

INVESTIGATION OF THE RELATIONSHIP OF TECHNOLOGY USE WITH HEALTH LITERACY AND HEALTH ANXIETY IN ADULTS

Erişkin Bireylerde Teknoloji Kullanımının Sağlık Okuryazarlığı ve Sağlık Anksiyetesi ile İlişkisinin İncelenmesi

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ABSTRACT

With the technological advancements, the domains in which technology is used are also gradually increasing. The objective of this study is to investigate the relationship of technology use with health literacy and health anxiety. The research was conducted with 228 individuals, 116 females and 112 males, with a mean age of 42.66±16.63 years, aged 18-65. In the study, the Sociodemographic Information Form, Technology Usage Scale (TUS), Health Literacy Questionnaire (HLQ), and The Health Anxiety Inventory (HAI) were used. It was found that the total score of TUS was positively and weakly correlated with the total score of HLQ and HLQ-1 (access to information), HLQ-2 (understanding information), HLQ-3 (appraising/evaluating), HLS-4 (applying/using). It was determined that there was a very weak negative correlation between TUS total score and HAI total score, HAI-1 (somatic sensitivity and anxiety), HAI-2 (negative disease-related expectations). Based on the results of the study, it was found that as the usage of technology increased, health literacy increased, whereas health anxiety decreased. It is considered that when technology is used for the right purposes and in the right way, it can provide support to individuals' ability to acquire information about health-related concepts and manage their health.

Keywords: Adult, Health anxiety, Health literacy, Technology usage.

ÖZ

Teknolojik gelişmelerle birlikte teknolojinin kullanıldığı alanlar da giderek artmaktadır. Bu araştırmanın amacı teknoloji kullanımının sağlık okuryazarlığı ve sağlık anksiyetesi ile arasındaki ilişkinin incelenmesidir. Araştırma, yaş ortalaması 42,66±16,63 yıl olan, 18-65 yaş arası, 116 kadın ve 112 erkek, 228 birey ile gerçekleştirildi. Çalışmada Sosyodemografik Bilgi Formu, Teknoloji Kullanım Ölçeği (TKÖ), Sağlık Okuryazarlığı Ölçeği (SOÖ) ve Sağlık Anksiyetesi Ölçeği (SAÖ) kullanıldı. TKÖ toplam puanının SOÖ toplam puanı ve SOÖ-1 (bilgiye erişim), SOÖ-2 (bilgileri anlama), SOÖ-3 (değer biçme /değerlendirme), SOÖ-4 (uygulama/kullanma) ile pozitif yönde zayıf düzeyde ilişkili olduğu belirlendi. TKÖ toplam puanı ile SAÖ toplam puanı, SAÖ-1 (bedensel duyarlılık ve kaygı), SAÖ-2 (hastalıkla ilişkili olumsuz beklentiler) arasında negatif yönde çok zayıf düzeyde ilişkili olduğu saptandı. Çalışmanın sonuçlarına göre teknoloji kullanımı arttıkça sağlık okuryazarlığının arttığı ve sağlık anksiyetesinin azaldığı görüldü. Teknoloji doğru amaçlarla ve doğru şekilde kullanıldığında bireylerin sağlıkla ilgili kavramlarda bilgi edinme ve sağlıklarını yönetme becerilerinde destek sağlayabileceği düşünülmektedir.

Anahtar kelimeler: Erişkin, Sağlık anksiyetesi, Sağlık okuryazarlığı, Teknoloji kullanımı.

INTRODUCTION

Technological advancements are increasing day by day and the use of technology is viewed as a necessity in a wide variety of domains. To benefit from technology, the individual need to have knowledge of technology and be able to use technology properly. Technology makes life far more manageable and better when used effectively and appropriately (Orun & Kula, 2012; Wiederhold, 2020).

Information and communication technologies enable the processing and transformation of information and have become an innovative element for education in health promotion and related issues in many developed countries (del Carmen Ortega-Navas, 2017). Individuals acquire health information from a broad range of sources. These are formal, informal, media, and commercial sources (Kilit & Eke, 2019; Kington et al., 2021). Health-related education programs, television programs, leaflets, and the use of technological tools can improve the health literacy levels of individuals (Akbulut, 2015).

