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Awareness of Patient Rights in Digital Health Services

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Research Article

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Abstract

Objective

The purpose of this study is to investigate the degree of understanding of the rights of patients in terms of the features of their socio-demographic status and how they use digital health tools.

Materials and Models:

This research is a descriptive, observational and cross-sectional survey of 300 adults who are over the age of 18 and who are either familiar with digital health or have previously used at least one digital health service. The data collection consisted of two methods: a demographic questionnaire covering socio-demographic and digital health use features and a Patient Rights Awareness Scale consisting of 20 items. Descriptive statistics, parametric/non-parametric analysis, correlations, and regression modeling were carried out to analyze the data.

Results

The study found that people were aware of the patients' rights at a good level, and using the scale demonstrated good internal consistency. There were found differences in patient rights awareness with respect to education level and some characteristics of digital health utilization. In addition, a positive correlation between digital health knowledge with the level of awareness of patient rights was established, and this variable demonstrated the highest degree of relationship with the variable of awareness in the correlation analysis. Moreover, in the multivariate analysis, the variable of digital health knowledge was the one that maintained its significant correlation with the level of patient rights awareness regardless of the influence from other sociodemographic and digital health utilization variables.

Conclusion

Knowledge of patient rights in the digital health environment is closely related to the level of individuals' digital health literacy. The findings indicate that expanding digital health services is not adequate; individuals should be supported in understanding and applying their rights in the digital environment. The implementation of issues such as patients' rights, guarantee of privacy, protection of health data, and informed consent in digital health literacy programs may help in providing patient-centered and rights-based digital health solutions.

1. INTRODUCTION

The rapid progress of digital technology has triggered enormous changes in the health services delivery process, making digital health solutions an integral part of today’s health systems. Telemedicine solutions, electronic health records, mobile health technologies, remote patient monitoring systems, and AI-based clinical decision-making provide a splendid opportunity for increased accessibility, efficiency, and sustainability of health services [1]. The application of digital health solutions became widespread after the pandemic of Covid-19, which increased the significance of remote access to health services [1, 2].

The advent of digital health technologies provides people with great benefits such as acceleration in service delivery, time and financial saving, the equal availability of medical services, and ability to manage chronic diseases more efficiently. But the digitalization of healthcare also involves a number of new problem areas which include data security and privacy concerns, algorithmic transparency, and ethical aspects of artificial intelligence. In particular, personal health information stored in big data systems and further analyzed by the means of AI makes patient rights further more important than before [3, 4, 5]. Current studies illustrate that trust in digital health systems is based on people's attitudes towards data security and privacy [6, 7].

Patient rights mean the inherent freedoms and rights each person has when using healthcare services. Patient rights contain the right to privacy, informed consent, access to the medical records, participation in the treatment process, dignity, etc. However, as time goes by and new healthcare technologies emerge, patient rights become even broader, acquiring such categories as data ownership, digital privacy, protection of electronic medical records, explanation of how the algorithm works, and responsibility for AI [8, 9]. The implementation of AI technologies in clinical practices raises many issues and concerns related to the lack of knowledge regarding purposes of the health data use and generation of algorithmic decisions [10, 11].

For the proper protection of patients' rights in the sphere of digital healthcare services, having laws alone is not enough. Another necessary element is the level knowledge and understanding of patients concerning their rights and the capacity to exercise them. In this regard, the notion of patient rights awareness means how people are aware of and capable to qualify and defend their rights concerning data privacy, informed consent, physical access to data, and using artificial intelligence applications. Studies on digital health literacy and empowerment of patients demonstrate that people possess not only the needed technical literacy but also possess knowledge about their rights [1, 12].

There have been many studies in the last few years about the issues of protecting health data and the autonomy of patients. Pilgram et al. [13] mention that privacy risks cannot be eliminated in synthetic health data; therefore, some new governance models should be introduced to ensure the rights of users. Moreover, Jangid et al. [14] talk about how artificial intelligence systems can provide some opportunities for the protection of patient privacy, but management of these technologies should be based on ethical principles.

The need for understanding patient rights in digital healthcare is amplified by debates on patient autonomy and informed consent. Presently, the large amount of data worked on by AI-supported healthcare systems requires the re-evaluation of traditional informed consent procedures [15]. Involving patients in the decision-making process concerning the sharing and secondary use of their health data is believed to represent one of the essential prerequisites of patient-centric healthcare [16].

The literature review shows that research in the area of digital health mainly concentrates on issues such as adoption of technology, utilization of telemedicine, digital health literacy, and efficiency of AI-related technologies [17, 18]. It should be noted, however, that there is a lack of studies that address the issue of patient rights awareness concerning digital health services. More specifically, examining the awareness of individuals in terms of data confidentiality, digital privacy, algorithmic transparency, and control of health data seems to be an under-researched area [19].

1.1. Digital Health Services and Digital Transformation in Healthcare Systems

Digital health represents extensive transformation as it encompasses systematic application and utilization of digital technologies in the planning, delivery, monitoring, and assessment of healthcare services. Major aspects of this transformation include electronic health records (EHR), telemedicine and telehealth services, mobile health (mHealth), wearable technologies, remote patient monitoring, big data analytics, cloud computing, and AI-based clinical decision-making instruments. Now, digitalization is not regarded merely as the transfer of standard processes into an electronic form, but rather as a holistic process enabling the redesigning of clinical workflows, patients' interaction with healthcare professionals and the healthcare system itself. Current reviews demonstrate that digital technologies perform one of the unique roles in being the vital component of quality, efficiency, and performance improvement of healthcare organizations and systems [20]. Digital transformation in healthcare systems contributes to accelerated and evidence-based decision-making through the harmonization of clinical data from various sources. Electronic health records interoperability makes it possible to access the patient's health history anywhere and anytime thus providing seamless continuity of care. The technologies of telehealth and remote monitoring are especially crucial for chronic disease management, providing medical services in remote areas with a limited access to health care, and encouraging patients to take a part in their own health. Additionally, artificial intelligence and machine learning play an important role in finding complex correlations in large volumes of clinical data, predicting disease and complications risk, and optimizing health care service delivery [21]. The influence of digital transformation on health outcomes does not depend only on availability of technologies. The availability of interoperable systems, quality of data, cybersecurity and privacy issues of personal health data, ethical and legal regulations, technological competencies of healthcare professionals, and the technological infrastructure of facilities are crucial criteria for successful transformation. Besides, differences in digital device affordability, internet connection, and digital literacy introduce the concept of “digital divide,” which can cause worsening instead of diminishing health inequalities. Thus, it is

necessary to change the approach to the creation of digital health policies and make them more people-centered, safe, inclusive, evidence-based, and equity-centered rather than technology-centered. The World Health Organization views digital transformation as one of the main tools for achieving more resilient and accessible human-centered healthcare systems and extended the time for implementing the Global Digital Health Strategy to 2027 [1, 22].

1.2. The Rights of Patients in the Age of Digitalization

Rights of patients refer to a collection of fundamental legal and moral rights that aim to protect any person who receives medical services. The history of medicine traces the evolution of medical technique from a paternalistic style to that of patient-centered health care where patients are not considered just as passive recipients of healthcare services, but rather dn individuals empowered to make their own decisions regarding their health. Consequently, a number of important patients' rights emerged to exist in modern medicine as follows: right to information; right to accept/treat; right to privacy; right to protection of personal information; and right to informed consent. The advent of digitalisation of health services may change the essence of previously existing rules to be applied in new conditions. According to modern bioethics literature, it is critical to combine clinical value arising from the use of digitalisation applications with the rights to be taken for granted [23].

Digital health has great potential for patient-centered care by improving patients' ability to view their health information, keep track of their health conditions, and engage in the clinical decision-making process. However, continuous creation, storage, processing, and sharing of health data through online platforms has its own ethical and legal challenges. With the development of decision support systems, it is crucial to pay attention to the patients' right to know what data about them is collected, why this data is used, and which impact algorithm-based decisions have made on health services. This means that people's rights in digital health do not only include access to medical services, and choice of treatment procedures but also include aspects like digital privacy, transparency of algorithms, ownership of the data, being accountable, and protection from discrimination. In terms of AI-powered technologies, patients should understand the information about clinical benefits of the solution, its accuracy and reliability, data safety, and accountability [24].

