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Health literacy in relation to attitudes towards traditional and complementary medicine among physical therapy and rehabilitation patients

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Abstract

Health literacy and digital health literacy (DHL) are crucial for enabling patients to make informed decisions, especially in the context of complementary and alternative medicine (CAM). This cross-sectional study included 211 patients attending a Physical Medicine and Rehabilitation outpatient clinic. Data were collected using the Health Literacy Scale, Digital Health Literacy Instrument (DHLLI), and the Complementary, Alternative and Conventional Medicine Attitudes Scale (CACMAS). Descriptive statistics and Spearman correlation analysis were conducted. Participants had moderate levels of health literacy and DHL. Their attitudes toward CAM were generally positive, with the highest scores in the “Holistic Balance” sub-dimension. A weak but significant negative correlation was found between health literacy and holistic CAM attitudes ($r=-0.315$, $p<0.001$). DHL was positively associated with dissatisfaction with conventional medicine, particularly in information searching and relevance evaluation ($p<0.05$). Navigation skills were positively related to philosophical compatibility with CAM but negatively associated with dissatisfaction with CAM. This study highlights that although patients are moderately health literate and digitally literate, those with higher health literacy tend to be less inclined toward a holistic CAM perspective. Conversely, individuals dissatisfied with conventional medicine exhibit higher engagement with digital health content. These findings underscore the importance of targeted education in promoting critical engagement with digital health.

Keywords: Health literacy, complementary therapies, physical therapy

Introduction

Health literacy, the ability to obtain, process, and understand basic health information and services needed to make informed health decisions, is increasingly recognised as a critical factor in patient outcomes [1]. Integrating digital health technologies into clinical practice has become increasingly common in this context. Digital health literacy (DHL) refers to a patient's ability to access, understand, and utilize health information provided through digital platforms [2]. Thus, individuals shifted from being passive recipients in information-imbalanced healthcare relationships to active agents in managing their health [3]. However, as medical and scientific information became increasingly accessible and complex, users often experienced condensed or biased presentations of health information [4].

Additionally, a lack of access to healthcare and the rising cost of healthcare also played a role in the decision-making process. This situation led individuals to turn to complementary and alternative medicine (CAM) practices [5]. However, what CAM users have in common is a belief in a holistic philosophy of health. This belief encompasses accepting the role of non-physical (mind/spirit) factors in the development and management of health and disease [6].

Today, the rate of diseases, especially chronic ones, is increasing in health systems worldwide [7]. Therefore, in addition to medical treatments, methods such as preventing complications, adopting a healthy lifestyle, encouraging physical activity, and managing stress are used to manage diseases [8]. In this context, one of the most common areas in the health system where

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patients with various problems are seen is physical therapy and rehabilitation. Physical therapy and rehabilitation are types of healthcare services that aim to treat functional disorders that occur as a result of illness, accident, congenital disability, or injury. It also aims to rehabilitate the patient and improve the quality of life, covering diagnosis, therapy, and rehabilitation processes [9]. Despite the advancement of physical therapy in modern medicine, CAM applications have recently begun to be widely used in the health system to manage symptoms [10]. CAM includes biological methods such as herbal medicines, vitamins, and food supplements. It also includes non-biological methods such as acupuncture, hydrotherapy, massage, and music therapy [11]. Individuals with insufficient health literacy may struggle to evaluate various treatment options. Therefore, an increase in health literacy may affect the decision-making mechanism by helping to inform the use of CAM [12]. Charoencheewakul et al. reported that 30.89% of patients with type 2 diabetes used CAM. Patients with adequate health literacy were approximately 2.5 times more likely to use CAM [13]. However, another study reported that CAM use was not significantly associated with people's health literacy [14].

Upon examining the literature, it was observed that research on health literacy and CAM use is increasing [15]. Therefore, it is essential to assess health literacy and digital advancements in clinics that treat a large number of patients and diverse disease groups, such as physical therapy departments. CAM should also be included in studies, as it can affect patients' participation in treatment and their overall health. However, the literature has not sufficiently examined the relationship between health literacy and CAM use. Therefore, this study aimed to investigate the relationship between health literacy, DHL, and CAM in patients who applied to the physical therapy clinic as outpatients.

