



ORIGINAL ARTICLE

Attitude towards telemedicine and e-health literacy among health sciences faculty students

Hilal DEMİRHAN KELEŞ¹  and Gülay YILMAZEL¹ 

¹Faculty of Health Science, Hitit University, Çorum, Turkey

*** Correspondence Author:**

 hilaldemirhan@hitit.edu.tr

Date of first submission, May 8, 2026

Date of final revised submission, August 3, 2026

Date of acceptance, August 10, 2026

Cite this article as: DEMİRHAN KELES H, YILMAZEL G. The Attitude towards telemedicine and e-health literacy among health sciences faculty students. Univ Med 2026;45:259-269

ABSTRACT

BACKGROUND

Telemedicine is no longer a futuristic concept and is increasingly integrated into health care. The aim of this study was to determine the attitudes toward telemedicine in connection with e-Health literacy among students in a Faculty of Health Sciences.

METHODS

This cross-sectional study was conducted involving 250 students aged 18 years and older. Data were collected using a sociodemographic information form, the Attitude Scale Toward the Use of Telehealth Services (ASTUTS), and the eHealth Literacy Scale (eHEALS). Mann-Whitney U test, the Kruskal–Wallis test, and the linear regression analysis were used. Statistical significance was set at $p < 0.05$.

RESULTS

Of the participants, 61.6% were aged 18–21 years, and 70.8% were female. Attitudes toward telehealth services were significantly higher among students aged 22 years and older ($p < 0.05$). eHealth literacy scores were significantly higher among female students than among males ($p < 0.05$) and differed significantly across academic departments ($p < 0.05$). Regression analysis showed that attitudes toward telemedicine services were positively associated with eHealth literacy ($\beta = 0.195$, $p = 0.002$), indicating that higher telemedicine attitude scores were related to higher levels of eHealth literacy. All variables (attitudes to telemedicine, age, gender, place of residence, economic status, general health status, smoking status, alcohol use, chronic disease status, hospital appointment system used) explaining 9.1% of the variance in eHealth literacy ($R^2 = 0.091$).

CONCLUSION

Students had moderate attitudes toward telemedicine and moderate eHealth literacy. Implementing a targeted, practical, and integrated curriculum to increase the use of telemedicine and digital health literacy in undergraduate health sciences programs could be beneficial.

Keywords: Telemedicine; e-Health literacy; health sciences; students

INTRODUCTION

Telehealth services (telemedicine) deliver healthcare via telecommunication technologies to support medical assessment, diagnosis, and treatment when distance is a barrier.⁽¹⁾ Telemedicine provides care, counseling, and education through digital communication, thereby transforming access to healthcare. Yet, technological infrastructure alone is not enough; users' perceptions, trust, and attitudes toward telemedicine also shape its success. Therefore, the adoption and sustainability of telemedicine depend on users' understanding and acceptance.⁽²⁾ Young populations, especially health sciences students, are central to this transformation. They are both active telemedicine users and future healthcare professionals. Studies of health professional faculties show that students' familiarity has increased. However, knowledge and practical experience often remain limited.⁽²⁾ In Turkey, telemedicine awareness is reported as being relatively low, highlighting the need for better integration into undergraduate education.^(3,4) International literature generally finds that health sciences students have positive attitudes toward telemedicine, but concerns about privacy, service quality, and insufficient training may hinder adoption.^(5,6) eHealth literacy is critical for effective telemedicine use. It covers individuals' abilities to seek, evaluate, and use electronic health information to solve health problems.⁽⁷⁾ This competency supports informed decisions by helping individuals identify accurate information and reduce anxiety. Inadequate eHealth literacy can lead to repeated searches and persistent uncertainty.

eHealth literacy levels among university students and young adults vary widely. Studies with similar samples report that eHealth literacy is generally moderate.⁽⁸⁾ Research with children and adolescents shows that many have low digital health literacy.⁽⁹⁾ These findings highlight the need to assess attitudes toward telemedicine within the broader context of eHealth literacy.

Researchers often study attitudes and adoption of telemedicine in the context of technology acceptance.⁽¹⁰⁾ eHealth literacy is often associated with how individuals access and evaluate online health information.⁽¹¹⁾ However, few studies examine both variables together within the same group, especially among future health professionals.⁽¹²⁾ This gap limits the evidence base for advising on which digital health

competencies to support at the undergraduate level.