Because personal health information includes highly sensitive information about a person's mental and physical health, it must be maintained securely in digital health systems. While there is a growing number of ways to collect and store large volumes of health data such as electronic medical records, mobile apps, and wearable devices, new risks arise such as unauthorized access, data breaches, re-identification, as well as using and sharing information with third parties without the consent of the individual. A recent systematic review conducted by Alhammad et al. [25] shows that issues of data privacy, confidentiality, and security are of great concern for adopting mobile health applications by patients. Data minimization, purpose limitation, access control, secure storage, encryption, and transparency should serve as the basis of any digital health system. Moreover, a patient must know who is using what part of their health data, why, and for how long, as well as have as much control over this process as possible. In their work, Baines et al. [26] note that while people generally are favorable

towards sharing their health data, the level of positivity is directly influenced by trust, transparency, privacy, and control aspects. Finally, Olsen et al. [27] provide evidence that people may be willing to share their health data but people are still concerned with aspects like consent, privacy, and transparency.

One of the vital indicators of patient autonomy in practice is informed consent. An acceptable consent process makes it necessary for the patient to be informed in detail regarding the procedure that will be performed, including its main advantages, possible threats, other possible treatments, and its impact on their data, giving them an opportunity to make a choice without being influenced by anyone or anything. The digitalization of the process can be achieved through the use of e-consent, videos, interactive educational materials, and personalized digital information tools. According to a study made by Goldschmitt et al. [28], the use of digital applications in the process of obtaining consent helps patients understand the medical procedures, potential risks of the procedures, benefits, and alternative procedures. However, it should be noted that there is enough evidence to support the idea of using AI-powered technologies for gaining consent without the supervision of medical professionals.

The concept of digital consent should be appropriately understood and analyzed. It is essential to understand consent scope, especially regarding future research, development of AI models, or other secondary applications using patient data. The latest research suggests that implementation of the dynamic consent model could result in patients becoming more autonomous [26]. The transition of healthcare systems to digital is not an excuse for violation of patient rights but requires that privacy, data protection, informed consent, and individual autonomy should be protected from the very beginning. Ethics and sustainability of digital healthcare systems depend on the creation of a governance model, where technological innovations meet patients' rights.

1.3. Awareness of Patient Rights in Digital Healthy Services

Digital transformation of healthcare is changing the way patients access medical healthcare but is imposing new requirements for the knowledge, understanding of, and dealing with patient rights. Widespread use of electronic health records, telehealth apps, mobile health platforms, wearable technologies, and AI-based systems enables patients to receive easier access to their healthcare data and be more involved in the processes of medical treatment while raising importance of patient rights in terms of privacy, data security, the right to informed consent, and control over their patient data. In this regard, the awareness of patient rights can be seen not only as being aware of the rights that the patient has when receiving medical services but also as knowing what their rights are, being able to identify violations of them, and exercising them in the case of a need. The understanding of patient rights in digital conditions implies the ability to ask the questions about how the patient health data is acquired, stored and shared, to evaluate the scope of consent during digital applications, and to identify appropriate healthcare services. One of the key factors that is influencing the awareness of patients about their rights in the digital healthcare services is the proficiency in digital health literacy. Digital health literacy involves the skill of searching, finding, understanding, and making use of health-related

information received from electronic resources when making health-related decisions. This notion is not restricted to the ability to use internet or mobile devices, but also includes skills connected with finding information, evaluating what was found and communicating with other people in electronic environments. Present researches show that digital health literacy plays a key role in the patients' ability to find the necessary health-related information [29].

Digital health literacy has a significant correlation to a patient's knowledge of their rights. This means that if someone is able to access their healthcare records online but does not know how or to whom their data can be shared, they will not be capable of exercising their rights even if they manage to log into the electronic system. Hence, high level of digital health literacy can help patients gain access to medical data as well as analyze the information sources' reliability and be more conscious when it comes to their rights and responsibilities in the realm of digital health. Indeed, in their study published in 2025 Edwards et al. performed a systematic review and a meta-analysis of 23 studies with the overall sample size of 25,505 and confirmed a positive correlation between general health literacy and e-health literacy. Some correlating indicators of general health literacy as well as e-health literacy were identified, e.g. educational level, economic status, self-efficacy, and digital literacy [30]. Wang et al. [31] published a systematic review and meta-analysis in which they confirmed the positive correlation between e-health literacy and online health information-seeking behavior.

One of the noteworthy results of digital advancement in relation to patients' rights is the empowerment of patients. Patient empowerment includes the capacity to access health-related information about oneself, review decision-making options, be involved in collaborative decision-making with medical experts, and be active in managing one's health. Digital solutions, such as portals and mobile applications, can help reduce information asymmetry in conventional healthcare by offering access for people to their data. But for availability of technology to lead to empowerment, people must be equipped with analytical skills that can be applied to the information acquired and capable of using the digital system effectively and safely. Thus, the importance of the efforts aimed at improving digital health literacy is clear. Barbati et al. [32] found that education programs usually work in enhancing e-health/digital health literacy.

One of the most important variables in the digital health service uptake process is trust. In a systematic review carried out by Catapan et al. [33] titled "Consumer Trust in Digital Health: A Systematic Review" and published by Digital Medicine, which includes 49 different studies, it is shown that consumer trust in digital health systems is related to the utilization, uptake, alleged effectiveness, and perceived usefulness of these innovations. Some of the determining factors for trust in the mentioned digital health systems include privacy, risk perception, information accuracy, digital skills, service quality, human interaction, education, and income. Hence, it is clear that the protection of the rights of patients and provision of transparency about how patient data is used is not only an ethical and legal obligation, but also plays an important role in maintaining trust in the digital health system.

In the digital health environment, awareness of patient rights depends on numerous elements, and it is influenced by an interaction of individual properties as well as socioeconomic, technological, and health system factors. Age, level of education, wealth, health literacy, digital experience, frequency of internet usage, self-efficacy, and health condition play the most significant role in this regard. According to a systematic review and meta-analysis conducted by Hua et al. [34], online usage, education, income, perceived usefulness, and self-efficacy increase the level of digital health literacy, while other factors such as age and health condition are also of key importance. Specifically, factors such as self-efficacy (β = 0.239), education (β = 0.154), income (β = 0.206), and perceived usefulness (β = 0.832) were defined as major determinants when determining the level of e-health literacy [34].

The usability and availability of health tools, the standards of information quality, the transparency of privacy and security practices, and the methods of healthcare workers to provide patients with information can play a role in awareness development. At the same time, the rising volume of health information available on the internet leads to the challenge of separating valid and reliable information from the false and inaccurate one. Thus, it is essential to increase not just the access of individuals to digital means but also their proficiency in assessing trustworthy health information. Recent systematic reviews highlight the need for education initiatives targeted at the improvement of these skills [35].

Patient rights cognizance in e-health services can be interpreted as a multilayered construct existing at the intersection of digital health literacy, empowerment, trust, self-efficacy, data privacy awareness, and social status. With the rise in digital health literacy, people are likely to start assessing the information they acquire about their health at a higher level and utilize e-health services more efficiently; however, the direct implications of this connection for patient rights cognizance have to be investigated empirically. This aspect of the issue is of considerable interest from the standpoint of research methodology and builds the theoretical ground for studying the connection between digital health literacy → patient rights cognizance → empowerment/trust.

1.4. Literature Review and Research Gap

The prevalence of digital transformation in healthcare makes digital health literacy, patient involvement, patient empowerment, privacy of personal health data, and trust towards digital health technologies important fields of study. Digital health literacy is viewed as an essential skill in the process of searching for health information online, assessing the accuracy of this information, and using it in making health-related decisions. The latest systematic reviews indicate that digital health literacy has a role to play in accessing healthcare services and using digital health resources properly [29]. Nevertheless, there are some factors that affect the use of digital health services, such as age, education, income level, digital skills, and access to technology.