Material and Methods

This cross-sectional study was conducted at the Karabük University Training and Research Hospital's Physical Medicine and Rehabilitation Outpatient Clinic. Two hundred eleven patients (134 females and 77 males) participated in the study. The inclusion criteria were as follows: participants had to be between 18 and 60 years of age and had voluntarily agreed to participate in the study. Individuals who declined to participate or were unable to cooperate were excluded from the study. This study was approved by the Karabük University Non-Interventional Clinical Research Ethics Committee (Approval No: 2024/1807) and conducted in accordance with the Declaration of Helsinki. Written and verbal informed consent was obtained from all participants before data collection. The study was also registered with ClinicalTrials (NCT06949345). Sample analysis was determined using the G*Power program. According to the data obtained from the pilot study, a significant relationship was found between health literacy and the Complementary, Alternative, and Conventional Medicine Attitudes Scale (CACMAS), with a $d=0.255$, 95% power, and an $\alpha=0.05$ margin of error. A minimum of 189 individuals was required for this analysis.

Considering the possibility of data loss, the study was planned to be completed with at least 209 individuals, approximately 10% more than the initially proposed sample size. Information posters about the study were distributed throughout the hospital. Volunteers interested in participating were interviewed at Karabük Training and Research Hospital, where data were collected through face-to-face surveys. The study recorded participants' socio-demographic profiles, including age, gender, marital status, education level, chronic diseases and their types, and medication usage. Data were gathered using the Socio-Demographic Information Form, the DHLI, and the Traditional and Complementary Medicine Attitude Scale.

Outcome measures

Digital Health Literacy Instrument

The scale consisted of 18 items across six dimensions: Information Seeking, Evaluation of Reliability, Determining Interest Level, Content Addition, Navigation Skills, and Privacy Protection. Participants rated their experiences on a 4-point Likert scale (1=Very difficult, 2=Difficult, 3=Easy, 4=Very easy) for the subdimensions of Information Seeking, Evaluation of Reliability, Determining Interest Level, and Content Addition. For Navigation Skills and Privacy Protection, a reverse-coded 4-point Likert scale was used (1=Never, 2=Occasionally, 3=Rarely, 4=Frequently). The overall and subscale scores ranged from 1 to 4, with scores below two indicating low DHL, scores between 2 and 3 indicating moderate DHL, and scores above 3 indicating high DHL. Cronbach's alpha coefficient for the overall scale was 0.896, indicating excellent internal consistency [2].

Complementary, Alternative, and Conventional Medicine Attitudes Scale

Developed by McFadden et al. [16], this scale was adapted for use in Turkey by Köse et al. [17]. The Turkish version of the scale comprises 27 items across three subdimensions: Cognitive View of Complementary Medicine, Dissatisfaction with Modern Medicine, and Holistic Health Perspective. The scale used a 7-point Likert-type rating system, with responses ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). Higher total scores on the scale indicate more positive attitudes toward traditional complementary medicine. The Turkish scale version demonstrated excellent reliability, with a Cronbach's alpha value of 0.80.

Health Literacy Scale

This scale, the validity and reliability of which was conducted in Turkish by Aras and Temel [18], was a simplified version of the European Health Literacy Survey form. The scale consisted of 25 items and four sub-dimensions: access to information (5 items, 5–25 points), understanding information (7 items, 7–35 points), evaluation (8 items, 8–40 points), and application (5 items, 5–25 points). The total score range was 25–125. The items were answered with a 5-point Likert-type scale and did not contain reverse items. Low scores indicated inadequate health literacy, and high scores indicated adequate health literacy.

Statistical Analysis

Normality of the data was assessed using visual methods (histograms and probability plots) and the Kolmogorov-Smirnov test. Since the data did not show a normal distribution ($p<0.05$), non-parametric tests were preferred. Descriptive analyses were expressed as mean±standard deviation (mean±SD) for normally distributed variables, median and interquartile range (IQR 25-75%) for non-normally distributed variables, and percentage (%) and frequency (n) for categorical variables. The relationships between health literacy levels, DHL levels, and attitudes towards traditional and complementary medicine were analyzed using Spearman correlation analysis. Correlation coefficients were classified as extreme ($r>0.89$), strong (0.70-0.89), moderate (0.40-0.69), weak (0.20-0.39), and very weak (0.00-0.19) [19]. The significance level was determined as $p\leq0.05$. All statistical analyses were performed using SPSS 25.0.