The concept of literacy has started to diversify with the technological advancements. In the most general sense, literacy has been described as the concept of literacy (Kurudayıoğlu & Tüzel, 2010). In the World Health Organization (WHO) Health Promotion Glossary, this concept is defined as "social and cognitive skills that determine the motivation and ability of individuals to access, understand and use information in a way that promotes and maintains good health" (WHO, 1998). Health literacy improves the ability to read and understand healthcare services instructions accurately, the ability of individuals to access the exemplary service and information, and the ability to use this service. Additionally, the creation of quality conditions in healthcare services ensures that the individual is effective and equipped for his or her health and the health of the community (Nielsen-Bohlman, Panzer Allison & Kindig, 2004). On the other hand, a low level of health literacy affects patient satisfaction adversely (Kahraman, Karagöz, Yalman & Yusuf, 2018). In a study (Smith, Curtis, Wardle, von Wagner C. & Wolf, 2013), it has been revealed that there is a significant correlation between low health literacy level and a high level of anxiety. Anxiety is an emotion characterized by physical changes such as a feeling of tension, anxious thoughts, and increased heart rate (Parchani, Panda & Krishnan, 2022). In contrast, health anxiety is characterized by an excessive and unfounded concern for a perceived health hazard. It is comparable to hypochondriasis. Physical signs, emotions, and test findings are examples of additional health data that might be interpreted as signs of a distressing physical condition. (Abramowitz & Braddock, 2008; Asmundson, Abramowitz, Richter & Whedon, 2010). Despite research into the use of technology as a source

of health information (Fox & Duggan, 2013; Maguire et al., 2011), little is known about technology use and how various psychological and communicative factors impact individuals (Lagoë & Atkin, 2015). However, it has been reported that the prevalence of health anxiety increases due to excessive surfing on the internet (cyberchondria) (Tyrer, 2018).

When the studies on the use of technology in the literature are reviewed, it is noticed that these studies are generally conducted in elderly individuals (Özsungur, 2022), adolescents (Forte, Sarli, Polidori, Lester & Pompili, 2021), university students (Aliaño, Hueros, Franco & Aguaded, 2019) and specific occupational groups (Gause, Mokgaola & Rakhudu, 2022; Siyam, 2019). Besides, no study has been found that investigates the relationship of technology use with health literacy and health anxiety in adults. The objective of this study is to investigate the relationship of technology use with health literacy and health anxiety in individuals aged 18-65. The current research has two main topics;

- Is technology use related to health literacy in individuals aged 18-65?
- Is technology use associated with health anxiety in individuals aged 18-65?

MATERIAL AND METOD

This study is a cross-sectional correlational study conducted to determine the relationship between technology use, health literacy and health anxiety in adults. The study includes individuals living in Ankara, Turkey. The scales used in the research were sent to the individuals online via Google Forms. Samples were taken by using the snowball sampling method. All individuals who agreed to participate in the study were included in the study. Inclusion criteria for the study were determined as being between the ages of 18-65, being literate, using a smartphone, tablet or computer, and agreeing to participate in the study voluntarily. The study was conducted online with 228 individuals. Individuals with a diagnosis of any psychiatric illness and having problems in reading comprehension and answering skills in Turkish were excluded from the study.

Data Collection Tools

In the study, the General Information Form prepared by the researchers, the Technology Usage Scale (TUS), the Health Literacy Questionnaire (HLQ), and the Health Anxiety Inventory (HAI) were used.

General Information Form

Information such as age, gender, educational status, and profession of the individuals participating in the study were recorded in the form.

Technology Usage Scale

The scale developed by Zincirkıran and Tiftik (Zincirkıran & Tiftik, 2014) was used to determine the technology usage levels of individuals. The Cronbach's alpha value of the scale was determined to be 0.84. The scale consists of 13 items and is scored between 1-5 for each item on the scale (5: strongly agree, 1: strongly disagree). The total score is taken into account. A high score on the scale indicates the level of high technology use (Aksoy, 2018).

Health Literacy Questionnaire

The validity and reliability study of the scale was conducted by Aras and Bayik-Temel and the Cronbach's Alpha coefficient was determined to be 0.92. The scale consists of 25 items and 4 sub-dimensions. A score between 25-125 can be obtained from the scale. Items in the scale are scored between 1 and 5 (1: unable to perform at all/ have no skills/impossible, 5: experiencing no difficulty). High scores obtained from the scale indicate a high level of health literacy. There is no reverse worded item in the scale (Aras & Temel Bayik, 2017).