The influence of digital healthcare solutions on patient empowerment and engagement has also been widely discussed in the academic literature. Digital health technologies allow individuals to easily access their medical data, stay informed about their health condition, and be more engaged in medical decision-making processes. Nevertheless, having a digital health tool does not automatically mean that the

patient is empowered. Other aspects, such as the individual skills in health and digital literacy as well as personal attitude towards digital health solutions are essential in this context. Thus, the contemporary digital health systems are expected to ensure security of data as well as to educate patients on how their data will be used.

The review of research on the subject shows that literature is mostly concentrated on general health literacy, patient engagement, and health-seeking behavior. The results of the research done in Turkey by Erişen [36] with the sample size of 1,045 adults confirm that health literacy and patient engagement correlate significantly with health-seeking behavior. It has also been demonstrated that age and health status are important factors for the health-seeking behavior [36]. The abovementioned results suggest that being engaged in health services is dependent not only on access to medical services but also on the ability to assess health issues.

The existing national and international literature has an apparent research gap. Research mostly focuses on the analysis of specific elements such as digital health literacy, patient activation, patient rights, privacy, or user trust in the field of digital health. However, the number of studies aiming to address the awareness of patient rights with regard to digital health technologies and analyze it jointly with the rate of digital health literacy of the users in the area is low. This gap appears to be even bigger in Türkiye. There have almost been some studies examining the relations between health literacy, patient activation, and health service utilization in Türkiye [36], but the overall situation concerning how patients understand their rights in the field of digital health (i.e., regarding their privacy, data protection, informed consent, access to their personal data, and rights to participate in decision making processes) still requires research. Overall, research of awareness of patients' rights in digital health services and analysis of correlation between digital health literacy of patients, their empowerment, and their trust in digital health services may help to fill the gap in research. Research conducted in Türkiye on this issue may have an immense significance as it will be aimed not only at analyzing the current state of health care digitalization but also at providing an important contribution to the consideration of the issue from the perspective of patient autonomy, rights, privacy, and patient-centered approach.

1.5. The Aim and Influence of The Research

Bringing the digital health technologies into the contemporary healthcare systems has put forward significantly positive changes related to the patient care procedures and a whole lot of new ethical and legal issues emerging along the way, such as data security, privacy, informed consent, transparency of algorithms in use, and autonomy of patients. In the recent years, particularly due to the influence of artificial intelligence based health apps, electronic health records, and telemedicine, it has become especially crucial that people are being taught about the importance of knowing how their health data is being collected, processed, and shared. The latest reports published by the World Health Organization show that sustainability and acceptance of digital health systems do not depend solely on the technical infrastructure but also on people being able to understand their rights and use these rights efficiently [1]. Similar to that, the recent researches in the field of ethics of digital health that have been completed show the importance of the rights awareness among the patients as one of the most vital factors

leading to trust towards the healthcare system, satisfaction with the services provided, and patients' involvement [9, 17].

Under this situation, the primary objective of the current study is to investigate the awareness among patients with regards to their rights in the digital health services without neglecting the various dimensions of this subject. The study is supposed to assess the level of knowledge of the respondents on such concepts as data confidentiality, privacy rights, informed consent, access to the health records, control over the health data, participation in the process of making decisions, and rights about AI technology in healthcare sphere. In addition, the researched should analyze the influence of such factors as digital health literacy, trust in digital health technologies, and experience of using those technologies, as well as demographic background of the respondents on their knowledge of patient rights.

Back to the literature, the current study is significant for several reasons. First of all, most existing studies focus instead on others aspects of the digital health technologies such as their implementation and their effectiveness or on the digital health literacy [3]. Therefore, current research makes a unique contribution to the field as it will allow to address the issue, which is crucial for digital health development in future. Moreover, this research establishes an extensive conceptual framework for the assessment of the level of patient awareness regarding their rights in connection with digital health services by utilizing the parameters of privacy of the data, consent, ownership of the data, algorithmic transparency, and autonomy of the patient. Present research proves that lack of knowledge on the proper use of personal patient information and how algorithmic decision-making process works in AI-based healthcare systems is quite severe [3, 7]. In these conditions, the current paper enhances the development of theoretical knowledge by highlighting new aspects of the patients' rights within the framework of digital health.

Thirdly, the research is likely to provide essential findings in relation to health policies and practices. The results are envisaged to support health administrators, health policy-makers, and developers of digital health technologies in creating patient-centered systems. Specifically, the research is expected to provide substantial input for developing data protection policies, improving informed consent procedures, enhancing the level of digital health literacy, and ensuring proper ethical governance in the implementation of artificial intelligence [1, 5, 8].

Lastly, the study will also contribute to the future empirical research by providing a scientific basis for measuring the level of awareness among patients about their rights in digital health services. In the modern world, where digital health technologies play an increasingly significant role, knowing the level of patients' awareness regarding their rights is considered strategically necessary.

2. MATERIALS AND METHODS

2.1. Research Design

The current project applied descriptive, observational, and cross-sectional research design to examine the awareness levels of subjects making use of digital health services related to patient rights and the factors influencing this awareness level. No diagnostic, treatment, or intervention was implemented; the data were generated based on the information provided by the respondents through the survey. The ethics commission description stated that the study was conducted in the observational, descriptive, cross-sectional, and survey-based format. The main dependent variable of the project was identified as the level of awareness of patient rights in the digital health services market. The independent variables included gender, age, education level, income, frequency of using digital health services.

2.2. Research Population and Sample

The population of the research consists of those individuals aged 18 and above who are well-informed on digital health services or have used at least one digital health service previously thus being qualified to participate in the research. The number of participants for the study was estimated to be 300 as per ethics committee approval. Participation was voluntary, and only the respondents who provided voluntary consent after learning about the purpose of study participated.

2.3. Size of Sample and Power Analysis

The research sample size was determined based on the assessment of the independent variables that affect the awareness of patient rights with the use of the multiple linear regression model. Under the ethics committee protocol, the dependent variable of this research is the level of awareness of rights of patients in the digital health services while the independent variables are the age, gender, education background, income status, frequency of using digital health services access to digital health services and health literacy. A priori power analysis is done with 7 independent variables in the multiple linear regression model. In order to ensure detection of small yet significant effect in the analysis, Cohen's effect size was taken as $f^2=0.05$, Type I error probability as $\alpha=0.05$, and statistical power as $1-\beta=0.80$. Under these parameters, the minimum size of the sample was calculated at around 295. Considering the potential loss or invalid questionnaires and observations, the target sample size had to reach around 300.

2.4. Inclusion and Exclusion Criteria

The inclusion criteria for the study were:

(A) Being at least 18 years of age,

(B) Voluntary participation in the study,

(C) Informed consent,

(D) Understanding Turkish language,

(E) Experience in digital health services or at least have used one digital health service, and

(F) Adequate digital literacy in order to fill out the online questionnaire.

All those below 18 years of age, not voluntarily participating in the research process, do not give informed consent, those with language problems in reading and understanding Turkish, never using digital health services previously, having insufficient digital literacy to fill the online survey form were eliminated from the study and only those who could fill the questionnaire were included in the study.

2.5. Data Collection Process

The acquired information was gathered from individuals who had applied to the healthcare institution that is attached with Kütahya Health Sciences University and consented to voluntarily take part in the research by means of a face-to-face survey technique. Prior to commencing the survey, the individuals were apprised of the purpose and objectives of the research and informed consent is obtained. Those providing consent were qaiven a personal information form along with a questionnaire/scale measuring their awareness of patient rights. Data collection form incorporated questions regarding age, sex, educational attainment, marital status, income level, frequency of utilization of digital health services, and digital health literacy of patients, as well as propositions assessing components of patient rights which pertain to digital health, namely personal data protection and security, privacy, informed consent, access to healthcare services, safety of electronic health records, credibility of digital health systems.

