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The Relationship Between Digital Literacy and Health Literacy in Individuals Aged 18-65

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ABSTRACT

Objective: The aim of this study is to examine the relationship between digital literacy and health literacy in individuals aged 18-65. **Materials and Methods:** A cross-sectional study was conducted between June and July 2023, with individuals aged 18-65 years applying to primary healthcare institutions affiliated with Agri Provincial Health Directorate. The Socio-Demographic Information Form, Health Literacy Scale, and Digital Literacy Scale were used to collect the research data. SPSS-25 package program was used. This study was conducted with 384 individuals. **Results:** According to the findings obtained in our study, the mean total score of the Health Literacy Scale was 102.27±17.34, and the mean total score of the Digital Literacy Scale was 64.39±12.75. Digital literacy level has a positive and significant effect on health literacy level (β= 0.581; t(382) =13.953, p=0.001). **Conclusion:** Digital literacy level has a positive and significant effect on health literacy level. It is recommended to provide training to increase the digital literacy levels of individuals or to broadcast public spots on social media platforms.

Keywords: Digital Literacy, Health Literacy, Technology.

18-65 YaşArası Bireylerde Dijital Okuryazarlık ve Sağlık Okuryazarlığı Arasındaki İlişkinin İncelenmesi

ÖZ

Amaç: Bu çalışmanın amacı 18-65 yaş arası bireylerde dijital okuryazarlık ve sağlık okuryazarlığı arasındaki ilişkiyi incelemektir. **Gereç ve Yöntem:** Araştırma kesitsel tipte olup Agri İl Sağlık Müdürlüğü'ne bağlı birinci basamak sağlık kuruluşlarına başvuran 18-65 yaş arası bireylerle Haziran-Temmuz 2023 tarihleri arasında yürütülmüştür. Araştırma verilerinin toplanmasında Tanıtıcı Bilgi Formu, Sağlık Okuryazarlığı Ölçeği ve Dijital Okuryazarlık Ölçeği kullanılmıştır. SPSS-25 paket programı kullanılmıştır. Bu çalışma 384 kişi ile gerçekleştirilmiştir. **Bulgular:** Çalışmamızda elde edilen bulgulara göre, Sağlık Okuryazarlığı Ölçeği toplam puan ortalaması 102,27±17,34, Dijital Okuryazarlık Ölçeği toplam puan ortalaması 64,39±12,75'dir. Dijital okuryazarlık düzeyinin sağlık okuryazarlığı düzeyi üzerinde pozitif ve anlamlı bir etkisi vardır (β=0.581; t (382) =13.953, p=0.001) **Sonuç:** Dijital okuryazarlık düzeyinin sağlık okuryazarlığı düzeyi üzerinde pozitif ve anlamlı bir etkisi vardır. Bireylerin dijital okuryazarlık düzeylerinin artırılması için eğitimler verilmesi veya sosyal medya platformlarında kamu spotları yayınlanması önerilmektedir.

Anahtar Kelimeler: Dijital Okuryazarlık, Sağlık Okuryazarlığı, Teknoloji.

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INTRODUCTION

Today's world includes thousands of symbolic expressions along with the written symbols we use to communicate. Including some meanings and expressions in the symbols used is a form of reading. There is a relationship between the level of literacy and the level of health literacy that should not be ignored. Individuals who are illiterate or have insufficient literacy levels cannot be expected to have high levels of health literacy (Üçpunar et al., 2021). On the other hand, high literacy levels of individuals do not mean that the level of health literacy is sufficient (Bükecik & Adana, 2021). Health literacy has recently emerged as a key concept that combines literacy and health concerns. Although definitions are highly controversial, health literacy can be recognized in the simplest way as "the skills required to access, understand and use the information for health" (Stormacq et al., 2023).

Today's health system is quite complex in terms of the services it provides to people. Health literacy has become increasingly important with the prolongation of life expectancy with developing technologies, the application of new treatment methods, and the increase in chronic diseases and obesity (Durusu Tanrıöver et al., 2014). Health literacy has become an increasingly important concept in the health sector due to the effective use of existing health services, the results obtained from the services received, and the reduction of health expenditures (Marinucci et al., 2023). It is seen that the success of health services and achievement of targeted results are related to the individual's health literacy level. Health literacy, which started to gain importance in the USA towards the end of the 20th century, has gained importance in the European Union countries where health literacy has low levels through research. As a result of a recent studies conducted in Turkey, it was found that the level of individual health literacy is not sufficient (Aboumatar et al., 2013; Callahan et al., 2013; Kaphingst et al., 2014).

A common assumption popular media and educators adopted is that young people have higher competence with Information Communication Technologies (ICT) than older people. However, in previous research, there is limited information about the relationship between age and ICT competence (Temel & Aras, 2017; Wells, 2023).