Results

This was a cross-sectional, observational study. When examining the demographic characteristics of the participants, the mean age was 52.50±13.22. Regarding gender, women (63.5%) were more represented than men (36.5%). Regarding education level, primary school graduates (38.9%) formed the largest group, followed by individuals who were illiterate (24.5%). The majority of participants are married (82%). Regarding residence, those living in cities (47.9%) were more represented than those living in villages or districts. As for chronic diseases, the highest percentage of participants (42.7%) had no chronic conditions, while diabetes (21.3%) and hypertension (28.9%) were the most common chronic diseases (Table 1).

The participants' total median health literacy score was 59 (43–71). Among the sub-dimensions, the “Appraisal/Evaluation” domain had the highest median score [19 (13–23)], whereas the “Apply/Use” domain had the lowest [10 (7–13)]. Overall, the participants' health literacy levels were moderate.

The total median score for attitudes toward traditional and complementary medicine was 104 (95–114). The highest sub-dimension score was in “Holistic Balance” [41 (35–49)]. The participants' attitudes were generally positive.

For DHL levels, the total median score of the participants was 2.39 (2–2.61). The highest sub-dimension score was in “Adding Self-Generated Content” [3 (2–3.33)], while the lowest was in “Protecting Privacy” [1.67 (1.33–2.33)] (Table 2).

There were negative and weak but significant relationships between health literacy and attitudes toward traditional and complementary medicine, especially in the “Holistic Balance” sub-dimension. Significant negative correlations were found between Holistic Balance and Access to Information ($r=-0.243$), Understanding Information ($r=-0.225$), Appraisal/Evaluation ($r=-0.349$), and Apply/Use ($r=-0.271$) ($p<0.01$). There was also a significant negative correlation ($r=-0.315$, $p<0.01$) between the general health literacy score and Holistic Balance.

Table 1. Demographic characteristics of the participants

Variables	n (%)
Age (years), mean±SD	52.50±13.22
Gender	
Male	77 (36.5%)
Female	134 (63.5%)
Educational Status	
Illiterate	51 (24.5%)
Primary school	82 (38.9%)
Middle school	9 (4.3%)
High school	36 (17.1%)
Bachelor's and/or higher	33 (15.6%)
Marital status	
Married	173 (82%)
Single	38 (18%)
Place of residence	
Village	39 (18.5%)
District	71 (33.6%)
City	(47.9%)
Occupation	
Housewife	102 (48.3%)
Retired	24 (11.4%)
Employed / Worker	81 (38.4%)
Student	4 (1.9%)
Chronic Disease	
None	90 (42.7%)
Diabetes	45 (21.3%)
Hypertension	61 (28.9%)
Respiratory Disease	11 (5.2%)
Cardiovascular Disease	6 (2.8%)
Other	27 (12.8%)
Use of Traditional/Complementary Medicine Practices	
Uses Traditional Medicine	57 (27%)
Does Not Use Traditional Medicine	154 (73%)
Methods	
Wet Cupping Therapy (Hijama)	50 (23.7%)
Leech Therapy	14 (6.6%)
Acupuncture	3 (1.4%)
Type of Disease	
Orthopedic	93 (44.1%)
Neurological	54 (25.6%)
Rheumatologic	26 (12.3%)
Degenerative	17 (8.1%)
Radicular	12 (5.7%)
Other	9 (4.3%)

There were positive associations between dissatisfaction with conventional medicine and DHL. Significant positive correlations were found in Information Searching ($r=0.138$, $p<0.05$) and Determining Relevance ($r=0.173$, $p<0.05$). In addition,

Navigation Skills showed a significant positive relationship with Philosophical Congruence with CAM ($r=0.153$, $p<0.05$), while Navigation Skills were lower in individuals dissatisfied with traditional medicine ($r=-0.208$, $p<0.01$) (Table 3).