2.6. Data Collection Instruments

The study was conducted using a Personal Information Form and a scale/questionnaire for the assessment of the awareness of patient rights. The Personal Information Form was created to identify the sociodemographic and digital health service usage characteristics of the participants. The questions included in the form cover age, gender, education level, income level, usage frequency of digital health applications, and accessibility of health services. The scale designed by Tanrıverdi [37] has been used for measuring the awareness of patient rights. The scale comprises 20 items in total, where the items are marked with a 5-point Likert-type rating scale. The response options range from 1 = “Strongly disagree” to 5 = “Strongly agree.” The form of the ethics committee application states that the Cronbach's alpha internal consistency coefficient of the scale equals 0.87. In the given study, the intention to calculate Cronbach's alpha coefficient for evaluation of the internal consistency of the scale was expressed.

2.7. Research Variables

The variable that is dependent on the study is the level of awareness of patient rights in digital healthcare services. In comparison, an independent variable for the study is the age, gender, level of education, income status, frequency of digital healthcare service use, level of digital health literacy, and availability of health services. The study aims at examining the relationship between the above variables and awareness of patient rights, as well as recognize the independent determinants for building patient awareness.

2.8. Statiscal Analysis

Statistical analysis involved the use of a statistical software program (SPSS 22), and before analysis was conducted, data were checked for any missing, wrongly entered, or out-of-line data. Categorical variables were expressed in terms of frequency (n) and percentages (%), while continuous variables were expressed as means ± standard deviation or median and interquartile ranges, in accordance with the type of distribution with respect to normality of distribution. Assessment of normality was carried out based on the obtained data through Shapiro-Wilk test, and if needed, Kolmogorov-Smirnov test was applied. For the analysis of two independent groups, independent samples t-test was first selected if normality of distribution is confirmed; otherwise, Mann-Whitney U test was applied. If there are three or more independent groups, one-way analysis of variance (ANOVA) is used if the parameters of parametric test are fulfilled, otherwise Kruskal-Wallis test was used. The Chi-square test was used in assessing the relationship between categorical variables. The data analysis process was determined beforehand in the committee protocol. The relationships between the awareness levels of the patient rights, patient age, education and the role of technology in promoting health were also assessed by using correlation analysis either Pearson or Spearman, depending on the distribution of the data. In order to find out the independent variables of awareness of patient rights, multiple linear regression analysis was used. Before building the regression model, linearity, normality, homogeneity of variances and independence alone as well as within groups were assessed. The outputs of model were presented with the regression coefficients, confidence intervals of 95% and p-values. The Cronbach's alpha analysis was used in order to check that the score of the second instrument is consistent with the results. In terms of statistical tests applied, $p<0.05$ was considered statistically significant. In relation to p-value thresholds that were set, it must be noted that the relevant statistical significance level of $p<0.05$ was justified beforehand in ethics committee protocol.

2.9. Ethical Considerations

Ethical approval for this non-interventional study was obtained from Republic of Türkiye Kütahya Health Sciences University Office of the Chairpersonship of the Non-Interventional Clinical Research Ethics Committee / Institutional Review Board (IRB) (Number: E-41997688-050.99-239054, Approval No: 2026/07-54 Date: 04.06.2026) before data collection. The study was conducted in accordance with the Declaration of Helsinki and applicable ethical principles for research involving human participants. All participants were 18 years of age or older, were informed about the purpose and procedures of the study, and provided voluntary informed consent before participation. Participation was entirely voluntary, and participants could withdraw at any time without providing a reason. Participant confidentiality and privacy were protected, and the data were used solely for scientific purposes.

3. FINDINGS

3.1.Socio-Demographic Characteristics of Participants

The socio-demographic characteristics of the participants are presented in Table 3.1.

Table 3.1. Socio-Demographic Characteristics of Participants

Attribute	**n**	**%(Percent)**
Age Group	**n**	**%(Percent)**
18-25 years old	62	20,7
26-35 years old	85	28,3
36-45 years old	73	24,3
46-55 years old	49	16,3
>=56 years old	31	10,3
Gender	**n**	**%(Percent)**
Female	146	48,7
Male	147	49,0
I don’t want to specify	7	2,3
Marital Status	**n**	**%(Percent)**
Married	175	58,3
Single	116	38,7
Other	9	3,0
Education Level	**n**	**%(Percent)**
Primary Scchool	16	5,3
High School	61	20,3
Associate Degree	72	24,0
Bachelor’s Degree	118	39,3
Postgraduate	33	11,0
Income Level	**n**	**%(Percent)**
Low	60	20,0
Medium	199	66,3
High	41	13,7
Presence of Chronic Disease	**n**	**%(Percent)**
Yes	57	19,0
No	243	81,0

A total of 300 individuals were considered in the research. In terms of age distribution, it was observed that the majority of participants belonged to the 26 to 35 age group with a total percentage of 28.3 where as the second majority group was 36-45 with a percentage of 24.3 and 18-25 age group which occupied 20.7%. The distribution based on gender was also equal with 48.7% of the participants being females and 49% being males. 58.3% of the participants were married. If we consider the educational status of the participants, 39.3% of the participants have a bachelor's degree, while 24.0% had an associate's degree and 20.3% had completed high school making the bachelor's degree holders to have the highest rate in the selected sample. 66.3% of the participants indicated their income level to be moderate. As for the states of chronic disease, it was found that 19.0% of the participants are reported to have at least one chronic disease while there is a total of 81.0% who have declared to be free from chronic disease.

3.2. Characteristics of Digital Healthcare Service Usage

Table 3.2. Characteristics of Digital Healthcare Service Usage

Attribute	**n**	**% (Percent)**
Use of digital health services	**n**	**% (Percent)**
Yes	300	100,0
No	0	0,0
Frequency of using digital health services	**n**	**% (Percent)**
Every day	24	8,0
A few times a week	61	20,3
A few times a month	140	46,7
Rarely	75	25,0
Most frequently used digital health application	**n**	**% (Percent)**
e-Nabız	133	44,3
MHRS	99	33,0
Telemedicine/online consultation applications	28	9,3
Hospital mobile applications	40	13,3
Other	0	0,0
Feeling sufficiently knowledgeable when using digital health applications	**n**	**% (Percent)**
Yes	108	36,0
Partially	15	5,0
No	177	59,0
Perception that personal health data is secure	**n**	**% (Percent)**
Yes	85	28,3
Partially	28	9,3
No	187	62,3
Level of knowledge about digital health services	**n**	**% (Percent)**
Insufficient	9	3,0
Moderately sufficient	107	35,7
Sufficient	140	46,7
Very sufficient	44	14,7

According to the findings of this study, every participant (100.0%) makes use of digital health services. In terms of usage frequency, the results showed that 46.7% of participants make use of digital health services several times a month, while 25.0% stated that they rarely use these services and 20.3% use them a couple of times a week. Only a small portion (8.0%) uses these services every day. e-Nabız was the most widely used application (44.3%), followed by MHRS (33.0%), hospital mobile applications (13.3%), online consultation/telemedicine applications (9.3%). In addition, 36.0% of participants said that they feel knowledgeable sufficient in using these applications, while 59.0% reported not feeling sufficiently knowledgeable when it comes to this topic. In terms of the security of personal health data in these digital health applications, 28.3% of respondents reported being positive, while 62.3% stated that they perceive their personal health data as insecure. On the other hand, considering the overall level of digital health knowledge in participants, the results indicated that 46.7% of respondents consider their knowledge as sufficient, 35.7% as moderately sufficient, and only 14.7% of them rated it as highly sufficient (see Table 3.2).

