International Journal of Information Science and Management
Vol. 22, No. 3, 2024, 247 -259
DOI: https://doi.org/10.22034/ijism.2024.2003265.1122 / DOR: https://dorl.net/dor/20.1001.1.20088302.2024.22.3.14.5

Original Research

The Challenging Triangle: Online Health Information Seeking, Uncertainty, and Cyberchondria

Shahnaz Khademizadeh
Associate Prof., Department of Knowledge and Information Science, Faculty of Educational Sciences and Psychology, Shahid Chamran University of Ahvaz; Ahvaz, Iran.
Corresponding Author: sh_khademizadeh@yahoo.com
ORCID iD: https://orcid.org/0000-0003-4494-7709

Fatemeh Rafieinasab
Ph. D. candidate, Department of Knowledge and Information Science; Faculty of Educational Sciences and Psychology, Shahid Chamran University of Ahvaz, Ahvaz, Iran. and Librarian; Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.
ftmhrafiei@gmail.com
ORCID iD: https://orcid.org/0000-0001-7065-127X

Natarajan Radhakrishnan
Professor, Department of Library and Information Science, Periyar University, Salem, India.
mkuradha@gmail.com
ORCID iD: https://orcid.org/0000-0002-2046-094X

Received: 13 December 2023
Accepted: 26 May 2023

Abstract

Online health information seeking can be related to various factors. Past studies have shown that two factors of uncertainty and cyberchondria can play a role in this regard. In this regard, the present research was designed to investigate online health information seeking with uncertainty and other criteria using a descriptive survey method. It was carried out in the research community of Ahvaz health network clients. The data collection tool was three questionnaires, and the findings were analyzed using SPSS statistical software. The findings showed that in the sample of 260 people under investigation, the mean of online health information seeking in the group of women was higher than that of men, but no significant difference was reported. In examining the average uncertainty and cyberchondria in gender groups, uncertainty was reported higher in women than men (significant difference). However, cyberchondria was not significantly different in the groups of men and women. No significant difference was observed regarding the educational level. Among the research variables, the uncertainty and doubt in facing the information have increased online health information seeking among the visitors to the health centers of Ahvaz City. According to the current research results, planning and training in health information search and making valid health information accessible in various information platforms by the policymakers and managers of the country's health system is necessary and inevitable.

Keywords: Online Health Information Seeking, Uncertainty, Cyberchondria.

Introduction

Increasing people's access to health information has led to significant growth in online health information seeking among various communities. Increasing the access to and use of health information-seeking tools can make people feel calm and confident, or vice versa, strengthening fear and anxiety. Online health information seeking can sometimes lead to health anxiety The results of some studies have shown that despite more than half of the individuals who have engaged in online health information seeking being influenced in their disease decision-making and leading to effective doctor-patient communication, problems related to coercion and uncertainty regarding the acquired information have also been observed in managing certain diseases (Bati, Mandiracioglu, Govsa & Çam, 2018). While these benefits have been widely praised, this thirst for online knowledge has led to a problem called cyberchondria, or the excessive search for medical information, according to a study conducted by (Starcevic & Berle, 2013). Individuals who exhibit uncontrollable behaviors when viewing medical information online may be at risk for cyberchondria, a phenomenon in intensifying searches for online health information that leads to excessive concerns about physical health.

Cyberchondria refers to increased anxiety and worries about one's health status due to excessive searching for health-related information. cyberchondria is the frequent and excessive search for medical information through the Internet, which is accompanied by anxiety and distress and continues with failed attempts to regain reassurance (Fergus, 2014; Karsazi, Nasiri, Asfuri, Mahmood Alilou (2016). Based on what was said, when people search for health information online, they experience a decrease or increase in health anxiety when faced with the obtained information.

Online health information seeking can be a potential factor in increasing uncertainty, which intensifies health anxiety in people with high levels of uncertainty tolerance. People with a lower tolerance for uncertainty will experience uncertainty in stressful situations. uncertainty is described as a state of mind caused by ambiguous or unpleasant stimuli, where the reduction of uncertainty tolerance causes sensitivity to stimuli that leads to anxiety and uncertainty or self-confidence (ibid). The OED (n.d.) defines uncertainty as being uncertain or ambiguous, doubtful or dubious, an uncertain state or state of mind, and the need to gain confirmation or confidence from others, which will eventually cause anxiety for them.

Several types of research have been conducted regarding certainty and uncertainty in facing information, especially online information. All of them have pointed out that the user will experience a degree of uncertainty directly or indirectly when facing online information and searching for information online (Anderson 2006; D'ambra & Wilson, 2004; Eysenbach et al. 1998; Kuhlthau, 1997; Rose, 2006; Wilson, Ford, Ellis, Foster & Spink, 2002; Yoon, 1998). They believe that online health information is one of the factors directly related to cyberchondria.

According to the mentioned cases, in addition to describing the status of online health information seeking, uncertainty, and cyberchondria, this research intends to address the relationships between them and determine the direction of these relationships. Also, this research can be influential in completing information related to health information seeking. Research in this direction can clarify the path of seeking online health information and reveal more details. Also, the user's awareness of the uncertainty caused by searching for online health information and increasing the level of anxiety can be enlightening for him. As it turns out, this is probably the case for many users, and he is not the only one in this situation. In addition,

due to the practical nature of this project, the results obtained from it can be used by librarians and information specialists when providing and supplying health information needed by different people. Therefore, the questions of the current research were designed as follows:

1. Is there a significant relationship between online health information seeking, uncertainty, and cyberchondria in clients' access to Ahvaz health and treatment networks?

2. