


<https://doi.org/10.22037/jmlis.v5i.46381>

Citation: Varnaseri A, Ghanbari Khoshnood M, Andalib Kondori M, Jasemi A, Akhavanhariri E, Hoseini Ahangari SA. Assessing health literacy levels and information-seeking anxiety in postgraduate students. J Med Libr Inf Sci. 2024; 5: e65.



Original article

Assessing Health Literacy Levels and Information-Seeking Anxiety in Postgraduate Students

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Abstract

Received: 06 Oct 2024

Accepted: 09 Dec 2024

Keywords:

Health literacy
Tehran University of
Medical Sciences
Information-seeking
anxiety
Students

Introduction: Health literacy encompasses the capacity of individuals to obtain, comprehend, assess, and apply health-related information, which is crucial for making informed health choices. Accordingly, the phenomenon of information-seeking anxiety among graduate students, along with the potential influence of health literacy in alleviating this anxiety, underscores the importance of exploring these two areas and their interconnection. This study aims to evaluate the health literacy levels of graduate students at Tehran University of Medical Sciences and to investigate the correlation between health literacy and health information-seeking anxiety.

Methods: This study follows a descriptive survey approach. The research focuses on all postgraduate students from the medical and allied medical schools at Tehran University of Medical Sciences, Tehran, Iran, for the academic year 2023-2024. A sample of 220 students was chosen from this group through a combination of stratified and convenience sampling methods. This study utilized questionnaires assessing health literacy and information-seeking anxiety to gather data. Descriptive statistics (such as mean, standard deviation, minimum, maximum, skewness, and kurtosis) and inferential statistics (including the one-sample t-test and Pearson correlation coefficient) were employed for data analysis. The analysis was conducted using SPSS software, version 26.

Results: The average health literacy score was 68.43, while the overall information-seeking anxiety score was 89.90. Participants demonstrated the highest level of health literacy in "decision-making skills in behavior," with a mean of 60.16 and a standard deviation of 415.4. Conversely, "reading skills" marked the lowest level of health literacy, with a mean of 76.5 and a standard deviation of 100.2. In terms of information-seeking anxiety, the highest levels were associated with "barriers related to information sources," having a mean of 67.24 and a standard deviation of 262.7. The lowest anxiety levels were found in "barriers related to information seeking," with a mean of 10.8 and a standard deviation of 131.3. Furthermore, a significant negative relationship was found between health literacy levels and students' anxiety about seeking health information ($P < 0.05$, $r = -0.84$). This indicates that as students' health literacy improves, their anxiety about seeking health information tends to decrease.

Conclusion: Enhancing health literacy and refining information-seeking behaviors are crucial for alleviating health information-seeking anxiety among graduate students. Libraries significantly mitigate health-related anxiety and foster self-care practices by offering educational workshops, creating trustworthy health resources, and delivering counseling services.

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Introduction

With the rapid pace of information-based processes, information search and retrieval skills have become increasingly important in today's information society. Information retrieval is an essential requirement and a prominent characteristic

of the information society (1). This necessity is felt more strongly in universities and higher education centers, serving as information societies and educational-research institutions, and is the scene of rapid changes in technology and the proliferation



of information resources, specifically among graduate students (2). Students experience high levels of anxiety in their research and educational environment, which is heavily dependent on information (3).

Kuhlthau, a noted theorist, explored students' various stages of information-seeking behavior. She highlighted that emotions like uncertainty, confusion, optimism, frustration, comfort, and satisfaction significantly influence how individuals seek information. Focusing on both the motivational and cognitive aspects, Kuhlthau identified the doubts and anxiety felt by searchers before and during the information-seeking process as a major influence on their behavior. She termed this specific anxiety as "information-seeking anxiety" (4, 5). Information-seeking anxiety can be interpreted as "fear and anxiety when searching for information in a library or database, when preparing to search for information, or even when thinking about searching for information" (6). Information-seeking anxiety occurs when individuals are unable to collect, process, organize, and desirably make available information. Consequently, when people cannot obtain the necessary information and meet their related needs, they may experience psychological distress. This anxiety can prevent them from using available information effectively and efficiently (7).