3.3. Patient Rights Awareness Level and Scale Reliability

Table 3.3. Descriptive Statistics and Reliability Analysis of the Patient Rights Awareness Scale

Scale / Variable	n	Number of items	Mean ± SD	Median (CAA)	Min–Max	Cronbach α
Patient Rights Awareness Scale total score	300	20	89,92 ± 7,64	92,00 (85,00–96,00)	52–100	0,910

Table 3.4. Descriptive statistics at the item level

Item	Mean ± SD	Adjusted item-total correlation	Cronbach α when item is removed
HHF-1	4,27 ± 0,77	0,602	0,904
HHF-2	4,81 ± 0,42	0,486	0,907
HHF-3	4,73 ± 0,49	0,554	0,905
HHF-4	4,61 ± 0,59	0,528	0,906
HHF-5	4,61 ± 0,58	0,627	0,903
HHF-6	4,73 ± 0,50	0,578	0,905
HHF-7	4,61 ± 0,59	0,521	0,906
HHF-8	4,47 ± 0,67	0,595	0,904
HHF-9	4,74 ± 0,50	0,490	0,907
HHF-10	4,46 ± 0,65	0,515	0,906
HHF-11	4,64 ± 0,59	0,555	0,905
HHF-12	4,68 ± 0,55	0,520	0,906
HHF-13	4,54 ± 0,63	0,579	0,904
HHF-14	3,69 ± 0,91	0,643	0,903
HHF-15	4,77 ± 0,48	0,479	0,907
HHF-16	4,72 ± 0,54	0,546	0,905
HHF-17	3,92 ± 0,84	0,593	0,905
HHF-18	3,61 ± 0,88	0,590	0,905
HHF-19	4,55 ± 0,62	0,599	0,904
HHF-20	4,76 ± 0,48	0,586	0,905

Note: Mean: Average; SD: Standard Deviation; CAA: Interquartile Range; Min–Max: Minimum–Maximum. Cronbach α represents the internal consistency coefficient of the scale.

The average total score of the respondents on the Patient Rights Awareness Scale was 89.92 ± 7.64 with a median score of 92.00 (minimum: 85.00, maximum: 96.00). Total scores varied between 52 and 100. The reliability of the scale's 20 items was evaluated using Cronbach's alpha, which was estimated at α=0.910 and indicates very high internal consistency of the scale in the current sample. The means of the items ranged from 3.61 to 4.81 with the highest mean recorded for item HHF-2 (4.81 ± 0.42) and the lowest mean recorded for HHF-18 (3.61 ± 0.88). The corrected item-total correlation values varied from 0.479 to 0.643 and suggested that all items had positive and satisfactory correlation with total scale scores. If an item was deleted from the scale, Cronbach's alpha values were in the range from 0.903 to

0.907 and did not exceed the value obtained for the total scale (α=0.910) which shows that removing an item did not contribute to an improvement in the scale's internal consistency (Table 3.3-Table 3.4).

3.4. Comparison of Patient Rights Awareness According to Socio-Demographic Variables

Patient rights awareness scores according to socio-demographic variables are presented in Table 3.5.

Table 3.5. Comparison of Patient Rights Awareness Scores According to Socio-Demographic Variables

Variable	n	Mean ± SD	Median (CAA)	Test Değeri	p
Age Group				**H=7,359**	**0,118**
18-25 years old	62	90,40±7,35	92,00 (87,00-96,00)		
26-35 years old	85	91,47±6,80	94,00 (88,00-97,00)		
36-45 years old	73	89,53±8,01	92,00(84,00-96,00)		
46-55 years old	49	88,39±8,14	90,00 (82,00-95,00)		
>=56 years old	31	88,03±8,24	89,00 (82,00-96,00)		
Gender				**H=1,905**	**0,386**
Female	146	90,22±7,75	92,00 (84,00-96,00)		
Male	147	89,52±7,55	91,00 (85,00-96,00)		
I don’t want to specify	7	92,14±7,82	93,00 (90,00-97,50)		
Marital Status				**H=0,501**	**0,778**
Married	116	90,17 ± 7,46	92,00 (84,75–96,00)		
Single	175	89,87 ± 7,65	92,00 (86,00–96,00)		
Other	9	87,56 ± 10,16	92,00 (82,00–95,00)		
Education Level				**H=20,190**	**<0,001**
Primary Scchool	16	84,06 ± 8,77	84,00 (75,75–92,50)		
High School	61	88,82 ± 6,90	90,00 (85,00–94,00)		
Associate Degree	72	89,36 ± 8,47	91,00 (84,00–96,00)		
Bachelor’s Degree	118	90,62 ± 7,24	92,00 (85,25–96,00)		
Postgraduate	33	93,52 ± 5,85	95,00 (92,00–98,00)		
Income Level				**H=0,443**	**0,801**
Low	60	89,77 ± 7,53	91,50 (84,75–95,25)		
Medium	199	89,75 ± 7,91	92,00 (85,00-96,00)		

High	41	90,98 ± 6,45	92,00 (87,00-96,00)		
Presence of Chronic Disease				**U=6939,0**	**0,982**
Yes	57	89,98 ± 7,32	91,00 (85,00-96,00)		
No	243	89,91 ± 7,73	92,00 (85,00-96,00)		

Note: Mean: Average; SS: Standard Deviation; CAA: Interquartile Range; H: Kruskal–Wallis H test; U: Mann–Whitney U test. Statistical significance level is considered to be $p<0.05$.

In the study examining the distribution of awareness scores regarding patient rights based on socio-demographic characteristics, no statistically significant difference was found among different age groups (H=7.359; p=0.118). At the same time, the highest awareness score was recorded in the 26-35 age group [median=94.00 (CAA: 88.00-97.00)], while the lowest score can be identified among 56 and above age group participants [median=89.00 (CAA: 82.00-96.00)]. Moreover, no statistically significant differences were identified in terms of gender (H=1.905; p=0.386) and marital status (H=0.501; p=0.778). Comparison based on educational attainment revealed that there is a statistically significant difference among patient rights awareness scores (H=20.190; 0.001). Thus, awareness scores increased with an increase in educational level- individuals with the lowest score were primary school graduates, while the highest score belonged to postgraduate graduates (93.52±5.85). It should be noted that this is an important socio-demographic variable referring to patient rights awareness (U=6939,0; p=0,982) (Tablo 3.5).

The post-hoc pairwise comparisons according to education level are presented in Table 3.6.

Table 3.6. Dunn Post-hoc Comparisons of Patient Rights Awareness Scores According to Education Level

Comparison of educational levels	Z	Raw p	Holm corrected p	Result
Primary school – High school	-1,711	0,087	0,261	Not statistically significant.
Primary school – Associate degree	-2,354	0,019	0,111	Not statistically significant.
Primary school – Bachelor's degree	**-2,972**	**0,003**	**0,024**	**Statistically significant**
Primary school – Postgraduate	**-3,939**	**<0,001**	**<0,001**	**Statistically significant**
High school – Associate degree	-0,977	0,329	0,658	Not statistically significant.
High school – Bachelor's degree	-1,974	0,048	0,194	Not statistically significant.
High school – Postgraduate	**-3,328**	**<0,001**	**0,008**	**Statistically significant**
Associate degree – Bachelor's degree	-0,945	0,345	0,658	Not statistically significant.
Associate degree – Postgraduate	-2,613	0,009	0,063	Not statistically significant.
Bachelor's degree – Postgraduate	-2,072	0,038	0,191	Not statistically significant.

Note: Dunn's post-hoc test was applied, and Holm's correction was used for multiple comparisons. A corrected $p<0.05$ was considered statistically significant.

It was discovered that there was a significant difference in the scores of patient rights awareness based on the level of education (Kruskal–Wallis $H=20.190$; $p<0.001$). Dunn post hoc analysis was conducted with Holm correction. The corrected analysis showed that undergraduate graduates had higher levels of patient rights awareness than primary school graduates ($p_{adj}=0.024$) and those with postgraduate education had higher levels of awareness than primary school graduates ($p_{adj}<0.001$) and high school graduates ($p_{adj}=0.008$). After the Holm correction, no differences were found in pairwise comparisons between other education levels (all $p_{adj}>0.05$). However, this is still an indicator of the upward trend in the growth of awareness scores in relation to education level, which can be clearly illustrated through the pairwise analyses between the lower education levels and undergraduate/postgraduate education levels in the research.