When the concept of "digital literacy" first appeared in the world in the late 1990s, Gilster (1993) defined it in educational terms. "Digital literacy is the student's capacity to use specific information skills applied to text and multimedia information found on the Internet or in a school-based learning context." It is clear that digital literacy goes beyond the basic literacy skills of reading, writing, listening, and speaking. With today's digital media and technologies, people can create content, work, share, socialize, research, play games, collaborate, communicate, and learn.

Since Gilster's initial concept of digital literacy, the term has evolved, changed and expanded, becoming increasingly central to cultural, civic, and economic participation (Toçi et al., 2015). With the advent of Web 2.0 tools, a participatory culture has emerged that requires skills to express, create, share, interact, and engage in activities far beyond the initial digital literacy vision (Sørensen et al., 2012). However, with its expanding definition, digital literacy has become what Chase and Laufenberg (2011) call "inherently squishy". Definitions of the term range from simply technology fluency to broader, more complex conceptual frameworks that encompass a broad spectrum from the ability to apply information literacy skills (e.g. organizing, managing, presenting, and evaluating information) in digital environments. In this direction, it was aimed to examine the relationship between digital literacy and health literacy in individuals aged 18-65.

Research questions

- What is the level of digital literacy among individuals aged 18-65?
- What is the level of health literacy among individuals aged 18-65?
- Is there a significant relationship between digital literacy and health literacy in individuals aged 18-65?

MATERIALS AND METHODS

Study design

The cross-sectional study was conducted between June and July 2023, with individuals aged 18-65 years applying to primary healthcare institutions affiliated with Agri Provincial Health Directorate.

The target population of the research was composed of primary healthcare institutions affiliated with Agri Provincial Health Directorate. In the study, it was tried to reach all individuals without using the sampling method. In our study, a total of 384 individuals were selected through a random sampling method. All individuals applying to primary healthcare institutions affiliated with Agri Provincial Health Directorate and volunteering to participate in the study were included. At the end of the study, in the post hoc power analysis conducted in line with the results obtained from 378 participants, the power of our study was calculated to be 99% at the 95% confidence level at the medium effect size (Cohen, 1988). The STROBE guidelines were used in the reporting process of this research article (Von Elm et al., 2007).

Data collection tools

A Socio-Demographic Information Form, Health Literacy Scale, and Digital Literacy Scale were used to collect research data.

Socio-Demographic Information Form: It consists of questions (age, gender, marital status, monthly income level etc.) formed by the researchers in line with the literature (Callahan et al., 2013; Toçi et al., 2015; Üçpunar et al., 2021) and containing the sociodemographic characteristics of the individuals.

The Health Literacy Scale: Aras and Temel (2017) tested the validity and reliability of the health literacy scale, which was developed by Sorensen (2012) and simplified by Toci, Bruzari, and Sorensen (2015) by reworking the 47-item Health Literacy Survey in Europe (HLS-EU) form. The health literacy scale consists of 25 items and four sub-dimensions. Access to information sub-dimension includes five items (1-5th), the lowest score to be obtained from this sub-dimension is 5 and the highest score is 25. The information comprehension sub-dimension includes seven items (6-12), the lowest score to be obtained from this sub-dimension is 7 and the highest score is 35. Appraisal/ Evaluation sub-dimension includes eight items (13-20), the lowest score to be obtained from this sub-dimension is 8, and the highest score is 40. The Application/Using sub-dimension also includes five items (21-25), the lowest score to be obtained from this sub-dimension is 5, and the highest score is 25. For the whole scale, the lowest score is 25 and the highest score is 125. The items in the scale are answered by the participants on a 5-point Likert scale as "5: I have no difficulty at all, 4: I have little difficulty, 3: I have some difficulty, 2: I have a lot of difficulty, 1: I am unable to do it / I have no ability / impossible". All items of the scale are positive and there are no reverse items. The standard deviation of the original scale was 0.95 and the internal consistency coefficients determined for its subscales ranged between 0.90 and 0.94. Low scores indicate that the health literacy status is inadequate, problematic, and poor, while high scores indicate that it is adequate and very good. As the score obtained from the scale increases, the health literacy level of the individual increases (Aras & Temel, 2017).