Thus, to effectively navigate and evaluate information, individuals need to develop a set of skills that allow them to access relevant information accurately and confidently, ensuring they are satisfied with their research process (8). Health literacy is a key tool in acquiring these skills. It involves understanding, processing, and using basic health information and services to make informed health decisions, specifically in challenging situations (9, 10). Experts widely agree that a community's health literacy level is a crucial indicator of the community's overall health. It is also recognized in academic circles as an essential predictor of student success and academic achievement (11). An adequate level of health literacy allows students to effectively understand and evaluate health-related issues, helping them manage factors that may cause anxiety when seeking information. Students'

strategies for handling stress, searching for health information, their health literacy level, and their behavior in seeking health information are crucial. These elements significantly influence their ability to access health information, enhance self-care skills, and improve overall efficiency and mental well-being (12).

Furthermore, the anxiety stemming from the pursuit of health information is referred to as cyberchondria (13). This phenomenon involves the frequent and excessive online search for medical information, which is often accompanied by feelings of anxiety and distress, leading to unsuccessful attempts to restore confidence (14). Recent studies indicate a strong correlation between cyberchondria and anxiety disorders (15). Health literacy is a significant factor anticipated to influence the degree of cyberchondria (16). In essence, an individual's approach to health is largely determined by their level of health literacy, and enhancing health literacy across various population segments necessitates a systematic and evidence-based advancement of health education within the country (17).

Information-seeking anxiety is a prevalent issue in academic settings, particularly in medical universities (18). A high level of health literacy can significantly improve one's understanding of anxiety-inducing situations related to achieving educational and health-related goals. Health literacy serves as a bridge between health and education (19), empowering individuals to excel in information-seeking behavior. Those who are health literate not only experience less anxiety when searching for and accessing information but also effectively identify their information needs, locate trustworthy sources, and utilize information to advance their academic objectives (20, 21).

Students today face increasingly anxiety-inducing situations, largely due to the growing demand for knowledge to meet educational and research objectives, coupled with the stress of feeling pressed for time to gather necessary information (22). A viable solution to this issue lies in promoting health literacy, empowering students to identify and manage factors affecting their well-being, and equipping them with the skills to tackle challenging and anxiety-inducing scenarios during information-

seeking. Achieving this involves developing literacy in accessing, comprehending, and utilizing health information (23). This approach highlights the importance of understanding the anxiety experienced by students during the information-seeking process and the potential role of health literacy in alleviating such stress. Research by Erfanmanesh sheds light on this issue, revealing those Iranian students studying at a Malaysian university experienced moderate level of information-seeking anxiety. The study noted that the highest anxiety levels were linked to “barriers related to information sources,” while the lowest was associated with “barriers related to computers and the Internet.” This indicates a need to explore the relationship between health literacy and information-seeking anxiety to better support students in managing these challenges (7).

The results of the study by Soruri, Alipoor and Riahi Nia showed that the level of information-seeking anxiety among postgraduate students was 16.33. The highest level of anxiety was related to the factor of barriers related to "using library materials," with 12.3%, and the lowest level of anxiety was associated with the factor of "interacting with librarians," with 32.2%. There was also no significant relationship between age and gender and the level of anxiety (23). According to the results of the study by Hosseini and Erfanmanesh, negative emotions such as fear, uncertainty, and anxiety affect the information-seeking process. In this study, the factors that cause negative emotions in users were classified and examined in four groups: factors related to information sources, factors related to computers, the Internet, and databases, factors related to the library, and factors related to the information search process (24). The findings of the study by Taghipoor Aghbolagh showed that there is a significant relationship between the level of information-seeking anxiety and the use of information sources, the level of computer and Internet use, the information-seeking process, the subject selection process, technical barriers, and the information search process. The level of information-seeking anxiety in using information sources, using computers and the Internet, the information-seeking process, selecting a topic, and technical barriers

to the information-seeking process in the Tabriz Central Library was observed to be below average. The six types of anxiety mentioned were considered factors of information-seeking anxiety (5).