3.5. Comparison of Patient Rights Awareness Based on Digital Health Use Characteristics

Table 3.7. Comparison of Patient Rights Awareness Scores Based on Digital Health Usage Characteristics

Variable	n	Mean ± SD	Median (CAA)	H	p
Frequency of use of digital health services				**8,570**	**0,036**
Every day	24	91,00 ± 5,18	91,50 (87,75–95,00)		
A few times a week	61	92,16 ± 6,75	95,00 (89,00–97,00)		
A few times a month	140	88,99 ± 8,43	91,00 (83,75–96,00)		
Rarely	75	89,49 ± 7,13	91,00 (85,50–95,50)		
Most frequently used digital health applications				**0,838**	**0,840**
e-Nabız	133	89,98 ± 6,86	91,00 (86,00–96,00)		
MHRS	99	90,40 ± 7,49	93,00 (85,00–96,00)		
Telemedicine/online consultation	28	89,46 ± 8,79	93,00 (83,25–96,25)		
Hospital mobile applications	40	88,85 ± 9,60	92,00 (82,00-96,00)		
Feeling informed when using digital health applications				**44,133**	**<0,001**
Yes	108	93,03±6,92	95,00 (90,00-97,00)		
Partially	15	82,33±7,98	82,00 (76,50-86,50)		
No	177	88,67±7,25	90,00 (83,00-95,00)		
Perception that personal health data is secure				**5,330**	**0,070**
Yes	85	90,72±8,54	94,00 (85,00-97,00)		
Partially	28	88,32±6,82	90,00 (82,00-93,25)		
No	187	89,80±7,32	91,00 (86,00-96,00)		
Knowledge level regarding digital health services				**51,916**	**<0,001**

Insufficient	9	82,78±6,85	82,00 (78,00-84,00)
Moderately adequate	107	87,15±7,99	89,00 (80,50-94,00)
Adequate	140	90,79±7,04	92,00 (87,00-96,00)
Very adequate	44	95,36±4,15	96,00 (93,00-99,00)

Note: Mean: Average; SS: Standard Deviation; CAA: Interquartile Range; H: Kruskal–Wallis H test; MHRS: Central Physician Appointment System. Statistical significance level is accepted as $p<0.05$.

Table 3.7 displays a comparison of patient rights awareness scores based on characteristics related to the usage of digital health services. It was concluded that the awareness scores significantly vary depending on the level of usage of these services ($H=8.570$; $p=0.036$). The maximum level was achieved by the patients who used digital health services several times weekly [median=95.00 (CMA: 89.00–97.00)]. In contrast, the median level in patients who apply these services several times monthly is estimated at 91.00 (CMA: 83.75–96.00). No significant distinction of patient rights awareness was revealed in relation to the most effectively used application within the framework of that digital health services ($H=0.838$; $p=0.840$). However, it was discovered that the level of awareness varies depending on whether or not the patient feels competent while using such applications ($H=44.133$; $p<0.001$). The level of awareness in the patients who feel competent is estimated as [median=95.00 (CAA: 90.00–97.00)] which is higher than in the patients who consider themselves partially competent [median=82.00 (CAA: 76.50–86.50)] and in the patients who feel non-competent [median=90.00 (CAA: 83.00–95.00)].

There were no significant discrepancies among groups when it came to their perspectives regarding the security of their personal health information ($H=5.330$; $p=0.070$).

The level of awareness of patients' rights showed remarkable distinctions among the participant groups based on how much they considered themselves knowledgeable about the aspects of digital health ($H=51.916$; $p<0.001$). People who perceived their knowledge to be at its maximum level achieved the highest awareness ratings with their median score being 96.00 (SCI: 93.00–99.00), while individuals stating that their knowledge wasn't sufficient obtained the lowest score, with the median number being 82.00 (SCI: 78.00–84.00).

The Dunn post-hoc pairwise comparison results for digital health usage characteristics are presented in Table 3.8.

Table 3.8. Dunn Post-hoc Pairwise Comparison Results Based on Digital Health Usage Characteristics

Variable/Binary comparison	Z	Raw p	Holm corrected p	Result
Frequency of use of digital health services				
Every day – A few times a week	-1,229	0,219	0,877	Not statistically significant.
Every day – A few times a month	0,576	0,565	1,000	Not statistically significant.
Every day – Rarely	0,552	0,581	1,000	Not statistically significant.
A few times a week – A few times a month	**2,759**	**0,006**	**0,035**	**Statistically significant**
A few times a week – Rarely	2,468	0,014	0,068	Not statistically significant.
A few times a month – Rarely	0,015	0,988	1,000	Not statistically significant.
Feeling informed when using digital health applications				
Yes – Partially	**5,051**	**<0,001**	**<0,001**	**Statistically significant**
Yes – No	**5,539**	**<0,001**	**<0,001**	**Statistically significant**
Partially – No	**-2,660**	**0,008**	**0,008**	**Statistically significant**
Knowledge level regarding digital health services				
Insufficient – Moderately sufficient	-1,637	0,102	0,102	Not statistically significant.
Insufficient – Sufficient	**-3,018**	**0,003**	**0,005**	**Statistically significant**
Insufficient – Very sufficient	**-4,743**	**<0,001**	**<0,001**	**Statistically significant**
Moderately sufficient – Sufficient	**-3,658**	**<0,001**	**<0,001**	**Statistically significant**
Moderately sufficient – Very sufficient	**-6,517**	**<0,001**	**<0,001**	**Statistically significant**
Sufficient – Very sufficient	**-4,035**	**<0,001**	**<0,001**	**Statistically significant**

Note: Dunn's post-hoc test was applied, and Holm's correction was used for multiple pairwise comparisons. A corrected p<0.05 was considered statistically significant. Values shown as p<0.001 in the table were rounded.

For the variables with significant differences in the Kruskal-Wallis analysis, the Dunn post-hoc test was utilized to identify the groups that account for the differences received from the analysis, and multiple comparisons were adjusted in accordance with the Holm correction method. In terms of frequency of usage of digital health services, the participants who reported doing that several times a week scored significantly higher in terms of the awareness level of the patient rights in comparison to those who reported using the services several times a month (p_adj=0.035). The differences among all other frequency usage groups did not remain statistically significant after Holm correction (p_adj>0.05). All the pair comparisons received positive results when it came to how competent the participants felt while using the digital health applications. In terms of the participants who felt competent, their awareness scores were significantly higher in comparison with those participants who felt partially competent (p_adj<0.001) and those who considered themselves incompetent (p_adj<0.001). At the same time, the participants who felt incompetent demonstrated higher scores compared to the group of partially competent persons (p_adj=0.008). Moving to the level of knowledge in the area of digital health service, the level of awareness increased correspondingly with the level of knowledge. More specifically, people who had a „very sufficient" level of knowledge during their research were found to have significantly higher awareness scores compared to the group consisting of people with insufficient knowledge, moderate knowledge, and sufficient knowledge (p_adj<0.001). In addition, the respondents of the very sufficient group scored significantly higher than those of the insufficient (p_adj=0.005) and those with moderate knowledge (p_adj<0.001). The only difference between the insufficient and moderate groups was found to be non-significant.

3.6. Correlation Analysis of Variables Related to Patient Rights Awareness

Table 3.9. Correlations Between Patient Rights Awareness Score and Socio-Demographic and Digital Health-Related Variables

Variable	Spearman ρ	p	Direction and level of relationship
Age	−0,116	0,044	Weak negative
Education Level	0,239	<0,001	Weak positive
Frequency of use of digital health services[1]	−0,120	0,038	Weak negative
Feeling informed when using digital health applications[2]	−0,296	<0,001	Weak-moderate negative *
Perception of the security of personal health data [2]	−0,074	0,199	No meaningful relationship.
Digital health knowledge level	0,405	<0,001	Moderately positive

[1] In the frequency of use coding, lower values represent more frequent use; therefore, the negative coefficient indicates that more frequent digital health use is associated with a higher awareness score.

[2] The coding for these variables is Yes=1, Partially=2, No=3. Therefore, the negative correlation coefficient indicates that more positive self-evaluation is associated with higher awareness.

Note: Spearman rank correlation analysis was used. The statistical significance level is $p<0.05$. N=300.