Table 2. Health literacy levels, DHLI, and CACMAS results

Variables	mean±SD / Median (IQR)
Health Literacy Scale	
Access to information	12.30±5.94 / 11.00 (8.00–15.00)
Understanding information	18.75±8.08 / 18.00 (13.00–22.00)
Appraisal/Evaluation	19.97±9.26 / 19.00 (13.00–23.00)
Apply/use	11.36±5.67 / 10.00 (7.00–13.00)
Total	62.38±27.31 / 59.00 (43.00–71.00)
CACMAS	
Philosophical congruence with complementary and alternative medicine	33.61±9.18 / 33.00 (28.00–39.00)
Dissatisfaction with conventional medicine	28.57±10.42 / 30.00 (19.00–38.00)
Holistic balance	42.08±9.72 / 41.00 (35.00–49.00)
Total	104.25±15.56 / 104.00 (95.00–114.00)
DHLI	
Information Searching	2.40±0.94 / 2.67 (1.67–3.00)
Evaluating Reliability	2.24±0.84 / 2.33 (1.67–3.00)
Determining Relevance	2.37±0.84 / 2.67 (1.67–3.00)
Navigation Skills	2.29±0.92 / 2.00 (1.67–3.00)
Adding Self-Generated Content	2.65±0.91 / 3.00 (2.00–3.33)
Protecting Privacy	1.90±0.97 / 1.67 (1.33–2.33)
Total	2.31±0.41 / 2.39 (2.00–2.61)
Frequency Distribution of DHLI Groups, n (%)	
Low DHL (less than 2)	34 (16.1%)
Moderate DHL (between 2 and 3)	175 (82.9%)
High DHL (Greater than 3)	2 (0.9%)

CACMAS: Complementary, alternative, conventional medicine attitude scale, DHLI: Digital health literacy instrument, DHL: Digital health literacy

Table 3. Relationships Between Health Literacy, DHLI and CACMAS

CACMAS	Philosophical congruence with complementary and alternative medicine (r)	p	Dissatisfaction with conventional medicine (r)	p	Holistic balance (r)	p	Total (r)	p
Health Literacy Scale								
Access to Information	0.027	0.694	0.093	0.179	-0.243**	< 0.001	-0.067	0.335
Understanding Information	0.036	0.602	0.017	0.804	-0.225**	< 0.001	-0.085	0.218
Appraisal/ Evaluation	0.032	0.642	0.110	0.110	-0.349**	< 0.001	-0.117	0.091
Apply/Use	0.059	0.396	0.066	0.337	-0.271**	< 0.001	-0.072	0.300
Total	0.032	0.642	0.077	0.265	-0.315**	< 0.001	-0.110	0.111
DHLI								
Information Searching	-0.017	0.811	0.138*	0.046	-0.023	0.741	0.055	0.427
Evaluating Reliability	-0.066	0.337	0.111	0.107	-0.129	0.061	-0.049	0.480
Determining Relevance	-0.047	0.500	0.173*	0.012	-0.009	0.899	0.050	0.469
Navigation Skills	0.153*	0.026	-0.208**	0.002	0.114	0.098	0.043	0.533
Adding Self-Generated Content	-0.035	0.616	0.036	0.602	0.037	0.589	0.000	0.997
Protecting Privacy	0.094	0.173	-0.081	0.239	-0.007	0.924	0.020	0.775
Total	0.051	0.458	0.075	0.275	-0.012	0.863	0.065	0.346

CACMAS: Complementary, alternative, conventional medicine attitude scale, DHLI: Digital health literacy instrument. p refers to the p-value, 0.01 * $p<0.05$, ** $p<0.01$

Discussion

Considering the growing use and popularity of CAM among patients, examining its association with health literacy and DHL is essential for understanding how individuals make informed health decisions. This study showed that 82.9% of patients had moderate DHL. Also, their attitudes toward CAM were generally positive. The most notable finding of this study was the presence of a significant relationship between health literacy levels and CAM attitudes, with the strongest association observed in the "Holistic Balance" sub-dimension. Relationships were also identified between certain sub-dimensions of DHL and attitudes toward CAM.