A study by Chowdhury and Gibb highlights that anxiety can arise or worsen for various reasons during the information-seeking process. Key factors contributing to this anxiety include choosing incorrect information sources and search terms, as well as hesitating to assess the quality and currency of these sources. Additionally, indecision about the relevance and suitability of sources can further heighten anxiety. Other challenges, such as failing to find necessary information, being unaware of available resources in a particular field, encountering an overwhelming amount of information, dealing with scattered sources, and lacking access to full texts, can amplify anxiety during this process (25).

Dalrymple and Zweizig (26), as well as Hyldegård (27), found in separate studies that graduate students often experience fear, anxiety, and worry during different stages of their information-seeking process. Ahmadi et al. revealed that half of the participants demonstrated desirable health literacy. The study also found that health literacy was linked to the student's level of education and faculty (28). Meanwhile, research by Khodashenas et al. indicated that among university library users, the component of health information comprehension was at a desirable level, while other components were somewhat satisfactory. Notably, no significant relationship was found between health literacy skills and factors like education level, department, gender, or age. However, a significant difference was observed between income levels and health literacy skills (29). Recent research by Sajjadi et al. revealed that the students surveyed had a commendable level of health literacy. The study found that health literacy was linked to variables such as education level and faculty of study, with postgraduate and basic science students exhibiting higher health literacy (30). Contrastingly, a study by Choe et al. reported that students had low health literacy, while Vozikis et al. identified it as moderate among students (31). Sevendsen et al. discovered a significant negative correlation between health



literacy and risky health behaviors, including worry and anxiety (32). Meanwhile, Jayasinghe et al. highlighted that low health literacy in students undermines their ability to access information effectively. They found a negative and significant relationship between anxiety-inducing factors and the students' understanding and purposeful use of information (33).

Being in scientific and educational settings often brings varying levels of anxiety for many students (34). A notable example of this in universities and higher education centers is information-seeking anxiety. This type of anxiety is particularly common among graduate students, who play a crucial role in knowledge production. These students are more engaged in the information-seeking process than those in other programs, as they are required to develop research plans and theses. Information-seeking anxiety can negatively impact this process, leading to feelings of fear and uncertainty, which can ultimately affect their well-being (34, 35). Given the significance of information-seeking anxiety and its contributing factors among graduate students, along with the critical role of health literacy in enhancing human development metrics, it is important to explore this relationship. To date, no independent study has examined the connection between these two variables. Therefore, the primary aim of the current study is to assess the level of information-seeking anxiety among graduate students at the Tehran University of Medical Sciences and determine its relationship with their level of health literacy.

Methods

This study falls under the applied research category based on its purpose and employs a descriptive survey approach regarding its nature and method. The research focuses on all postgraduate students from the medical and allied medical faculties at Tehran University of Medical Sciences for the academic year 2023-2024. The total population size is 506 students. Using the Morgan table and a stratified sampling method according to different academic levels (master's and doctoral), a sample size of 220 students was determined. This

included 130 master's students and 90 doctoral students. A research team member was present at the relevant faculties to distribute and collect the questionnaires. The students who were available and willing to participate completed and returned these questionnaires.

The data collection tools include two health literacy questionnaires and an information-seeking anxiety questionnaire.

The health literacy questionnaire: Developed and rigorously tested by Montazeri et al. (36), features 33 items. Each item is rated on a Likert scale from 1 to 5. The total scores are calculated to determine a respondent's average health literacy level, with potential scores ranging from 33 to 165. Higher scores imply greater health literacy. The questionnaire evaluates five key areas: reading skills (4 items), access skills (5 items), comprehension skills (6 items), evaluation skills (4 items), and behavioral decision-making skills (11 items).