Health Anxiety Inventory

It consists of items that question the mental state of individuals (14 items) and ask individuals to speculate on what their mental state might be like under the assumption of a serious illness (4 items). Scoring for each item ranges between 0-3. The total score is taken into account. An increase in the score indicates an increase in the level of health anxiety. The Cronbach's alpha coefficient of the scale was determined to be 0.918 (Aydemir, Kirpınar, Sati, Uyur, & Cengisiz, 2013).

Ethical Approval of Study

The Helsinki Principles served as the foundation for the current study's design. There were obtained ethics committee approval from University of Health Sciences Gülhane Scientific Researchs Ethics Committee with date: 20.01.2022 and number: 2022-54.

Statistical Method

The sample calculation was done with the G*Power Version 3.1.9.4 package program. Type1 error was 0.05 and power was 0.95, and the minimum number of samples required to be included in the study was determined as 138 when the effect size index was taken as the medium size (0.30) suggested by Cohen.

Statistical analyses were performed using the IBM SPSS for Windows Version 22.0 software. Numerical variables were expressed as mean (standard deviation) while categorical variables were expressed as numbers and percentages (frequency). The Kolmogorov Smirnov

test was used to determine whether the numerical variables fit the normal distribution. The correlation between numerical variables was analyzed by Spearman correlation analysis. A p-value of <0.05 was considered statistically significant.

RESULTS

The study was completed with a total of 228 individuals, 116 females and 112 males, between the ages of 18-65. The mean age of the individuals was 42.66 ± 16.63 years. Data related to the socio-demographic characteristics of the participants are presented in Table 1.

Table 1. Sociodemographic Characteristics of Individuals

Socio-demographic Characteristics		N=228 (%)
Gender	female	116 (50.9)
	male	112 (49.1)
Marital status	married	151 (66.2)
	single	77 (33.8)
Educational status	primary school	11 (4.8)
	middle school	5 (2.2)
	high school	33 (14.5)
	associate degree	40 (17.5)
	bachelor's degree	122 (53.5)
	masters degree	17 (7.5)
Employment status	employed	102 (44.7)
	unemployed	126 (55.3)
Perceived economic level	very low	12 (5.3)
	low	19 (8.3)
	neither low nor middle	23 (10.1)
	middle	123 (53.9)
	neither middle nor high	38 (16.7)
	high	12 (5.3)
Presence of chronic disease	very high	1 (0.4)
	Yes	69 (30.3)
	No	159 (69.7)

The mean scores of the participants obtained from the scales are presented in Table 2.

Table 2. Mean Scores of Scales

	Min-Max	Mean (SD)
TUS Total	15-56	38.68 (6.57)
HLQ Total	51-125	107.00 (14.03)
HLQ-1	10-25	21.75 (3.51)
HLQ-2	14-35	30.20 (4.15)
HLQ-3	15-40	34.37 (5.14)
HLQ-4	10-25	20.68 (3.40)
HAI Total	2-49	17.09 (7.48)
HAI-1	1-42	13.83 (6.31)
HAI-2	0-12	3.25 (2.21)

TUS: Technology Usage Scale, HLQ: Health Literacy Questionnaire, HLQ-1: Access to information, HLQ-2: Understanding information, HLQ-3: Appraising/evaluating, HLQ-4: Applying/using, HAI: Health Anxiety Inventory, HAI -1: Somatic sensitivity and anxiety, HAI-2: Negative disease-related expectations

In the study, the relationship of HLQ and HAI scales with TUS was investigated. It was found that the total score of TUS was positively and weakly correlated with the total score of HLQ and HLQ-1, HLQ-2, HLQ-3, and HLQ-4 ($r=0.326$, $p<0.01$; $r=0.261$, $p<0.01$; $r=0.237$, $p<0.01$; $r=0.356$, $p<0.01$; $r=0.239$, $p<0.01$ respectively). It was determined that there was a very weak negative correlation between TUS total score and HAI total score, HAI-1, and HAI-2 ($r=-0.146$, $p=0.028$; $r=-0.131$, $p=0.048$; $r=-0.131$, $p=0.048$, respectively) (Table 3).