Individuals with low health literacy experience various challenges, including misunderstanding their diagnosis and treatment plans, ineffective communication with healthcare providers, and decreased treatment adherence [20]. Thus, it is crucial to determine patients' health literacy levels. The study showed that the participants' health literacy levels were moderate. This result was consistent with previous literature. In a study conducted by Gökşen et al. [21] to investigate health literacy among individuals receiving physiotherapy and rehabilitation services, the patients' health literacy was found to be adequate. Additionally, these results are consistent with those of patients with knee osteoarthritis [22], primary care patients [23], cancer patients [24], and chronically ill outpatients [25]. This is a process in which individuals receiving long-term healthcare (e.g., physical therapy patients) develop their health literacy through experience-based learning [26].

Participants were proficient in evaluating their health information, but their ability to apply it to manage their health was limited. This may reflect a gap between knowledge and action, resulting from limited health support or difficulties interpreting complex health instructions. A study by Murugesu et al. [27] examines the challenges faced by healthcare providers in interacting with patients. They reported that patients had difficulties in comprehending or applying health-related information. However, even individuals with adequate health literacy may struggle with taking responsibility, which is more closely related to personal factors such as poor health habits, lack of motivation, or low self-confidence [27]. This deficiency can be addressed through education programs or patient counselling services.

As medical information becomes increasingly accessible and complex, patients are more frequently exposed to biased information. Therefore, determining their level of DHL is essential for informed decisions regarding CAM use. The study shows that 82.9% of the participants have a moderate level of DHL. A study reported that the DHL of diabetic patients was insufficient [28]. Also, low DHL levels were reported among primary care patients [29]. and patients with chronic disease [30]. Individuals who receive long-term health services such as physical therapy may improve their health literacy over time,

depending on their experiences [26]. This may explain the higher level of DHL in our study, as continuous interaction with health services may increase individuals' ability to access and use digital resources. However, more studies are needed to examine levels of DHL across different disease groups.

In the present study, participants expressed confidence in sharing their health information or experiences online; however, they demonstrated a lack of awareness regarding privacy and data protection. Previous studies have indicated that age progression may lead to lower familiarity with privacy settings, data protection tools, and digital security practices, which may explain poorer performance in this area [31]. These findings underscore the importance of incorporating digital privacy education into public health literacy interventions, particularly those targeting less tech-savvy populations.

The use of CAM has become increasingly widespread in recent years [32]. In this study, participants' overall attitudes toward CAM were generally positive, as reflected in the total CACMAS score. This finding is consistent with previous studies that suggest an increasing interest and acceptance of CAM practices. A study conducted on patients with low back pain reported that 85% of the patients stated that doctors should be able to provide counselling about CAM, and 82% indicated that CAM should be tested for safety. In addition, 69% said clinical evidence is essential, and 65% stated that knowledge about CAM is necessary. 51% thought that CAM has fewer side effects than traditional treatments. These findings show a positive approach to CAM [33]. Similar findings were reported in various populations. Positive perspectives towards CAM have also been reported in oncology [34] and those undergoing dialysis [35]. According to a systematic review [36], the most reported reasons for CAM use in various populations were perceived benefits (treatment of illness, alleviation of symptoms, reduction of side effects of conventional medicine), the safety of CAM, and dissatisfaction with conventional medicine. In this study, participants' attitudes toward Holistic Balance received the highest score among the sub-dimensions of the CACMAS scale. In the study by McFadden et al. [16], individuals with high scores on the "Holistic Balance" subscale were found to have higher current and future use of CAM. This result may reflect cultural beliefs or personal values that prioritize harmony between the mind, body, and spirit, supporting a more holistic view of health.

CAM use can complicate health decision-making and navigation. This can be due to the unregulated market, personal choices, inconsistencies in product quality, drug-supplement interactions, and unsubstantiated marketing claims [5]. These issues may vary depending on the individual's level of health literacy. Therefore, determining between health literacy and CAM attitudes is essential. One of the key findings of this study was the significant negative correlation between health literacy levels and attitudes toward CAM, particularly within the "Holistic Balance" sub-dimension. This result suggests that individuals