The Information-Seeking Anxiety Scale (ISAS): Developed and validated by Erfanmanesh (35) and later assessed in Iran. This tool comprises 47 items, each rated on a Likert scale from 1 to 5. Like many psychological assessments, the ISAS includes both positive and negative items. To determine a respondent's total score, scores for the positive items are reversed, and then an average anxiety level is calculated based on the overall scores. The scale's total score ranges from 47 to 235, with higher scores indicating greater anxiety related to information seeking. The ISAS identifies six main factors contributing to this anxiety: Barriers related to information sources" (14 items), computers and the Internet (6 items), libraries (11 items), the information search process (5 items), technical issues (6 items), and subject selection (5 items).

The data collected from the questionnaires were analyzed through two distinct methodologies: descriptive statistics and inferential statistics. Various tools such as frequency and percentage tables, mean, standard deviation, minimum, maximum, skewness, and kurtosis were employed in the descriptive statistics segment. Before examining and testing the hypotheses, the reliability of the questionnaires was assessed using Cronbach's

alpha coefficient. A one-sample t-test was utilized to ascertain health literacy and information-seeking anxiety levels. Additionally, Pearson's correlation coefficient was applied to explore the relationship between these two variables and their respective components. All statistical calculations were conducted using SPSS26 software.

To evaluate the reliability of the health literacy and information-seeking anxiety variables, along with their dimensions, Cronbach's alpha was computed. The findings indicated that Cronbach's alpha values for all variables related to health literacy and information-seeking anxiety were at an acceptable threshold, exceeding 0.7. Specifically, Cronbach's alpha for the health literacy questionnaire was recorded at 0.721, while the information-seeking anxiety questionnaire achieved a score of 0.918.

Notably, one limitation of the study pertained to the sampling availability, posing challenges

to the generalizability of the findings. Evidently, employing random sampling methods would enhance the generalizability of the results.

Results

Table 1 shows that the students studied have the highest level of health literacy in the factor of “decision-making skills in behavior” (mean 16.60 and SD 4.415) and the lowest level of health literacy in the component of “reading skills” (mean 5.76 and SD 2.100). Furthermore, the average total health literacy score was 43.68, indicating that the students' health literacy level is low. They also experience the highest level of information-seeking anxiety in the factor of “barriers related to information sources” (mean 24.67 and SD 7.262) and the lowest level of information-seeking anxiety in the component of “barriers related to information seeking” (mean 8.10 and SD 3.131).

Table 1. Level of health literacy and information-seeking anxiety and their dimensions

Variable	Components	Mean	standard deviation	Minimum	Maximum	Skewness	Kurtosis
Health literacy	Reading skills	5.76	2.100	3	14	1.507	2.200
	Access skills	6.96	1.815	1	13	0.859	1.82
	Comprehension skills	8.35	2.250	3	17	1.037	1.127
	Skill Evaluation	6.00	1.757	3	13	1.142	1.228
	Behavioral decision-making skills	16.60	4.415	11	32	1.011	0.607
Overall score of health literacy		43.68	9.140	27	75	0.794	0.056
Obstacles	Obstacles related to information sources	24.67	7.262	13	50	1.069	0.991
	Obstacles related to computers and the Internet	13.94	3.054	9	25	1.051	1.017
	Obstacles related to the library	23.01	4.539	16	40	1.021	1.320
	Obstacles related to information search	8.10	3.131	5	20	1.526	2.087
	Technical obstacles	12.30	2.391	4	20	1.878	1.156
	Obstacles choosing the topic	8.87	3.802	5	21	1.477	1.659
Overall score of information seeking anxiety		90.89	21.875	55	175	1.346	1.904

The skewness and kurtosis results show that the data follows a normal distribution, allowing for the use of parametric tests. Consequently, a series of t-tests were performed to assess health literacy levels, information-seeking anxiety, and the various

dimensions of these variables. The t-test results are presented in the table below. According to Table 2, questionnaire scores reveal that the students' health literacy and its dimensions, as well as information-seeking anxiety and its dimensions, are below average.