Table 3. The Relationship of TUS with HLQ and HAI

	TUS Total	
	r	p
HLQ Total	0.326	<0.01
HLQ-1	0.261	<0.01
HLQ-2	0.237	<0.01
HLQ-3	0.356	<0.01
HLQ-4	0.239	<0.01
HAI Total	-0.146	0.028
HAI-1	-0.131	0.048
HAI-2	-0.131	0.048

TUS: Technology Usage Scale, HLQ: Health Literacy Questionnaire, HLQ-1: Access to information, HLQ-2: Understanding information, HLQ-3: Appraising/evaluating, HLQ-4: Applying/using, HAI: Health Anxiety Inventory, HAI -1: Somatic sensitivity and anxiety, HAI-2: Negative disease-related expectations

In the study, the relationship between HLQ and HAI was also examined. Moreover, it was found that the HLQ-Total score was correlated both with the HAI-Total score and the subscales of the HAI ($p<0.05$) (Table 4).

Table 4. The relationship between HLQ and HAI

	HLQ Total		HLQ-1		HLQ-2		HLQ-3		HLQ-4	
	r	p	r	p	r	p	r	p	r	p
HAI Total	-0.306	<0.01	-0.254	<0.01	-0.271	<0.01	-0.306	<0.01	-0.173	0.009
HAI-1	-0.250	<0.01	-0.209	0.002	-0.232	<0.01	-0.250	0.001	-0.142	0.032
HAI-2	-0.322	<0.01	-0.262	<0.01	-0.267	<0.01	-0.306	<0.01	-0.188	0.004

HLQ: Health Literacy Questionnaire, HLQ-1: Access to information, HLQ-2: Understanding information, HLQ-3: Appraising/evaluating, HLQ-4: Applying/using, HAI: Health Anxiety Inventory, HAI -1: Somatic sensitivity and anxiety, HAI-2: Negative disease-related expectations. Spearman Correlation Analysis, $p<0.05$

DISCUSSION AND CONCLUSION

The study was planned to investigate the relationship of technology usage with health literacy and health anxiety in adults, and it was revealed that technology use in adults was correlated with both health literacy and health anxiety. As individuals' use of technology increases, their health literacy level increases, and their health anxiety decrease.

In the study, it was found that as the level of technology use increased, health literacy also increased. Especially, the development of digital technologies has also provided the development of ideas about health education, and the concept of e-health has emerged. E-health

is the field of healthcare services offered or developed through the internet and other technologies (Shaw et al., 2017). There is scarce evidence in the literature on how the use of health information technology may affect health outcomes. The underlying idea behind incentives for health systems to expand the use of patient portals is that these portals will improve health. Although the evidence is insufficient, studies demonstrate that patient portals can also enhance care and adherence processes (Sarkar et al., 2014; Tenforde, Nowacki, Jain & Hickner, 2012).

When the individual has an adequate level of health literacy, they will have the capacity to benefit from the advantages of technology (Harbi, 2019). In a study (Teleş, 2018), some of the sources used by patients to access health information have been reported to be radio (18.0%), newspaper-magazine (26.7%), and internet (45.0%) and television (46.7%). In another study by Steehler et al. (2013), it was determined that roughly 20% of Americans use social media to access information about healthcare services, and 88% browse the internet for health-related topics. This situation shows that individuals often use technology to access health resources. However, browsing for health information online using search engines might be challenging for elderlies with limited health literacy (Lyles & Sarkar, 2015). Studies emphasize that it is difficult to navigate these sites, specifically for patients with limited health literacy and numeracy skills (Segall, Saville & L'Engle, 2011; Taha, Sharit & Czaja, 2014). There is compelling evidence that individuals with low health literacy have difficulty accessing and using state-of-the-art digital health communication tools such as websites (Jensen, King, Davis & Guntzviller, 2010; Neter & Brainin, 2012; Sarkar et al., 2010). In a study, it was stated that there is a correlation between higher health literacy and greater access to technological devices and higher online health-related information seeking behavior. It has been shown that participants were more likely to use the internet and to search for health-related information when they had higher levels of health literacy and accessibility to technological devices (Lee et al., 2021). The fact that the level of health literacy has increased with the increase in the level of technology use in the current study is a result that is compatible with the literature.