The Digital Literacy Scale: Developed by Ng (2012), which was translated into Turkish by Hamutoğlu et al. (2016), consists of 17 items. Scale items were answered by the participants as "5: Strongly agree, 4: Agree, 3: Undecided, 2: Disagree, 1: Strongly disagree" on a 5-point Likert scale. All items of the scale are positive, there are no reverse-scored items. The scale has four sub-dimensions: Attitude, Technical, Cognitive, and Social. There are 7 items (1-7) in the Attitude sub-dimension, the lowest score that can be obtained from this dimension is 7 and the highest score is 35. There are 6 items (8-13) in the technical dimension. Therefore, the lowest score that can be obtained from this dimension is 6 and the highest score is 30. There are 2 items (14-15) in the cognitive sub-dimension. Therefore, the lowest score that can be obtained from this dimension is 2 and the highest score is 10. Similarly, since there are 2 items (16-17) in the social dimension, the lowest score that can be obtained from this dimension is 2 and the highest score is 10. The minimum score for the whole scale is 17 and the maximum score is 85. The standard deviation of the original scale is 0.89 and the internal consistency coefficients determined for the subscales vary between 0.79 and 0.98. The lower scores obtained from the sub-dimensions of the digital literacy scale and the overall scale indicate insufficient / low digital literacy level, while the higher scores indicate high digital literacy (Ng, 2012).

Statistical analysis

IBM SPSS V-25 program was used in the statistical analysis of the study. Data security and confidentiality were provided. Necessary normality tests were performed in the process of analyzing the data and it was understood that the data showed normal distribution (kurtosis and skewness -1.5 to +1.5) (Tabachnick & Fidell, 2013). Simple linear regression analysis was used. A p value of <0.05 was considered statistically significant.

Ethical consideration

In advance of initiating the research endeavor, necessary approvals were obtained through due diligence from the Agri Ibrahim Cecen University Scientific Research Ethics Committee (Date: 25.05.2023, Approval no: 120). Furthermore, written authorizations were procured from the institutions acting as the operational contexts for this study. With unwavering transparency, the research's aspirations were communicated, harmonizing seamlessly with the ethical precepts encompassing 'Confidentiality and Protection of Confidentiality,' 'Respect for Autonomy,' and the overarching principle of 'Do No Harm/Benefit.' The realization of these ethical tenets was ensured through the enrollment of participants who volunteered to partake, thus upholding their autonomy.

RESULTS

In our study, it was found that 71.4% of the individuals were female, 91.1% were single, 75.0% were nuclear family, 52.6% were higher education graduates, 46.6% had income less than expenditure, 93.5% had no chronic disease, and 52.1% had a family history of chronic disease (Table 1).

The mean age of the individuals was 22.68±4.48, the mean total score of the Health Literacy Scale was 102.27±17.34, the Access to Information Subscale was 20.55±4.05, the Understanding Subscale was 29.06±5.28, the Appraisal/ Evaluation Subscale was 32.50±5.94, and the Application/ Utilization Subscale was 20.16±3.82 (Table 1).

The mean total score of the Digital Literacy Scale was 64.39±12.75, Attitude Subdimension 27.15±5.54, Technical Subdimension 22.41±4.99, Cognitive Subdimension 7.60±1.85, Social Subdimension 7.21±1.87 (Table 1).

Table 1. Descriptive characteristics of individuals (n=384).

Demographic characteristics		**n**	**%**
Gender	Female	274	71.4
	Male	110	28.6
Marital status	Married	34	8.9
	Single	350	91.1
Family type	Elementary family	288	75.0
	Extended family	86	22.4
	Divided family	10	2.6
Education level	Primary education	6	1.6
	Secondary education	163	42.4
	Tertiary education	202	52.6
	Postgraduate	13	3.4
Monthly income status	My income is less than my expenses	179	46.6
	My income is equal to my expenses	173	45.1
	My income is more than my expenditure	32	8.3
Chronic disease condition	Yes	25	6.5
	No	359	93.5
Chronic disease in the family	Yes	200	52.1
	No	184	47.9
			$\overline{X}$ **±SS (Min-Max)**
Age (Year)			22.68±4.48 (18-55)
Mean Total Score of Health Literacy Scale			102.27±17.34
Access to Information Subdimension			20.55±4.05
Information Understanding Subdimension			29.06±5.28
Appraisal / Evaluation Sub-dimension			32.50±5.94
Application/ Utilization Subdimension			20.16±3.82
Mean Total Score of Digital Literacy Scale			64.39±12.75
Attitude Sub-dimension			27.15±5.54
Technical Sub-dimension			22.41±4.99
Cognitive Sub-dimension			7.60±1.85
Social Sub-dimension			7.21±1.87

n: Count, **%:** Column percentage.

The regression model developed to determine the effect of digital literacy on health literacy level was found F (1,382) =194.700, p=0.001 and 33.8% of the variance in the dependent variable (R^2=.338) was explained by the independent variable. The independent variable predicts the dependent variable. Accordingly, digital literacy level has a positive and significant effect on health literacy level (β=0.581; t=13.953, p=0.001) (Table 2).

Table 2. Simple linear regression analysis to determine the effect of digital literacy on health literacy level (n=384).