Table 2. Results of the t-test for the level of health literacy and information-seeking anxiety and their dimensions

Variable	Test statistics	Degrees of freedom	Mean	P value
Reading skills	-44.07	219	1.44	0.000
Access skills	-65.66	219	1.39	0.000
Comprehension skills	-63.59	219	1.39	0.000
Skill evaluation	-50.65	219	1.50	0.000
Behavioral decision-making skills	-55.09	219	1.51	0.000
Overall score of health literacy	-75.17	219	1.46	0.000
Obstacles related to information sources	-35.39	219	1.76	0.000
Obstacles related to computers and the internet	-19.71	219	2.32	0.000
Obstacles related to the library	-32.64	219	2.09	0.000
Obstacles related to information search	-32.70	219	1.61	0.000
Technical obstacles	-35.35	219	2.05	0.000
Obstacles choosing the topic	-23.92	219	1.77	0.000
Overall score of information seeking anxiety	-33.97	219	1.93	0.000

Another objective of the present study was to investigate the relationship between health literacy level and information-seeking anxiety and their dimensions. The study's findings showed an indirect and inverse

relationship between health literacy level and information-seeking anxiety ($P \leq 0.001$). This means that as students' health literacy level increases, their information-seeking anxiety also decreases (Table 3).



Table 3. Results of the correlation test between health literacy level and information-seeking anxiety and their dimensions

Variable		Obstacles related to information sources	Obstacles related to computers and the Internet	Obstacles related to the library	Obstacles related to information search	Technical obstacles	Obstacles choosing the topic	Information seeking anxiety
Reading skills	Test statistics	-0.54	-0.44	-0.50	-0.40	-0.45	-0.38	-0.52
	P value	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Access skills	Test statistics	-0.58	-0.51	-0.59	-0.52	-0.48	-0.46	-0.60
	P value	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Comprehension skills	Test statistics	-0.62	-0.54	-0.62	-0.58	-0.53	-0.49	-0.64
	P value	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Skill evaluation	Test statistics	-0.53	-0.43	-0.54	-0.47	-0.51	-0.41	-0.54
	P value	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Behavioral decision-making skills	Test statistics	-0.71	-0.61	-0.67	-0.62	-0.62	-0.50	-0.70
	P value	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Health literacy	Test statistics	-0.84	-0.71	-0.81	-0.74	-0.73	-0.62	-0.84
	P value	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Discussion

This study explored the health literacy levels among Tehran University of Medical Sciences postgraduate students and examined its relationship with information-seeking anxiety. The findings revealed that “behavioral skills” had the highest level of health literacy, with a mean score of 16.60 and a standard deviation of 4.415. Conversely, “reading skills” showed the lowest level, with a mean score of 0.76 and a standard deviation of 2.100. Overall, the study found that the students’ health literacy levels were below average. Supporting these findings, Choe et al. (31) reported low health literacy levels among students, while Vozikis et al. (37) found them to be average, indicating some alignment with the current study.

Moreover, the study’s findings differ from those of Sajjadi et al. (30), who reported that students

had a desirable level of health literacy. In contrast, this study found that students’ health literacy and its components—such as reading, access, comprehension, evaluation, and decision-making skills—are below average. This highlights the need for the Tehran University of Medical Sciences to implement foundational and effective programs in the education and research processes focused on health literacy and anxiety. Experts widely agree that health literacy is a crucial indicator of a society’s overall health. Enhancing health literacy is expected to elevate the community’s sense of responsibility for their health. Libraries serve as key social institutions that significantly contribute to lifelong learning and literacy. Librarians play a crucial role in enhancing individuals’ general literacy and can be seen as central to supporting community health (38). Libraries are pivotal in advancing health literacy by



fostering learning environments that equip people with the knowledge and skills needed to comprehend health information and policies. This understanding empowers individuals to make informed decisions about their personal and community health (39). Therefore, collaboration and planning from all relevant organizations, including libraries, are vital to elevate students' health literacy.