A cross-sectional study found that the majority of paramedical science students still lack the experience of being exposed to telemedicine technology, despite the increasing development of telemedicine.⁽¹³⁾ The attitude and awareness of physicians and students of medical and paramedical sciences as present and future key agents of digital health are essential elements for its success and acceptance. On the other hand, half of the students (51.9%) stated that they were not sure if they would use telemedicine in their profession in the future. However, in most of the previous studies, students had a positive attitude towards telemedicine.^(5,14,15)

While previous studies have primarily emphasized students' positive attitudes and acceptance levels towards telehealth, this study demonstrates that awareness alone does not guarantee a willingness to use telehealth. Providing only theoretical knowledge in health science education programs may be insufficient; practical training and experiential opportunities should also be provided to increase students' confidence in and intention to use telehealth applications—in other words, attitudes should be supported by e-health literacy skills. The novelty of our study is that it reveals the gap between telehealth attitudes and e-health literacy for future intention to use it. This study aims to examine the relation between attitude of telemedicine services and e-health literacy among health sciences faculty students.

METHODS

Study design

This cross-sectional study was conducted at the Faculty of Health Sciences of Hitit University between December 2025 and January 2026.

Research subjects

The minimum required sample size was calculated using the known population formula with a 95% confidence interval, a 5% margin of error and the approximately 50% prevalence of positive attitudes⁽¹³⁾ Based on calculations performed using the OpenEpi program (OpenEpi, 2013),⁽¹⁶⁾ the minimum sample size was determined to be 242 students. The study was completed with 250 students aged 18 years and older who met the inclusion criteria.

The study sample included students enrolled in the Faculty of Health Sciences who met the inclusion criteria. Eligibility criteria were as follows: (i) being 18 years of age or older; (ii) being actively enrolled in the Faculty of Health Sciences. Students who had insufficient Turkish language proficiency to comprehend and complete the questionnaires (international students) and those with visual, hearing, or speech impairments that could hinder effective communication and participation in the study were excluded.

Data collection

Data collection was carried out using a group-administered questionnaire in classroom settings. Completion of the questionnaire took approximately 15–20 minutes. The questionnaire package consisted of three components: (i) a sociodemographic information form developed by the researchers; (ii) The Attitude Scale Toward the Use of Telemedicine Services, and (iii) The eHealth Literacy Scale.

The sociodemographic form collected information on participants' age, sex, academic year, family structure, and place of residence. It also asked about perceived economic status, general health, smoking, and alcohol use. Additional questions covered regular physical activity, chronic illness, preferred healthcare service in case of a health problem, and healthcare use in the past six months. The form included questions about owning a smartphone with internet access, frequency of internet use, knowledge of hospital appointment systems, and frequency of using the internet for health information.

Measurements

Attitude Scale Toward the Use of Telemedicine Services (ASTUTS)

The Attitude Scale Toward the Use of Telehealth Services was developed by Yücel and Uyar.⁽¹⁷⁾ The scale is unidimensional and consists of 18 items rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The scale is designed to assess attitudes toward telehealth services among adults aged 18 and older. Total scores range from 18 to 90. Item 8 is negatively worded and is reverse-coded (1↔5, 2↔4; 3 remains unchanged) before calculating the total score. Higher scores indicate more positive attitudes toward telehealth services, whereas lower scores reflect more negative attitudes.⁽¹⁷⁾

eHealth Literacy Scale

The eHealth Literacy Scale (eHEALS) was originally developed by Norman and Skinner⁽¹⁸⁾, and its Turkish validity and reliability were examined by Bebiş and Coşkun⁽¹⁹⁾. The scale consists of 8 items measuring attitudes toward internet use for health-related purposes and 2 additional items related to internet use, rated on a 5-point Likert scale. The total score ranges from 8 to 40, with higher scores indicating greater eHealth literacy. The scale has been widely used to assess individuals' perceived ability to locate, evaluate, and apply online health information.

Study outcomes

Primary outcome: The primary outcome was eHealth literacy, assessed using the eHealth Literacy Scale (eHEALS). The total eHEALS score was used as a continuous variable, with higher scores indicating higher levels of eHealth literacy.

Secondary outcomes: Secondary outcomes included attitudes toward telemedicine services measured by the Attitude Scale Toward the Use of Telemedicine Services (ASTUTS), the association between telemedicine attitudes and eHealth literacy, and differences in both outcomes according to participants' sociodemographic and health-related characteristics. Participants' economic status and general health were assessed as "good, average, or bad" according to their own perceptions. Their smoking and alcohol use status was answered with "never, quit, or current" based on their own statements. The question "Which system do you use when making a hospital appointment?" was to be answered with either *Merkezi Hekim Randevu Sistemi* ("MHRS") or "Other".

Statistical analysis

Data were analyzed using SPSS software (version 22.0). Descriptive statistics were presented as mean $\pm$ standard deviation (SD) for continuous variables and as frequencies and percentages for categorical variables. The normality of data distribution was assessed using the Kolmogorov–Smirnov and Shapiro–Wilk tests, which indicated that the data were not normally distributed. Accordingly, non-parametric statistical methods were used. Median values, frequencies, and percentages were reported for descriptive analyses. The Mann–Whitney U test and Kruskal–Wallis test were used to compare scale scores across categorical

variables. Multivariable linear regression analysis was performed to determine the effect of attitudes toward telehealth services and socio-demographic variables on eHealth literacy. Statistical significance was set at $p < 0.05$.

Ethical considerations

Ethical approval for the study was obtained from the Hitit University Non-Interventional Research Ethics Committee (approval date: December 24, 2025; approval number: 2025-0629). Written and verbal informed consent was obtained from all participants prior to data collection.

RESULTS

Of the participants, 61.6% were aged 18–21 years, while 38.4% were aged 22 years and older. Female students accounted for 70.8% of the sample. Regarding academic departments, 51.6% of the participants were enrolled in Nursing, 20.0% in Child Development, 11.6% in Nutrition and Dietetics, 9.2% in Health Management, and 7.6% in Social Work. Analysis of scale scores revealed that the median total score on the Attitude Scale Toward the Use of Telehealth Services was 58.00 (min–max: 18.00–84.00), whereas the median total score on the eHealth Literacy Scale was 35.00 (min–max: 13.00–50.00). Participants' sociodemographic characteristics are presented in Table 1.

Table 2 presents the distribution of median scale scores according to participants' sociodemographic characteristics. When comparing age groups, the median ASTUTS score was 57.50 among students aged 18–21 years and 60.00 among those aged 22 years and older. The difference between age groups was statistically significant ($p < 0.05$). In contrast, median eHealth literacy scores were 35.00 in the 18–21 age group and 36.00 in the ≥ 22 age group, with no statistically significant difference observed ($p > 0.05$). Regarding sex, the median eHealth literacy score was 34.00 among male students and 36.00 among female students, and this difference was statistically significant ($p < 0.05$). Median attitude scores toward telehealth services were 60.00 for males and 58.00 for females, with no statistically significant difference between sexes ($p > 0.05$). Analysis by academic department indicated that median attitude scores toward telehealth services were 59.00 in Nursing, 56.00 in Child Development, 58.00 in Health Management,

59.00 in Social Work, and 60.00 in Nutrition and Dietetics. No statistically significant differences were observed between departments for attitude scores ($p > 0.05$). However, median eHealth literacy scores differed significantly across departments ($p < 0.05$), with scores of 36.00 in Nursing, 31.00 in Child Development, 35.00 in Health Management, 36.00 in Social Work, and 31.00 in Nutrition and Dietetics.

Table 1. Distribution of participants' socio - demographic characteristics and scores obtained from the scales (n=250)

Characteristics	n	%
Age group (years)		
18-21	154	61.6
≥ 22	96	38.4
Gender		
Male	73	29.2
Woman	177	70.8
Section		
Nursing	129	51.6
Child development	50	20.0
Health management	23	9.2
Social work	19	7.6
Nutrition and dietetics	29	11.6
Place of residence		
Province	147	58.8
District/Village	103	41.2
Economic situation		
Good	52	20.8
Average/poor	198	79.2
General health status		
Good	94	37.6
Average/poor	156	62.4
Smoking status		
Never smoked/Quit	188	75.2
Current smoker	62	24.8
Alcohol use status		
Current user	35	14.0
Never used/Quit	215	86.0
Chronic disease status		
Present	53	21.2
Absent	197	78.8
Hospital appointment system		
MHRS (Yes)	201	80.4
Other (Yes)	49	19.6
Telemedicine	58.00	18.00 84.00
E-Health	35.00	13.00 50.00

Note : Data presented as n (%), except Telemedicine and e-Health literacy as median (min-max); MHRS : *Merkezi Hekim Randevu Sistemi* /Central Doctor Appointment System

Table 2. Distribution of participants' scores on the telemedicine and e-Health scales according to their socio-demographic characteristics

	Telemedicine		e-Health	
	Median	p value	Median	p value
Age groups (years)				
18-21	57.50		35.00	
≥22	60.00	0.026	36.00	0.082
Gender				
Male	60.00		34.00	0.045
Woman	58.00	0.077	36.00	
Section				0.006
Nursing	59.00		36.00	
Child development	56.00		31.00	
Health management	58.00	0.469	35.00	
Social work	59.00		36.00	
Nutrition and dietetics	60.00		31.00	
Place of residence		0.461		0.162
Province	59.00		36.00	
District/Village	58.00		34.00	
Economic status		0.815		0.066
Good	58.00		32.00	
Moderate/poor	59.00		35.00	
General health status		0.876		0.877
Good	58.00		35.50	
Moderate/poor	58.00		35.00	
Smoking status				
Never smoked/quit	58.00	0.656	35.00	0.710
Current smoker	59.00		35.00	
Alcohol use status				
Current user	59.00	0.311	34.00	
Never used/quit	58.00		35.00	0.786
Chronic disease status				
Present	58.00	0.797	35.00	0.933
Absent	58.00		35.00	
Hospital appointment system				
Central hospital	59.00		35.00	
Appointment system				
Other	56.00	0.064	35.00	0.985

When comparing participants by place of residence, the median attitude score toward telehealth services was 59.00 among those living in city centers and 58.00 among those living in districts or rural areas. Median eHealth literacy scores were 36.00 and 34.00, respectively. No statistically significant differences were found between residence groups for either scale ($p>0.05$). Similarly, no statistically significant differences were observed in median attitude or eHealth literacy scores according to perceived economic status, perceived general health status, smoking or alcohol use, or presence of chronic disease ($p>0.05$).

When evaluated based on the hospital appointment scheduling system in use, the median

attitude score toward telehealth services was 59.00 among participants using the Central Physician Appointment System (*Merkezi Hekim Randevu Sistemi* (MHRS) = Central Doctor Appointment System) and 56.00 among those using other systems; however, this difference was not statistically significant ($p>0.05$). Median eHealth literacy scores were 35.00 in both groups, with no significant difference observed ($p>0.05$).

Multivariable linear regression analysis was performed to examine the association between attitudes toward telemedicine services and eHealth literacy after adjusting for sociodemographic and health-related characteristics (Table 3).

Table 3. Multivariable linear regression of factors influencing e-Health literacy of subjects

Model	Unstandardized Coefficients		Standardized Coefficients	p value	95% CI for β	
	B	SE	β		Lower Bound	Upper Bound
Telemedicine Total Score	0.293	0.095	0.195	0.002	0.106	0.481
Age	1.643	1.314	0.080	0.212	-0.945	4.231
Gender	-3.070	1.415	-0.139	0.031	-5.858	-0.281
Section	-0.179	0.453	-0.025	0.693	-1.073	0.714
Place of residence	0.143	1.293	0.007	0.912	-2.405	2.690
Economic status	-0.638	1.642	-0.026	0.698	-3.872	2.597
General health status	-0.265	1.338	-0.013	0.843	-2.901	2.370
Smoking status	-0.415	1.502	-0.018	0.783	-3.373	2.543
Alcohol use status	-2.170	1.908	-0.075	0.257	-5.929	1.590
Chronic disease	0.949	1.580	0.039	0.549	-2.163	4.061
Hospital appointment system	-3.518	1.604	-0.139	0.029	-6.678	-0.357

* All variables entered in the model (telemedicine, age, gender, place of resident, economic status, general health status, smoking status, alcohol use status, chronic disease, system used when making hospital appointment); $p < 0.05$; $R^2 = 0.091$; Adj $R^2 = 0.049$

The overall model explained 9.1% of the variance in eHealth literacy ($R^2=0.091$; Adjusted $R^2=0.049$). Attitudes toward telemedicine services were positively associated with eHealth literacy ($\beta=0.195$, $p=0.002$), indicating that higher telemedicine attitude scores were related to higher levels of eHealth literacy. Among the covariates included in the model, female sex ($\beta=-0.139$, $p=0.031$) and the hospital appointment scheduling system in use ($\beta=-0.139$, $p=0.029$) were also significantly associated with eHealth literacy. In contrast, age, academic department, place of residence, perceived economic status, perceived health status, smoking status, alcohol use, and chronic disease status were not significantly associated with eHealth literacy ($p>0.05$).

DISCUSSION

In the present study, participants' eHealth literacy levels were generally moderate. This finding is consistent with previous studies conducted among university students in Türkiye, which have reported moderate levels of eHealth literacy, particularly highlighting limitations in critical appraisal and application-oriented skills.^(20,21) International evidence similarly suggests that although young and educated populations have widespread access to digital tools, their ability to critically evaluate and effectively use online health information does not

always reach the expected level.⁽²²⁾ In line with these findings, a cross-sectional study conducted among health sciences students in Spain reported moderate eHealth literacy levels.⁽²³⁾ Conversely, a study among medical students in Tunisia reported higher eHealth literacy levels, suggesting that contextual factors, such as faculty-based educational content and digital health practices, may play a significant role.⁽²⁴⁾ Findings indicate that eHealth literacy should be systematically supported through both technical skill development and structured educational processes. Previous research has generally demonstrated positive attitudes toward telemedicine and telehealth services; however, the strength of these attitudes appears to vary according to factors such as level of experience, awareness, knowledge, and perceived trust.⁽²¹⁾ A systematic review of cross-sectional studies involving medical students reported generally positive attitudes toward telemedicine, while emphasizing that variations in knowledge and awareness may influence the strength of these attitudes.⁽¹³⁾ Likewise, studies conducted among dental students have demonstrated favorable perceptions of telehealth, particularly regarding its potential benefits in clinical education settings.⁽²⁵⁾ Consistent with the literature, students in the present study demonstrated moderate attitudes toward telemedicine services. However, unlike studies reporting highly positive attitudes, our

findings indicate that attitudes alone may not be sufficient to support the effective use of telemedicine. The positive association observed between telemedicine attitudes and e-Health literacy suggests that students who are more receptive to telemedicine also possess stronger digital health competencies. Therefore, improving telemedicine adoption among future healthcare professionals may require not only increasing awareness and acceptance but also strengthening eHealth literacy through structured educational and practical training opportunities. The joint examination of telehealth attitudes and eHealth literacy in this study underscores the importance of both technological infrastructure and individual competencies in the dissemination of telemedicine services. Consistent with the literature, there is a broad consensus that digital health competencies should be integrated into the core education of healthcare professionals.^(13,26,27) eHealth literacy reflects individuals' capacity to understand digital health tools, evaluate online health information, and appropriately use digital services, forming the foundation for the effective utilization of telehealth applications. In this context, educational experiences and clinical exposure are expected to enhance both eHealth literacy and telehealth-related competencies among students.

However, the proportion of variance explained by telehealth attitudes and socio-demographic variables was relatively high (9.1%). This finding suggests that eHealth literacy is shaped by multiple factors. Accordingly, initiatives aimed at improving eHealth literacy should extend beyond promoting technology use and incorporate educational programs, digital health guidance, and awareness-raising interventions. Similar studies have reported low to moderate associations between eHealth literacy and attitudes toward or use of digital health applications.⁽²⁸⁻³⁰⁾

Moreover, the relationship between e-Health literacy and telehealth attitudes becomes more pronounced when examined alongside factors such as perceived benefit, trust, ease of use, and prior service experience.^(22,31-33) Therefore, particularly among young educated populations, understanding the adoption of telehealth services requires a combined assessment of eHealth literacy and telehealth-related attitudes. From this perspective, the development of curriculum content that supports experiential learning in digital health and telehealth applications aligns

well with both national and international literature.

Age-related differences in attitudes toward telemedicine services were also observed in this study. This finding suggests that attitudes toward telemedicine may be heterogeneous even within relatively homogeneous student populations and may vary according to demographic characteristics. However, the scope of the present study does not allow for a detailed examination of the mechanisms underlying age-related differences. The Unified Theory of Acceptance and Use of Technology (UTAUT) states that perceived usefulness and ease of use are key determinants of technology adoption, with age functioning as a moderating variable in this process.⁽³⁴⁾ According to the UTAUT model, age influences technology acceptance not directly, but rather as a moderator that alters the impact of other determinants. While the intention to use technology among younger individuals is primarily driven by perceived usefulness, for older age groups ease of use and facilitating conditions become more significant. Furthermore, the influence of one's social environment is more pronounced among older individuals. Consequently, advancing age can reinforce the perception of the utility of digital health applications—such as telemedicine—thereby contributing to the development of more positive attitudes. Previous studies have also demonstrated that satisfaction with telehealth services is closely associated with attitudes toward their use.⁽³⁵⁾

The finding that telehealth attitudes were higher among older students may be related to greater healthcare utilization, increased health awareness, or more frequent exposure to clinical decision-making processes. Students aged 22 years and older may have developed a higher level of awareness regarding healthcare management and may therefore perceive greater utility in telehealth services. Additionally, increased clinical exposure and educational experiences in upper academic years may contribute to more favorable perceptions of telemedicine. In contrast, although younger students are generally more familiar with digital technologies, their lower frequency of healthcare utilization may limit their engagement with telehealth services. This highlights that access to technology alone does not necessarily translate into service use; motivation and health-related needs also play critical roles.

Sex-based differences were observed in eHealth literacy scores, with female students

demonstrating higher levels than their male counterparts. This finding aligns with the existing literature suggesting that women tend to engage more actively in health information-seeking behaviors, use healthcare services more frequently, and demonstrate greater health-related awareness.⁽³⁶⁻³⁹⁾ However, studies conducted among university students in Portugal and China have reported no significant association between sex and eHealth literacy.^(40,41) These inconsistencies may reflect cross-national differences in digital infrastructure, educational systems, levels of healthcare digitalization, socioeconomic conditions, and cultural norms. Consequently, interventions aimed at enhancing eHealth literacy should be designed with careful consideration of country-specific contextual factors.

The present study also revealed significant differences in eHealth literacy levels across academic departments. This finding suggests that eHealth literacy may be influenced not only by individual characteristics but also by educational content and professional orientation. eHealth literacy encompasses a range of competencies, including the ability to locate, evaluate, and apply online health information.⁽¹⁸⁾ Previous studies have emphasized that these competencies are closely linked to digital skills, foundational health literacy, and educational processes, particularly in health-related disciplines.^(20,42) The observed departmental differences may therefore be attributable to variations in curriculum emphasis on digital health content, students' engagement with health information, and the extent to which critical appraisal skills are supported during training. Integrating digital health literacy components into curricula in a visible, practice-oriented manner—especially in disciplines that involve direct patient care—may facilitate the development of these essential competencies.

This study has several limitations. First, its cross-sectional design does not allow causal inferences regarding the relationship between telemedicine attitudes and eHealth literacy. Second, the study was conducted at a single Faculty of Health Sciences, which may limit the generalizability of the findings to students from other universities or disciplines. Third, all data were based on self-reported questionnaires and may therefore be subject to recall and social desirability bias. Finally, the study assessed attitudes and perceived competencies rather than

actual telemedicine use or objectively measured digital health skills.

The findings highlight the importance of strengthening digital health competencies among future healthcare professionals. Moderate levels of telemedicine attitudes and eHealth literacy suggest that students may require additional support to effectively utilize digital health technologies in clinical practice. Integrating telemedicine training, digital communication skills, online health information evaluation, and practical telehealth experiences into undergraduate curricula may improve students' readiness for technology-supported healthcare delivery. Enhancing these competencies may ultimately contribute to improved patient education, communication, and healthcare accessibility.

Future research should employ multicenter and longitudinal designs to better understand the causal relationship between telemedicine attitudes and eHealth literacy. Studies involving students from different healthcare disciplines and universities would improve external validity. Additionally, intervention studies evaluating the effectiveness of telemedicine-focused educational programs on digital health competencies are warranted. Future investigations should also examine other determinants of eHealth literacy, including digital skills, technology acceptance, health literacy, and previous telemedicine experience.

CONCLUSIONS

The finding that attitudes toward telemedicine and levels of eHealth literacy among students of the Faculty of Health Sciences were generally moderate suggests that students are not unfamiliar with digital health services; however, they have not yet achieved sufficient competence to use these services in a fully informed, safe, and effective manner. Based on these findings, it is recommended that telemedicine and eHealth literacy content be addressed in undergraduate health sciences curricula in a more comprehensive, practice-oriented manner.

Conflict of Interest

Competing interests: No relevant disclosures

Acknowledgement

None

Authors' Contributions

HDK, GY: Study design; HDK, GY data collection and data analysis; HDK, GY: manuscript writing; HDK, GY; critical revisions of the manuscript: Both authors take public responsibility for the content of the manuscript submitted to *Universa Medicina*.

Funding

The authors declare that no funds, grants, or other support was received during the preparation of this manuscript.

Data Availability Statement

The authors have nothing to report.

Declaration of AI Usage in Scientific Writing

Nothing to declare

REFERENCES

- World Health Organization. WHO develops guidance to improve telemedicine services. Geneva: World Health Organization;2024.
- Ghaddaripouri K, Mousavi Baigi SF, Abbaszadeh A, Mazaheri Habibi MR. Attitude, awareness, and knowledge of telemedicine among medical students: a systematic review of cross-sectional studies. *Health Sci Rep* 2023;6:e1156. doi: 10.1002/hsr2.1156.
- Aytimur D, Mandiracıoğlu A, Batı AH, Gövsa F. Awareness of healthcare faculty students on telemedicine: a mixed methods study. *Eur J Ther* 2024;30:879-89. Doi:<https://doi.org/10.58600/eurjther2256>.
- Aydin MO, Alper Z, Ozkaya G, Caliskan SA. Turkish medical students' perspectives on the advantages and disadvantages of telemedicine: scale development and psychometric evaluation. *BMC Med Educ* 2026;26:175. doi: 10.1186/s12909-025-08515-7.
- Kong SS, Azarfah A, Ashour A, Atkins C, Bhanusali N. Awareness and attitudes towards telemedicine among medical students in the United States. *Cureus* 2020;12:e11447. doi: 10.7759/cureus.11574.
- Kunwar B, Dhungana A, Aryal B, Gaire A, Adhikari AB, Ojha R. Knowledge and attitude of telemedicine among medical students of Nepal: a cross-sectional study. *Health Sci Rep* 2022;5:e532. doi: 10.1002/hsr2.532.
- Norman CD, Skinner HA. eHEALS: the eHealth literacy scale. *J Med Internet Res* 2006;8:e27. doi: [10.2196/jmir.8.4.e27](https://doi.org/10.2196/jmir.8.4.e27).
- Nakas D, Erek Kazan E. e-Health literacy levels of university students in Turkey and affecting factors. *Int J Caring Sci* 2020;13:2149-59.
- Stauch L, Renninger D, Rangnow P, et al. Digital health literacy of children and adolescents and its association with sociodemographic factors: representative study findings from Germany. *J Med Internet Res* 2025;27:e69170. doi: [10.2196/69170](https://doi.org/10.2196/69170).
- Aufenberg B, Offermann J, Pauge S, Ziefle M, Greiner W. Acceptance of telemedicine among care personnel in inpatient and outpatient elderly care: a systematic review. *BMC Geriatr* 2025;25:1010. doi: 10.1186/s12877-025-06786-9.
- Lu X, Zhang R. Association between eHealth literacy in online health communities and patient adherence: cross-sectional questionnaire study. *J Med Internet Res* 2021;23:e14908. doi: 10.2196/14908.
- Aldekhyyel RN, Alshuaibi F, Alsaaid O, et al. Exploring behavioral intention to use telemedicine services post COVID-19: a cross sectional study in Saudi Arabia. *Front Public Health* 2024;12:1385713. doi: 10.3389/fpubh.2024.1385713.
- Ghaddaripouri K, Mousavi Baigi SF, Hashemi SA, Sezavar Dokhtfaroughi S, Dahmardeh Kemmak F, Mazaheri Habibi MR. Awareness and attitude toward telemedicine of students at university of paramedical sciences. *Front Health Inform* 2024;13:208. doi: 10.30699/fhi.v13i0.572.
- Aldebasi B, Alhassan AI, Al-Nasser S, Abolfotouh MA. Level of awareness of Saudi medical students of the internet-based health-related information seeking and developing to support health services. *BMC Med Inform Decis Mak* 2020;20:209. doi: 10.1186/s12911-020-01233-8.
- Kazmi S, Yasmin F, Siddiqui SA, et al. Nationwide assessment of knowledge and perception in reinforcing telemedicine in the age of COVID-19 among medical students from Pakistan. *Front Public Health* 2022;10:845415. doi: 10.3389/fpubh.2022.845415.
- Dean AG, Sullivan KM, Soe MM. OpenEpi: open source epidemiologic statistics for public health Version 3.01;2013.
- Yücel M, Uyar M. Development of an attitude scale for the use of telemedicine services. *Telemed J E Health* 2024;30:825-34. doi: 10.1089/tmj.2023.0189.
- Norman CD, Skinner HA. eHealth literacy: essential skills for consumer health in a networked world. *J Med Internet Res* 2006;8:e9. doi: 10.2196/jmir.8.2.e9.
- Coşkun S, Bebiş H. Adölesanlarda e-sağlık okuryazarlığı ölçeği: Türkçe geçerlik ve güvenirlik çalışması. *Gulhane Med J* 2016;57:378-84. (Türkiye) doi: 10.5455/gulhane.157832.

