is essential to consume food in recommended portions from different food groups, as outlined in various dietary guidelines for each country. A varied diet ensures that daily energy and nutrient requirements are fully met. Diet quality serves as an indicator of the level of a healthy diet. Several indicators, including the Healthy Eating Index, the Mediterranean Diet Scale, the Diet Quality Index, and the Healthy Diet Indicator, have been developed to assess the level of diet quality.[16] The Healthy Eating Index is an index used to measure diet quality according to the recommendations of the American Dietary Guidelines. HL is crucial for individuals to obtain and understand reliable information about nutrition, critically evaluate that information, and make and implement the right decisions to consume healthy foods based on that information. A study conducted in the state of Maryland, United States, to examine the relationship between HL and dietary behaviors reported that individuals with low HL ate unhealthy diets regardless of income level, while individuals with sufficient HL were less likely to eat fried foods and instead consumed fresh fruits and vegetables without peeling off the skin. Studies have shown that individuals with high HL tend to eat healthier diets.[18-20] HL and nutrition are of great importance in managing diseases and protecting the health of individuals with chronic conditions. In today's rapidly evolving world of science and technology, HL serves as a guide for patients to access treatment and care. This study was conducted to determine the HL and DHDL levels of individuals aged 18-65 years with chronic diseases and to examine the relationship between these levels. It is believed that the data obtained from this research will contribute to the literature by determining the health and digital healthy diet literacy proficiency status of individuals with chronic diseases and enhancing this knowledge.

Research Questions

- What are the sociodemographic characteristics of the patients?
- What is the HL level of the patients?

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- What are the patients' DHDL levels?
- Is there a relationship between patients' HL and DHDL?
- Is there a difference in HL and DHDL levels based on the sociodemographic characteristics of the patients?

Materials and Methods

Type of Study

This is a descriptive study conducted between July and December 2022 with individuals diagnosed with a chronic disease and living in a city center in the eastern part of the country.

Population and Sample

The research was conducted in a city center in the eastern part of the country. The population of the study consisted of individuals who met the inclusion criteria. An attempt was made to obtain the research population without selecting a sample. The sample size was determined using a sample calculation formula, as the total population size was unknown. Since it was not possible to determine the population number, the formula was applied, indicating that at least 384 individuals should be included in the study. The formula is as follows:

(n = (t2. p. q) / d2) & ((1.962) x 0.5 x 0.5 / 0.052 = 384),

Where:

n = Number of individuals to be sampled, p = Probability of occurrence of the event (frequency = 0.5), q = Probability of non-occurrence of the event (1 – p = 0.5),

t = Theoretical value in the t-table at a certain level of freedom and the determined error rate = 1.96),

d = Desired value according to the occurrence frequency of the event ± deviation = 0.05.

To account for potential data loss, 500 individuals were selected for the study. The final study sample consisted of 451 volunteer participants. The inclusion criteria were residency in a city in the eastern part of the country, age between 18 and 65 years, and a diagnosis of a chronic disease.

Data Collection Instruments

The "Descriptive Characteristics Form," the "Short Form Health Literacy Instrument," and the "Digital Healthy Diet Literacy Instrument" were used to collect the data.

Descriptive Characteristics Form

This form included demographic characteristics of individuals such as age, gender, and marital status, as well as questions about chronic diseases and diet. Chronic diseases were identified based on patient self-report.

Short-Form Health Literacy Instrument

Short-Form Health Literacy Instrument (HLI) was developed by Tuyen V. Duong et al. in 2019 and was translated into Turkish by Yılmaz and Eskici in 2021. The scale includes 4-point Likert-type response options (1: very difficult to 4: very easy) and consists of 12 items. The formula (Index = (Mean - 1) x 50 / 3) is used to calculate

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the scale score. The final score ranges from 0 to 50, and the level of HL increases as the score increases. The Cronbach alpha was 0.856. In our study, the Cronbach alpha was 0.511.

Digital Healthy Diet Literacy Instrument)

Digital Healthy Diet Literacy Instrument (DHDLI) was developed by Tuyen V. Duong et al. in 2020.[10] Its Turkish version was validated by Yılmaz and Eskici in 2021.[22] The scale includes 4-point Likert-type response options (1: very difficult to 4: very easy) and consists of 4 items. The formula (Index = (Mean - 1) x 50 / 3) is used for scale evaluation. The calculated index value ranges from 0 to 50, and a higher score indicates better healthy diet literacy. The Cronbach alpha was 0.785.In our study, the Cronbach alpha was 0.710.

Data Collection

Data were collected by all authors through face-to-face interviews with individuals in the community who agreed to participate in the study. Data collection took approximately 15 minutes for each individual. Written and verbal consent was obtained from each participant.