Spearman's correlation analysis was used to investigate the relationship between patients' rights awareness scores and socio-demographic and digital health utilization variables (see Table 3.9). It was found that there was a significant weak negative correlation between patients' rights awareness scores and age ($\rho=-0.116$; $p=0.044$), meaning that as age increased, the awareness scores decreased slightly. A positive significant correlation between education level and patients' rights awareness scores was detected ($\rho=0.239$; $p<0.001$), indicating that patients' rights awareness scores increased as the education level increased. Similarly, a weakly significant relationship was found between the frequency of digital health service utilization and patients' rights awareness scores ($\rho=-0.120$; $p=0.038$); due to the interpretation of lower frequency codes indicating more frequent use, these results mean that a more frequent utilization of digital health services correlates with higher patients' rights awareness.

A notable association was identified between the factor of feeling informed while employing digital health apps as well as the score of patient rights knowledge ($\rho=-0.296$; $p<0.001$). When it comes to the coding characteristic of the factor, respondents who believed they know more about digital health apps have higher scores for the level of knowledge. On the other hand, no significant association was found between the understanding of the safety of one's own medical data as well as the level of patient rights knowledge ($\rho=-0.074$; $p=0.199$). The strongest connection between factors was the one between the level of knowledge of digital health and the level of patient rights knowledge, which is positive, medium and statistically significant ($\rho=0.405$; $p< 0.001$), indicating that the increase in digital health knowledge is followed by an increase in patient rights knowledge score.

3.7. Independent Determinants of Patient Rights Awareness

The multiple linear regression results for the independent determinants of patient rights awareness are presented in Table 3.10.

Table 3.10. Multiple Linear Regression Analysis of Independent Determinants of Patient Rights Awareness Level

Variable	B	SH	β	%95 CI	p	VIF
Age	−0,167	0,344	−0,028	−0,844–0,510	0,628	1,48
Gender	−0,616	0,800	−0,040	−2,190–0,958	0,442	1,04
Education level	0,768	0,410	0,113	−0,039–1,575	0,062	1,42
Income level	0,735	0,665	0,060	−0,574–2,044	0,270	1,07
Frequency of digital health use	−0,151	0,452	−0,019	−1,041–0,739	0,739	1,10
Level of digital health knowledge	3,596	0,598	0,354	2,416–4,775	<0,001	1,45
Presence of chronic disease	−0,709	1,101	−0,037	−2,876–1,458	0,520	1,09

B: unstandardized regression coefficient; SH: standard error; β: standardized regression coefficient; CI: confidence interval; VIF: variance inflation factor. Dependent variable: Total score of the Patient Rights Awareness Scale. Statistical significance level was accepted as $p<0.05$.

Model statistics: $R^2=0.170$; Adjusted $R^2=0,147$; $F=9,31$; $p<0,001$;

Durbin–Watson=1.85; maximum VIF=1.48.

In order to assess the individual factors of the awareness of patients' rights, a multiple linear regression analysis was conducted. The developed model was found to be statistically significant in total ($F=9.31$; $p<0.001$), with the independent variables accounting for approximately 17.0% of the total variance in patient rights awareness ratings ($R^2=0.170$; adjusted $R^2=0.147$).

After accounting for other variables, it was determined that the digital health knowledge level was the one and only statistically significant predictor of awareness regarding patient rights ($B=3.596$; $\beta=0.354$; 95% CI: 2.416–4.775; $p<0.001$). Therefore, every increase of one category in digital health knowledge corresponds with an increase of approximately 3.60 points in the general score for the awareness of patient rights, keeping other variables constant.

While a positive correlation was found for education and patient rights awareness, the correlation was not statistically significant in the multivariate model ($B=0.768$; $\beta=0.113$; $p=0.062$). Similarly, age ($p=0.628$), gender ($p=0.442$), income ($p=0.270$), frequency of use of digital health services ($p=0.739$), and existence of chronic disease ($p=0.520$) have failed to be statistically significant predictors of patient rights awareness scores.

The evaluation of the model assumptions has shown that with a maximum VIF of 1.48, there is no issue of serious multicollinearity problem among independent variables. The Durbin-Watson statistic was found to be 1.85 too, thereby confirming the absence of serious autocorrelation in the residuals of the model. Furthermore, no issues of heteroskedasticity were identified in the model which was verified by means of using robust standard errors for regression results. This finding complements the results of

correlation analysis where the level of digital health knowledge was found to be the most correlated with the level of patient rights awareness (ρ=0.405; p<0.001).

4. DISCUSSION

The objective of this research is to investigate the level of awareness of people utilizing the digital health services in relation with their patient rights, as well as the socio-demographic and digital health characteristics connected with this awareness. The most important conclusion drawn from this research is that the level of digital health knowledge is directly related and remains important for analysis in case of multivariate data study. In addition, while the level of education and digital health characteristics in general were connected with awareness in univariate analysis, explicit differences were not registered in regard to age, gender, marital status, income, and chronic disease identification. This means that in the digitally improved health care systems the awareness of people concerning their rights should be studied beyond using the classical approach regarding social and demographic characteristics.

4.1. Patient Rights Awareness Level and Scale Reliability

According to this research, the average total patient rights awareness achievement was 89.92 ± 7.64, with a median score of 92.00, meaning that the data are close to the upper-scale limit. Additionally, the Cronbach alpha coefficient equaling 0.910 shows good internal consistency of the current sample. Additionally, the information that the item-total correlation ranged from 0.479 to 0.643, and eliminating any item did not raise the alpha coefficient, supports the consistency of the items of the scale. The fact that the average awareness score is close to the top limit should be considered together with the fact that the study involved respondents who had experience of using the following digital health tools, including e-Nabız and MHRS. In the current research findings discuss the importance of e-Nabız and MHRS as the most common utilized digital health channels that demonstrate participants' involvement with the relevant processes of the health system. It is worth noting that interaction with digital health systems involves not only the process of utilization but also participation regarding the practice of getting access to one's health records, managing the process of receiving healthcare services, and obtaining medical information [38].

4.2. Socio-Demographic Characteristics and Patient Rights Awareness

One of the prominent discoveries of the research is the link between education and knowledge of patient rights. It was established that there is a real difference for different levels of education (H = 20.190; p < 0.001) as it was learned that people with a bachelor's degree have the highest scores of knowledge than those who had only primary education and postgraduate education level has higher knowledge scores than those who have elementary and higher secondary education. The other breakthrough is identified during the correlation analysis as this study has revealed a positive correlation between the education level and patient rights knowledge (ρ = 0.239; p < 0.001). The described result is somehow supported by

health literacy and digital literacy literature. According to the recent review that studied socio-demographic factors affecting digital literacy it was noted that in the majority of studies reviewed the level of education was related positively to the level of health literacy [39]. In such cases, the education plays pivotal role in finding and interpreting information used in the medical field. However, at the same time it should be noted that in the multiple regression analysis the significance of the education degree disappeared (B = 0.768; β = 0.113; p = 0.062). It indicates that the link between education and patient rights knowledge could be explained to some extent by cognitive factors. Thus, the concept of knowledge of digital health may be a more contributing factor compared to the education level. Nevertheless, no image of causality could be drawn from the results of this study. Despite a weak negative correlation between age and knowledge obtained in the analysis of correlation (ρ=−0.116; p = 0.044), there was no statistical significance noticed in age comparison and age was not studied as an independent predictor in the regression analysis. The result indicates that age is not only an important variable. Although the literature on digital health literacy suggests that older individuals may possess lower digital health literacy, research has not delivered uniform findings. For example, a rapid review of 36 studies found that younger age is usually associated with digital health literacy, but other studies showed no correlation whatsoever [39]. A new comprehensive review focused specifically on older adults and showed that digital health literacy depends not only on age but on the interplay of multiple other constituents, including education, experience with digital devices, social support, and conditions of technology use [38]. The fact that gender, income level, and having chronic diseases were not independent determining factors indicates that the knowledge of patients' rights can be due to the fact that the information does not only come from demographic or illness-related experience of those people. Indeed, during the regression analysis age, gender, income, and presence of chronic diseases lost their significance as independent variables. Thus, diversity of findings across different studies regarding sociodemographic aspects of health literacy supports this interpretation [39].