The study revealed that the level of information-seeking anxiety, along with its various aspects, falls below average. This suggests strategic planning should elevate it to the desired level. Students experience the highest level of anxiety related to "barriers related to information sources," with a mean score of 24.76 and a standard deviation of 7.262. Conversely, the lowest anxiety is "barriers related to information seeking," which has a mean score of 8.10 and an SD of 3.311. These findings align with previous research by Hosseini and Erfanmanesh (24), Taghipoor Aghbolagh (5), and Chowdhury and Gibb (25). These researchers identify significant barriers to information-seeking anxiety, particularly concerning the incorrect selection of information sources and search terms. The overwhelming amount of information available, combined with limited resources for effective searching, can cause anxiety for those seeking information. Several strategies can be implemented to alleviate this stress and enhance the information-seeking experience. These include training in information and health literacy, providing access to reliable resources like scientific articles, specialized books, and databases, offering psychological and counseling services, creating supportive environments, and promoting activities encouraging relaxation, such as yoga and meditation.

The study reveals an indirect and inverse relationship between health literacy levels and students' anxiety when seeking information. Essentially, as health literacy improves, students experience less anxiety about seeking information; the opposite is also true. Supporting this, Sevendsen et al. found that health literacy is significantly and negatively linked to risky health behaviors like worry and anxiety (32). Similarly, Jayasinghe et al. reported that low health literacy undermines students' ability to access

information effectively and is negatively associated with anxiety-inducing factors, impacting their purposeful use of information (33). These findings align with Soroya et al. (40), who demonstrated a significant connection between health anxiety and online information-seeking behavior. Individuals with high health anxiety are more inclined to search for health-related information online, which can increase their concerns and anxiety. This underscores the importance of high health literacy in distinguishing reliable and accurate information from various sources.

In light of the findings from the previously mentioned studies, along with the results of the current research that align with them, it is imperative to address the issues and risks associated with students' low health literacy in a focused manner. To alleviate students' anxiety related to information-seeking, it is essential to develop strategies aimed at enhancing their health literacy. Undoubtedly, the absence of adequate planning in this area poses significant and potentially irreversible risks for health students.

Conclusion

The findings indicate that having strong health literacy can significantly reduce students' anxiety about seeking information. Individuals with higher health literacy levels are more adept at analyzing information and using reliable sources, leading to decreased anxiety. Engaging in active information-seeking behaviors has boosted awareness and enhanced self-care.

Enhancing health literacy and improving information-seeking behaviors are crucial to alleviating anxiety among graduate students. Libraries can play a pivotal role by offering educational workshops that promote health literacy, enhance self-monitoring behaviors, and reduce anxiety related to information seeking. These strategies can empower students to make informed health decisions with greater confidence and less anxiety.

Given the complexity of the information-seeking process, various factors can influence its success or failure. By understanding the potential



anxiety-inducing elements, information seekers can effectively minimize barriers. Additionally, acknowledging that negative emotions during the information-seeking process are common can help reduce anxiety. Therefore, it is recommended that individuals become familiar with the concept of information-seeking anxiety and undergo the necessary training to manage it.

Declaration

Acknowledgment

The authors are grateful for the valuable efforts of the journal administrators, editors, and anonymous reviewers, whose comments and observations improved this study.

Conflict of Interest

The authors declared no conflicts of interest.

Ethical Statement

This article is part of a research project entitled "Investigating the Relationship between Health Literacy and Information Seeking Anxiety in Graduate Students of Tehran University of Medical Sciences," approved in 2023 by Hamadan University of Medical Sciences with the scientific project code 140205244063 and ethics code: IR.UMSHA.REC.1402.034.

Funding and Support

This research was conducted with financial support from Hamedan University of Medical Sciences.

Authors' Contribution

All of the authors have voluntarily and diligently collaborated in this research.

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