Table 1. Comparison of Demographic Variables and Mean Scores from the Health Literacy Instrument (HLI) and Digital Healthy Diet Literacy Instrument (DHDLI) (N = 451)

Demographic Variables	N	%	Health Literacy Instrument Mean ± SD	Digital Healthy Diet Literacy Instrument Mean ± SD
Sex				
Female	245	54.3	27.97 ± 6.21	25.62 ± 12.12
Male	206	45.7	28.82 ± 5.84	26.69 ± 10.74
Test – p (t/p)			-1.502/0.134	-0.983/0.326
Educational Status				
Illiterate	10	2.2	23.05 ± 10.54	17.08 ± 12.49
Literate	44	9.8	26.48 ± 5.21	21.96 ± 12.59
Primary/Secondary School	86	19.1	25.14 ± 6.20	20.15 ± 14.20
High School	133	29.5	28.80 ± 5.48	29.16 ± 9.59
University	178	39.5	30.35 ± 5.33	28.25 ± 9.35
Test – p (KW/p)			**KW:54.173/P =0.000**	**40.952/0.000**
Marital Status				
Married	306	67.8	27.94 ± 6.24	25.05 ± 12.20
Single	145	32.2	29.25 ± 5.56	28.36 ± 9.57
Test – p (t/p)			**-2.156/0.032**	**-3.127/0.002**
Have children?				
Yes	286	63.4	27.77 ± 6.45	24.85 ± 12.50
No	165	36.6	29.38 ± 5.15	28.30 ± 9.19
Test – p (t/p)			**-2.911/0.004**	**-3.355/0.001**
Who do you live with?				

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Alone	58	12.9	27.44 ± 5.59	24.92 ± 10.22	
With a partner	99	22.0	27.35 ± 6.13	22.18 ± 13.61	
With partner and children	191	42.4	28.40 ± 6.31	26.89 ± 11.09	
With parents	18	4.0	29.41 ± 5.31	28.72 ± 10.14	
Other (dormitory, student lodging, guest house, etc.)	58	12.9	31.48 ± 6.22	31.01 ± 6.88	
Test – p (KW/p)	**KW:18.530/P = 0.001**		**KW:40.952/P = 0.000**		
Smoking					
Yes	167	37.0	28.62 ± 6.03	27.02 ± 9.85	
No	284	63.0	28.20 ± 6.07	25.58 ± 12.38	
Test – p (t/p)			0.707/0.408	1.355/0.176	
Are you on a diet due to your illness?					
Yes	281	62.3	28.29 ± 5.94	25.38 ± 11.57	
No	170	37.7	28.47 ± 6.24	27.32 ± 11.34	
Test – p (t/p)	-0.298/0.766		-1.740/0.083		
Do you adhere to your diet?					
Yes	152	33.7	29.16 ± 6.23	23.05 ± 12.55	
No	299	66.3	27.95 ± 5.93	27.67 ± 10.63	

AV: Average; SD: Standard Deviation; KW: Kruskal-Wallis test; t: t-test; P= Spearman, P < 0.05.

Ethical Aspects of the Study

After the study was planned, approval was obtained from the Ethics Committee of Erzincan Binali Yıldırım University University, (Approval Number: E-88012460-050.01.04-158492, Date: 25.02.2022). This study was conducted in accordance with the Declaration of Helsinki. Individuals participating in the study were informed in writing, and only volunteers participated. Since this is a descriptive study with no intervention or application, and no personal data were collected or used, there was no danger or threat to the participants.

Data Analysis

The data were analyzed using the IBM SPSS (Statistical Package for the Social Science) version 26.0 for Windows (IBM Corp., Armonk, NY, USA). In the analysis, the number, percentage, average, t-test for independent groups, Kruskal-Wallis test, and correlation analyses were performed. A statistical significance value of $P < 0.05$ was considered.

Results

The mean age of the participants was 39.28 ± 13.61 years, with 54.3% of participants being female. Among the participants, 39.5% had a bachelor's degree, 67.8% were married, 63.4% had children, 42.4% lived with their spouse and children, 63.0% did not smoke, 62.3% were on a diet due to their disease, and 66.3% were not adhering to their diet. There was no statistically significant difference between the mean scores of participants in terms of gender, smoking status, and being on a diet due to their disease, and their mean scores from the HLI and DHDLI ($p > 0.05$). On the other hand, there were statistically significant differences between the variables of marital status, age, educational status, having children, living arrangements, and adherence to diet, with the mean scores

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from the HLI and DHDLI ($P < 0.05$). Among those included in the study, single people without children had higher mean scores on the HLI and DHDLI than married people with children (Table 1). A statistically significant difference ($P < 0.05$) was found between adherence to diet and mean scores on the HLI and DHDLI. Those who adhered to their diet had higher mean scores on the HLI and lower scores on the DHDLI than those who did not adhere to their diet. Additionally, there was a statistically significant difference between the variables of educational status, place of residence, and mean scores on the HLI and DHDLI ($P < 0.05$). The mean HLI score was 28.36 ± 6.05, while the mean DHDLI score was 26.11 ± 11.51 (Table 2). There was a negative and weak relationship between the mean HLI and DHDLI scores and the age of the participants in the study. As the mean age of the participants increased, the mean HLI and DHDLI scores decreased. A positive and statistically significant, weak relationship was found between the HLI and DHDLI ($P < 0.05$) (Table 3).

Discussion

Health literacy levels are important in protecting and improving individuals' health and enabling them to make informed decisions. When examining national and international literature, studies determining HL levels and DHDL levels were found. Identifying the HL and DHDL relationships in individuals with chronic diseases and raising awareness of these relationships will facilitate the promotion of healthy lifestyle behaviors, such as physical activity. In this

Table 2. Health Literacy Instrument (HLI) and Digital Healthy Diet Literacy Instrument (DHDLI) Scores of Individuals (N = 451)

	Min.	Max.	Mean ± SD
Health Literacy Instrument	6.94	48.61	28.36 ± 6.05
Digital Healthy Diet Literacy	0.00	50.00	26.11 ± 11.51 Instrument

Min: Minimum; Max: Maximum; AV: Average; SD: Standard Deviation.

Context, this research aims to assess the HL and DHDL levels of individuals with chronic diseases and assist in planning educational programs at the appropriate level. The results of this study, which examined the HL and DHDL of individuals with chronic diseases, indicated that both HL and DHDL levels were moderate. A review of the literature revealed that HL levels were categorized as problematic or marginal in many national and international studies, moderate in a few, and high in very few studies. Although it is a positive this study rated both HL and DHDL as moderate, this is still not sufficient. This may be attributed to the fact that the average age of the participants was 39.28 ± 13.61 years, and more than half of the participants had an educational status below the level of a college degree. From the research data, variables such as marital status, having children, educational level, and living arrangements had a statistically significant impact on HL and DHDL. The high levels of HL and DHDL among singles and childless individuals could be related to the fact that the average age of singles/childless individuals is lower, their level of education is higher, and younger individuals are more familiar with various

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ways to access information. The same results were obtained in a similar study conducted recently. It is reasonable to assume that individuals with a college degree have higher levels of HL and DHDL than individuals with a secondary school degree or below. Several studies in the literature report that HL increases as the level of education increases. The findings reported in this study reflect those observed in the literature. There was a weak and negative relationship between HL and DHDL levels as the average age of participants increased, with HL and DHDL

Table 3. Comparison of Individuals' Age, Health Literacy Instrument, and Digital Healthy Diet Literacy Instrument Mean Scores (N = 451)

	Age		**Health Literacy Instrument**		**Healthy Diet Literacy Instrument**	
	r	**P**	**r**	**P**	**r**	**P**
Age	1					
Health Literacy Instrument	-0.201**	0.000	1			
Digital Healthy Diet Literacy Instrument	-0.257 **	0.000	0.263**	0.000	1	

Correlation is significant at the 0.01 level (two-tailed). *P= Spearman, P < 0.05.*

Levels decreasing as age increased. Similar studies conducted with different sample groups show varying results, with some indicating that HL increases with age and others suggesting it decreases with age. Discrepancy may be related to the average age of the groups studied. For example, the mean ages of participants in a study conducted with university students and a study conducted with hypertension patients are different. While the average age is 21.5[45] in one study, it may be 67 in the other, and this results in different positive or negative results between age and HL levels in the literature. We had a large sample, and the mean age was 39.28 ± 13.61. We expected that HL and DHDL levels would decrease with increasing age due to factors such as a decrease in education level, reduced use of digital communication tools, and limited access to information we found a weak, positive relationship between HL and DHDL. The fact that individuals with high HL also have high DHDL indicates that the research findings are consistent. The digital age in which we live offers new opportunities for individuals to manage chronic diseases and many related conditions. Those who adapt to this new era have easier access to information on various topics, such as HL, DHDL, and others.

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Limitations of the Research

The limitations of the study include the fact that it was conducted in only a single city center, the chronic diseases were not specified, and the age range was limited to 18-65. Additionally, the answers provided by the participants are a limitation. The data obtained are specific to the instruments used and the research group.

Conclusion

We found that the HL and DHDL levels of individuals with chronic diseases were at a medium level, and there was a positive relationship between HL levels and DHDL levels. The HL and DHDL levels of single and childless individuals were higher than those of married individuals. Individuals who are married and have children are expected to pay more attention to their health and diet because they lead a more organized life and have more responsibilities. We recommend that this be investigated in future studies, and that awareness training be organized for patients to improve their HL and DHDL levels.

References

Bakan, A. B., & Yıldız, M. (2019). 21-64 yaş grubundaki bireylerin sağlık okuryazarlık düzeylerinin belirlenmesine ilişkin bir çalışma. Sağlık Toplum, 29(3), 33-40.

Bakan, G., & İnci, F. H. (2021). Hipertansiyonlu hastalarda tedavi uyumu ve sağlık okuryazarlığı. Turk J Cardiovasc Nurs, 12(28), 81-87.

Çetin, F., & Yılmaz, E. (2022). Cerrahi kliniğinde yatan hastaların sağlık okuryazarlığı düzeylerinin sağlık algısı ve ameliyat korkusuna etkisi. İzmir Katip Çelebi Univ Sağlık Bilim Derg, 7(1), 61-67.

Dadaczynski, K., Okan, O., Messer, M., et al. (2021). Digital health literacy and web-based information-seeking behaviors of university students in Germany during the COVID-19 pandemic: Cross-sectional survey study. Journal of Medical Internet Research, 23(1), e24097.

Duong, T. V., Aringazina, A., Kayupova, G., et al. (2019). Development and validation of a new short-form health literacy instrument (HLS-SF12) for the general public in six Asian countries. Health Literacy Research and Practice, 3(2), e91-e102.

Duong, T. V., Pham, K. M., Do, B. N., et al. (2020). Digital healthy diet literacy and self-perceived eating behavior change during COVID-19 pandemic among undergraduate nursing and medical students: A rapid online survey. International Journal of Environmental Research and Public Health, 17(19), 7185.

Güner, T. A., Kuzu, A., & Bayraktaroğlu, T. (2020). Diyabetli bireylerde sağlık okuryazarlığı ve akılcı ilaç kullanımı arasındaki ilişki. Turk Diyabet Obezite Derg, 4(3), 214-223.

Güven, A. (2016). Sağlık okuryazarlığını etkileyen faktörler ve sağlık okuryazarlığı ile hasta güvenliği ilişkisi (Master's thesis). Hacettepe University, Institute of Social Sciences.

Hussein, S. H., Almajran, A., & Albatineh, A. N. (2018). Prevalence of health literacy and its correlates among patients with type II diabetes in Kuwait: A population-based study. Diabetes Research and Clinical Practice, 141, 118-125.

Kourlaba, G., & Panagiotakos, D. B. (2009). Dietary quality indices and human health: A review. Maturitas, 62(1), 1-8.

Krebs-Smith, S. M., Pannucci, T. E., Subar, A. F., et al. (2018). Update of the healthy eating index: HEI-2015. Journal of the Academy of Nutrition and Dietetics, 118(9), 1591-1602.

Lee, H. Y., Rhee, T. G., Kim, N. K., & Ahluwalia, J. S. (2015). Health literacy as a social determinant of health in Asian American immigrants: Findings from a population-based survey in California. Journal of General Internal Medicine, 30(8), 1118-1124.

Marks, R. (2015). Health literacy. In Encyclopedia of Global Bioethics (pp. 1-8). Springer.

Milne, R. A., Puts, M. T. E., Papadakos, J., et al. (2015). Predictors of high eHealth literacy in primary lung cancer survivors. Journal of Cancer Education, 30(4), 685-692.

Nguyen, T. T., Nguyen, M. H., Pham, T. T. M., et al. (2021). Negative impacts of COVID-19 induced lockdown on changes in eating behavior, physical activity, and mental health as modified by digital healthy diet literacy and eHealth literacy. Frontiers in Nutrition, 8, 774328.

Svalastog, A. L., Donev, D., Jahren Kristoffersen, N. J., & Gajović, S. (2017). Concepts and definitions of health and health-related values in the knowledge landscapes of the digital society. Croatian Medical Journal, 58(6), 431-435.

Toçi, E., Burazeri, G., Kamberi, H., Jerliu, N., Sørensen, K., & Brand, H. (2014). Socio-economic correlates of functional health literacy among patients of primary health care in Kosovo. Public Health, 128(9), 842-848.

World Health Organization. (n.d.). Constitution. Retrieved March 17, 2023, from

Yiğitbaş, Ç. (2016). Sağlık okuryazarlığının sağlığı koruma ve geliştirmedeki etkileri. In C. Demirbağ (Ed.), Sağlığı koruma ve geliştirme (1st ed., pp. xx-xx). Göktuğ Basın Yayın Dağıtım.

Zoellner, J., You, W., Connell, C., et al. (2011). Health literacy is associated with healthy eating index scores and sugar-sweetened beverage intake: Findings from the rural Lower Mississippi Delta. Journal of the American Dietetic Association, 111(7), 1012-1020.