In the current study, as the level of technology use increases, individuals' access to information, understanding, and appraising/evaluation levels also increase. Hitherto, a wide variety of models have been proposed in the field of Technology acceptance; however, the Technology Acceptance Model (TAM) is considered to be the most valid and effective model in explaining individuals' acceptance of information systems (Hsiao & Yang, 2011). The model was introduced by Davis (Davis, Bagozzi & Warshaw, 1989) in 1989 and it seeks to explain why individuals accept or reject information technologies and to predict how individuals will

respond to changes. TAM involves two factors "perceived ease-of-use" and "perceived usefulness". Plus, these factors are of primary importance in the acceptance of information technologies (Davis, Bagozzi & Warshaw, 1989). Perception and attitude towards the use of technology are the result of an internal cycle that forms the cognitive process (Agarwal & Karahanna, 2000). Whether the use of innovation and technology is enjoyable and/or entertaining from an individual's point of view is crucial in an individual's user behavior. Perceived usefulness, perceived ease of use and perceived pleasure directly affect behavioral intention to use mobile learning (total variance 47.1%). Hedonic motivation is a key element in the adopting of technology, as it helps to initiate/form a positive attitude among individuals (Poong, Yamaguchi & Takada, 2017). Hence, the increase in the level of individuals' access to information, understanding of information, and value appraising/evaluation may have increased the technology use of individuals by making individuals adopt technology more.

We found that the increase in the level of technology use decreased the level of health anxiety. In their study, Starcevic and Berle (2013) proposed a hybrid model of health-related Internet searches. According to the model, searching for health can lead to an increase or decrease in existing anxiety. Depending on the increase in anxiety, individuals will make more searches or show internet use/avoidance behavior to prevent an increase in anxiety levels. In the current study, health anxiety decreases as the level of technology increases. Nonetheless, there is more evidence in the literature that health-related research on the Internet increases health anxiety due to technology use. The concept of cyberchondria, which is associated with definitions such as searching for health information online or on the Internet, online health research, health-related use of the Internet, and increased use of the Internet for self-diagnosis, is basically described as the behavior of doing too much and repetitive research on the internet to ease health-related stress and anxiety (Berle et al., 2007; Mubeen & Tayyaba, 2020; Muse et al., 2012; Tyrer et al., 2019). In contrast to these views, there is also evidence in the literature that patients can be successful in managing their diseases if the accurate information is accessed via the Internet (Barlow, Stapley, Ellard & Gilchrist, 2007). In a review investigating online health-related attitudes and behaviors by Zülfikar (2014), it was stated that more than half of the individuals who obtained health information over the internet contributed to the management of their health or the health of the people around them, the information obtained by some patients (eg cancer patients) from the Internet strengthened their decision processes. Moreover, it helped them in their communication with physicians. However, it has been determined that some patients, such as cancer patients, have difficulty in managing their diseases as a result of the information they have obtained from the Internet. According to the

study by Sing et al., participants searched the Internet out of; curiosity, fear about unidentified symptoms, and a desire to find treatments. The study provided findings that were both favourable (such as assurance) and unfavourable (such as uncertainty). The study's conclusions show that the internet may be a valuable source of health information for those who are anxious about their health and that it can both help them about anxiety and make them more anxious (Singh, Fox & Brown, 2016). Considering the current literature, the results show that the findings do not provide a definitive conclusion about the effects of technology use on health anxiety and this impact may vary depending on a broad range of variables.

Furthermore, in this study, it was determined that the concepts of health literacy and health anxiety are associated with each other and it has been demonstrated that as the level of health literacy increases, health anxiety decreases. In another study that shows similarities with the results of our study, the relationship between health anxiety and health literacy was scrutinized and it was found that as health literacy level increased, health anxiety decreased (Aktürk & Oğulluk, 2019). In the current study, it is considered that the lower health anxiety of individuals with higher health literacy may be associated with their active involvement in any health problem and more accurate understanding of the information given by health professionals. Moreover, the fact that health literacy and health anxiety were found to be correlated in the study is an expected result in terms of both concepts being associated with the level of technology use.

The fact that the variables related to technology use of individuals (e.g., which resources they use) were not questioned in the study constitutes a limitation of the study. It is thought that future studies could reveal the relationship of technology use with health literacy and health anxiety more clearly, by conducting research that includes the reasons, challenges, and facilitating factors of technology use by individuals.

This study provides data that technology use is associated with both health literacy and health anxiety in adult individuals, and that health literacy levels increase as individuals increase technology use, and health anxiety decreases. Increasing advice for people to monitor their health and access to technology more easily over time may explain the relationship of technology use with health literacy and health anxiety. It is considered that when technology is used for the right purposes and properly it can provide support to individuals' ability to acquire information about health-related concepts and manage their health.

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