20. Dolu İ, Çelik Durmuş S. The relationship of e-health literacy levels of university students studying other than health sciences with health literacy, digital literacy, media and television literacy. *Turk J Public Health* 2023;21:16-27. doi:10.20518/tjph.1074107.
21. Doğanıyigit PB, Keçelilgil HT. The role of e-health literacy in the use of telemedicine among medical students. *Turk J Fam Med Prim Care* 2024;18:56-63. doi: 10.21763/tjfmprc.1331049.
22. Sainimnuan S, Preedachitkul R, Petchthai P, Paokantarakorn Y, Siriussawakul A, Srinonprasert V. Low prevalence of adequate eHealth literacy and willingness to use telemedicine among older adults: cross-sectional study from a middle-income country. *J Med Internet Res* 2025;27:e65380. doi: 10.2196/65380.
23. Rueda-Medina B, Gómez-Urquiza JL, Casas-Barragán A, Toledano-Moreno S, Aguilar-Ferrándiz ME, Correa-Rodríguez M. eHealth literacy, internet use and health-related behaviour among health sciences students: a cross-sectional study. *Contemp Nurse* 2023;59:143-52. doi: 10.1080/10376178.2023.2166547.
24. Chelly S, Omri N, Saadallah Z, et al. Knowledge, attitudes, and practices regarding blood exposure accidents and eHealth literacy among Tunisian medical students: a cross-sectional study. *BMC Med Educ* 2025;25:366. doi: 10.1186/s12909-024-06544-2.
25. Bakerywala A, Finkelman M, Swee G, Lerman M, Loo CY. Attitudes and opinions of telehealth in the dental school environment: a survey study. *J Dent Educ* 2023;87:1598-606. doi: 10.1002/jdd.13347.
26. Machleid F, Kaczmarczyk R, Johann D, et al. Perceptions of digital health education among European medical students: mixed methods survey. *J Med Internet Res* 2020;22:e19827. doi: 10.2196/19827.
27. Veikkolainen P, Tuovinen T, Kulmala P, et al. The evolution of medical student competencies and attitudes in digital health between 2016 and 2022: comparative cross-sectional study. *JMIR Med Educ* 2025;11:e67423. doi: 10.2196/67423.
28. Deshpande N, Hanna K, Caulfield B, O'Connor M. eHealth literacy and patient portal use and attitudes among hospitalized patients: cross-sectional study. *JMIR Hum Factors* 2023;10:e40105. doi :10.2196/40105.
29. Cho OH, Kim H, Cho Y. Attitudes and digital health literacy mediate the relationship of digital information accessibility with intention for digital healthcare service use in patients with multiple myeloma: a cross-sectional study. *Eur J Oncol Nurs* 2025;74:102786. doi: 10.1016/j.ejon.2025.102786.
30. Mutlu A, Onsuz MF, Kilinc A, Ozcan L, Tepetas M, Metintas S. Turkish validity and reliability of telemedicine awareness, knowledge, attitude and skills questionnaire. *North Clin Istanbul* 2024;11:18-26. doi: 10.14744/nci.2023.79989.
31. Cheng C, Beauchamp A, Elsworth GR, Osborne RH. Applying the electronic health literacy lens: systematic review of electronic health interventions targeted at socially disadvantaged groups. *J Med Internet Res* 2020;22:e18476. doi: 10.2196/18476.
32. van der Vaart R, Drossaert C. Development of the digital health literacy instrument: measuring a broad spectrum of Health 1.0 and Health 2.0 skills. *J Med Internet Res* 2021;23:e23473. doi: 10.2196/jmir.6709.
33. Dadaczynski K, Okan O, Messer M, et al. Digital health literacy and web-based information-seeking behaviors of university students: cross-sectional study. *J Med Internet Res* 2022;24:e31027. doi :10.2196/24097.
34. Venkatesh V, Morris MG, Davis GB, Davis FD. User acceptance of information technology: toward a unified view. *MIS Q* 2003;27:425-78. doi:10.2307/30036540.
35. Kruse CS, Krowski N, Rodriguez B, Tran L, Vela J, Brooks M. Telehealth and patient satisfaction: a systematic review and narrative analysis. *BMJ Open* 2017;7:e016242. doi :10.1136/bmjopen-2017-016242.
36. Neter E, Brainin E. eHealth literacy: extending the digital divide to the realm of health information. *J Med Internet Res* 2012;14:e19. doi :10.2196/jmir.1619.
37. Hargittai E. Digital natives? Variation in internet skills and uses among members of the "net generation". *Sociol Inq* 2010;80:92-113. <https://doi.org/10.1111/j.1475-682X.2009.00317.x>.
38. Chesser A, Burke A, Reyes J, Rohrberg T. Navigating the digital divide: eHealth literacy in underserved populations in the United States. *Inform Health Soc Care* 2016;41:1-19. <https://doi.org/10.3109/17538157.2014.948171>.
39. Kontos E, Blake KD, Chou WS, Prestin A. Predictors of eHealth usage: insights on the digital divide from the HINTS 2012. *J Med Internet Res* 2014;16:e172. doi :10.2196/jmir.3117.
40. Almeida S, Pinto E, Correia M, Veiga N, Almeida A. Evaluating e-health literacy, knowledge, attitude, and health online information in Portuguese university students: a cross-sectional study. *Int J Environ Res Public Health* 2024;21:271. doi: 10.3390/ijerph21030271.
41. Jiang S, Ng JYY, Choi SM, Ha AS. Relationships among eHealth literacy, physical literacy, and physical activity in Chinese university students: cross-sectional study. *J Med Internet Res* 2024;26:e56386. doi :10.2196/56386.

42. Paige SR, Stellefson M, Krieger JL, Anderson-Lewis C, Cheong J, Stopka C. Proposing a transactional model of eHealth literacy: concept analysis. *J Med Internet Res* 2018;20:e10175. doi: 10.2196/10175.



This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License