Independent variable	**B**	**SD**	**β**	**t**	**p***
(Constant)	51.418	3.71		13.838	**0.001**
Digital Literacy Scale	0.790	0.057	0.581	13.953	**0.001**
	R=0.581 R^2=0.338 F=194.700 p=0.001				

Simple linear regression analysis*

DISCUSSION

Communication, which is the basis of the inclusion of individuals in society, has undergone a process from face-to-face communication to virtual communication over time. With this change in the communication of individuals, there has been a great increase in the use of mass media and with this increase, the habits of obtaining information easily have been gained. Although the importance of easy access to information in human life is indisputable, it is also a fact that not all information is correct or not all correct information is interpreted correctly. With the coronavirus pandemic, the role of mass media in people's lives was once again understood, and extremely vital information was provided on issues related to the virus and disease while people could not leave their homes. In addition to such an important and positive role of mass media, it is not only the competent authorities who provide health information. Social media applications are channels where information can be easily registered and shared without measuring its accuracy. Therefore, in environments such as social media, where the accuracy of the information shared cannot be checked, individuals need to confirm and understand the accuracy of the information and reflect it in their lives. However, even if the information is correct, it is still related to the individual's skills to make sense of it correctly and apply it correctly (Akalın et al., 2021). Two of the skills related to providing the right information and using this information are digital literacy and health literacy, and the relationship between these two skills was examined in the study:

The mean total score of the health literacy scale was 102.27±17.34. Considering that the score that can be obtained from the scale can be between 25-125, it can be said that the score obtained is quite good. In a study conducted by the Ministry of Health (2018) with 6628 participants, it was determined that 6.9 out of 10 people in each age group in Turkey have inadequate or problematic-limited health literacy level. According to the results of the health literacy survey conducted in 9 countries in Europe, 4.8 out of 10 people have inadequate or problematic-limited health literacy level (Sørensen et al., 2015). When the results of the study adapted to Turkish by Aras and Bayık Temel (2017) and applied to 30 patients twice with a four-week interval are examined; it is seen that the mean health literacy score is 90.30±12.35. In the other study conducted by İbrahimoğlu et al. (2019) with 437 participants, the average health literacy score was determined as 13.32±3.62 in the range of 0-23 points. When the studies in the literature are examined, it can be said that the health literacy level of the participants is very good (102.27±17.34).

The participants' digital literacy levels were found to be above moderate. In the study conducted by Çetin (2016), it was determined that the participants' digital literacy levels were at an adequate level. In the study conducted by Semerci (2019) and Güngör & Kurtipek (2020), it was concluded that the participants' digital literacy levels were above the moderate level. In some studies, it was concluded that the participants' digital literacy levels were high (Karakuş & Ocak, 2019; Kozan & Özek, 2019). The findings align with the existing literature.

The regression model developed to determine the effect of digital literacy on health literacy level was found $F(1,382)=194.700$, $p=0.001$ and it was determined that the level of digital literacy had a positive and significant effect on the level of health literacy ($\beta= 0.581$; $t(382)=13.953$, $p=0.001$). In the study conducted by Van der Vaart and Drossaert (2017) on 200 people aged 18-84 in the Netherlands with the digital health literacy tool, a moderate relationship was found between digital health literacy and general health literacy and digital skills. The findings in the study show the impact of e-health utilization on people's lives. More than half of the participants reported using health-related social media or consumer review sites.

In the study conducted by Rosario et al. (2020) on 3084 university students in Portugal with the digital health literacy tool, the relationship between digital health literacy related to COVID-19 and online information-seeking behavior among university students was examined. According to the study findings, digital health literacy was found to be associated with university students' online information-seeking behavior during COVID-19. Male students were reported to have less difficulty than females when adding their digital content and evaluating the reliability of health information they obtained from online sources. Those who searched more frequently on websites of public institutions and health portals were found to be more likely to achieve an adequate level of digital health literacy in assessing the reliability of health information. The findings highlight the critical role of targeted interventions to enhance digital health literacy among university students, emphasizing the need for gender-sensitive approaches and promoting the use of reliable online health information sources.

CONCLUSION

This study found that as individuals' digital literacy levels increase, their health literacy levels also improve. To address this, it is recommended to provide training programs to enhance digital literacy and use public service announcements on social media to raise awareness. Academically, future studies should focus on identifying barriers to digital and health literacy and explore interdisciplinary approaches to develop effective strategies. Evaluating the impact of training and campaigns and fostering collaboration between policymakers, educators, and health professionals can further bridge the literacy gap and improve public health outcomes.

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

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Plan, design: M.S.Y.; **Material, methods and data collection:** M.S.Y.; **Data analysis and comments:** M.S.Y.; **Writing and corrections:** M.S.Y.

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