with higher levels of health literacy may be less likely to value the holistic or integrative view of health that emphasises the mind-body connection and balance as commonly known in CAM philosophies. The negative correlation between the holistic balance and health literacy scale's sub-dimension (access to information, understanding, appraisal, and application) further supports the idea that as individuals become more proficient in accessing, understanding, appraising, and applying the conventional health information, their belief in and reliance on CAM may decrease. In parallel with our study, Tek Ayaz [37] reported that low health literacy in parents was associated with positive attitudes towards CAM. Similarly, health literacy has been found to affect CAM use in chronic outpatients and patients with Type 2 diabetes mellitus [13,25,38]. Dişsiz and Yılmaz [24] indicate that health literacy levels among cancer patients do not affect CAM usage, but rather their knowledge. This may reflect the tendency among individuals with high health literacy levels to prioritise evidence-based practices and indicate that they do not look favourably on or prefer treatments with low scientific evidence [39].

Marketing content for CAM products and methods often includes claims not based on scientific evidence regarding quality and effectiveness; moreover, advice on this subject is frequently shared by non-experts, especially on the Internet [5]. Therefore, it is essential to evaluate patients' DHL levels and examine their relationship with CAM attitudes. Another important finding in this study was the significant relationships observed between information-searching, determining Relevance, and navigation skills sub-dimensions of DHL, dissatisfaction with conventional medicine, and philosophical compatibility with CAM. These results suggest that individuals dissatisfied with conventional medicine are more likely to seek health-related information in digital environments, and that more dissatisfied individuals will seek information and may be more involved in evaluating its Relevance. Similar to our results, excessive technology dependency in oncology patients may cause dissatisfaction with conventional medicine due to the lack of a holistic approach and insufficient treatment efficacy. In addition, system-related problems such as long waiting times and high costs are reported to further contribute to this dissatisfaction [34]. Negative experiences with conventional medicine, shared online or by people around the patient, misperceptions about conventional medicine, or the belief that conventional medicine has limitations, can lead individuals to explore alternative methods. Therefore, the relationship between health literacy and CAM in patients is important and should be examined.

On the other hand, it has been observed that as the "navigation skills" score increases, individuals' satisfaction with conventional medicine also increases. In other words, individuals who can act more effectively in a digital environment tend to express lower dissatisfaction with healthcare services. These individuals are more likely to find the information they need quickly and

accurately, better understand the treatment process, and have greater trust in the healthcare system. It has been stated in the literature that DHL plays a crucial role in health conditions and that searching and selecting appropriate and accurate information enhances trust in the health system [2].

Although this finding may initially seem contradictory to our results, it suggests that different dimensions of DHL have varying effects on health-related attitudes. While information-seeking and evaluation skills may lead individuals to question the health system more and turn to CAM, individuals with high navigation skills can access accurate information faster and have more trust in the health system, while also being open to CAM. This situation illustrates how an individual's use of information and their search strategies affect their attitudes.

This study also found that navigation skills and philosophical compatibility with CAM were associated. This suggests that individuals with strong digital information management skills trust the conventional healthcare system and remain open to CAM approaches. In this context, the current study provides new insights into the interactions between DHL and attitudes towards CAM. The absence of a similar study in the literature emphasises the originality and importance of these findings.

Limitations

This study has some limitations. First, due to its cross-sectional design, causal relationships between variables cannot be determined. In addition, data were collected only in a specific centre, which limits generalizability. Finally, data based on participants' self-reports carry the risk of social desirability bias.

Conclusion

This study showed that 82.9% of patients had moderate digital health literacy levels, and their attitudes towards CAM were positive. Health literacy was negatively associated with CAM attitudes, especially the holistic balance dimension. In contrast, specific dimensions of digital health literacy, such as information searching and navigation skills, exhibited complex associations with CAM attitudes, particularly in terms of dissatisfaction with conventional medicine and philosophical compatibility with CAM. These findings suggest that improving patients' health and digital health literacy is crucial since it affects how they choose between conventional and CAM. Therefore, critically evaluating online CAM information is essential to making informed decisions about these methods. Future studies are recommended to explore this relationship in different patient populations.

Conflict of Interests

The authors declare that there is no conflict of interest in the study.

Financial Disclosure

The authors declare that they have received no financial support for the study.

Ethical Approval

The study received ethical approval from the Karabük University Non-Interventional Clinical Research Ethics Committee (Approval No: 2024/1807) (Approval Date: 06.06.2024).

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