4.3. Digital Health Use and Patient Rights Awareness

The awareness levels of the rights of patients vary significantly, depending on the frequency of utilization of the elements of digital health (H = 8.570; p = 0.036). The analysis performed afterwards showed that respondents who used digital health elements a few times a week had a considerably higher level of awareness than those using them a few times a month (Holm-corrected p = 0.035). Nevertheless, other pairwise comparisons were found to be non-significant. As a result, the present finding cannot be regarded as if "the higher the frequency of use, the higher the level of awareness." Correlation analysis also confirmed a weak connection between the frequency of use and awareness (ρ=−0.120; p = 0.038; in this case, the higher the frequency of use, the higher the level of awareness). At the same time, the loss of significance of the frequency of use in the multivariate model (p = 0.739) suggests that the frequency of use by itself is not as good predictor as the level of knowledge in the sphere of digital health. The finding discussed in this paper is extremely important when it comes to Türkiye. In a recent study conducted among e-Nabız users from 21 cities, it was established that digital health literacy produces a great impact on the performance expectations, effort expectations, and facilitating conditions, becoming a crucial factor for the continued usage of electronic health records [40]. Based on this finding, it may be

stated that apart from access and utilization of digital health systems, it is necessary to establish qualified, conscious, and rights-based digital participation.

4.4. Digital Health Knowledge Level

The most important finding of the research is the existence of a stable relationship between digital health knowledge level and patient rights awareness. As the level of digital health knowledge increases, so does the level of awareness, with the median score being 96.00 in the “very adequate” category of respondents and 82.00 in the “inadequate” category ($H = 51.916$; $p < 0.001$). From the correlation analysis, it has been found that there is a significant relationship between both variables ($\rho = 0.405$; $p < 0.001$). Moreover, according to the multiple regression analysis, it was proved that digital health knowledge level is the only variable that has a significant impact on patient rights awareness ($B = 3.596$; $\beta = 0.354$; 95% CI: 2.416–4.775; $p < 0.001$). The model explained 17.0% of variance in patient rights awareness levels. This conclusion is the main result of the study. The theoretical justification of the established relationship is presented in the literature. Digital health literacy is the ability not only to use technology but has the multi-dimensional competence, which involves searching for, evaluating, and using digital health information appropriately. Modern research proves that higher digital health literacy is related to higher levels of acceptance and usage of modern technologies in healthcare [39]. In a more direct manner, in 2025, it was proved that there is a connection between digital health literacy and the ethical aspects of the digital health environment, such as trust and privacy [41]. Thus, one possible explanation of the established correlation can be the fact that people who have good digital health knowledge are able to assess the way health data is used and understand what kind of information is to be shared with them when they can take part in some decisions in the healthcare system and which rights are ensured in the digital environment. However, it should be stated that this research is of a cross-sectional nature and, thus, it may be stated that high digital health knowledge is connected with a higher level of awarness.

4.5. Data Security and Privacy Perception

While 62.3% of the respondents believed that the personal health information in digital health applications was insecure, the association between data security perception and awareness about patient rights was not established ($\rho = -0.074$; $p = 0.199$). The findings appear surprising at first. A plausible explanation could be that people’s perceptions of safety and privacy are quite more complex than their awareness of rights in general. Current evidence suggests that the most important things to consider when sharing health-related data are trust, transparency, privacy, and security issues. A study that included eleven systematic reviews found that trust, privacy, and transparency were stimulating the sharing of health information as opposed to privacy and security that were the main barriers [42]. Another review on trust in e-health care indicated that understanding, autonomy, and protection of data were essential components of public trust [43]. Moreover, the current empirical studies imply that higher literacy in technology does not mean lower privacy concern; rather, it indicates the better ability of respondents to realize specific risks of sharing data [44]. Thus, lack of established relationship between security and general awareness about patient rights should not be referred to low privacy awareness.

Rather it may indicate that the data security perception may be determined by other more specific motives, such as institutional trust, prior digital experience, data leakage perception, the transparency of the process of information sharing with various parties, etc. The similar study on the disclosure of personal health data in Türkiye found that the among the factors influencing privacy behavior of individuals there are perceived risks of sharing information as well as anticipated benefits [45].

4.6. Implications from a Clinical and Health Policy Perspective

The outcome of the research reveals that education on patient rights cannot be seen separately from the education on digital health literacy. Since the number of digital healthcare services has increased a lot, many traditional patient rights - for instance, being informed and making decisions, privacy, securing personal health data, getting access to medical records, and consent - are partially realized in the digital environment today. Patient rights protection policies should be based on more than the legal definition of these rights; patients should gain the necessary competence around the matters of understanding and exercising their patient rights through digital systems. This creates the need for defining populations with low digital health literacy level and forming adequate training programs for them. The assumption that education might have a positive impact on digital health literacy is confirmed by a number of studies in the field. A recent systematic review with a meta-analysis is a clear example of this tendency. It included 21 studies with a total of 4195 participants and showed that digital health literacy has improved as a result of educational interventions both in terms of short- and long-term effectiveness, especially emphasizing the value of face-to-face and interactive learning [46]. As a result, there is a need for e-Nabız, MHRS, hospital mobile applications, and online healthcare services be not only focused on how to use the applications electronically but also… Providing answers and information on the questions like “What rights do I have in the digital environment?” “Who has access to my data?” “How do I provide my consent?” “What do I have to do in case my data has been used improperly?” is also a must and can serve this purpose.

4.7. Strengths and Limitations

A strength of the study is that it measures the awareness of patient rights not only from socio-demographic characteristics but also from the aspects of using digital health and knowledge of digital health. Another point is that the reliability of the measure is high ($\alpha = 0.910$) and there is evidence of post-hoc corrections for group comparisons and that relationships were studied using a multiple regression model. At the same time, there are several limitations of the study. The first limitation is that the cross-sectional design does not allow for making statements about causality of the relationship between the level of digital health knowledge and awareness of patient rights. The second limitation is that self-reports of the level of digital health knowledge and some characteristics of using it may lead to the bias of measurement. The third limitation is that since the sample consisted of people who had used digital health, the results may not be generalized to the population not using digital health. The fourth limitation is that the portion of the variance explained by the regression is 17%, which means that a big part of awareness about the rights of patients is not accounted for the variables in the model.

5. CONCLUSION

The research shows that as per the findings of the research study the patients rights awareness in the digital healthcare landscape is associated with the level of digital health literacy of the individual. The analysis indicates that having access to or using digital healthcare services is not enough; it is additionally essential for the individual to understand the digital health system, assess the information related to his or her own health situation, and learn about his or her patient rights in the digital environment. When developing digital health tools, particular attention should be paid to making the rights-related aspects visible in addition to the technical comprehensibility of the product. In particular, the creation of training materials for individuals with a low level of digital health literacy is expected to make a positive contribution to the increase in the awareness of patients regarding their rights. To sustain digital transformation in patient-centered and rights-based ways digital health literacy and awareness of patients' rights need to be tackled together. The findings of future research projects based on multicenter and longitudinal studies as well as intervention studies in the field of education can bring better understanding of the nature of this relationship.

Declarations

Human Ethics and Consent to Participate Declarations

All participants were aged 18 years or older and provided voluntary informed consent before participation in the study. Participants were informed about the purpose and procedures of the research, participation was entirely voluntary, and they could withdraw at any time without providing a reason.

Consent to Participate

Ethical approval for this study was obtained from Republic of Türkiye Kütahya Health Sciences University Office of the Chairpersonship of the Non-Interventional Clinical Research Ethics Committee / Institutional Review Board (IRB), Approval No: 2026/07–54 Number: E-41997688-050.99-239054, Date: 04.06.2026. The study was conducted in accordance with the Declaration of Helsinki and applicable ethical principles for research involving human participants.

Funding

This study involved human participants. Ethical approval was obtained from the committee/IRB specified above, and informed consent to participate was obtained from all participants before data collection.

Author Contribution

N.D. is the sole author of this manuscript and was responsible for all aspects of the study, including conceptualization, methodology, data collection, analysis, and mauscript preparation. The author read and approved the final manuscript.

Data Availability

The datasets used and/or analysed during the current study are available from the corresponding author.

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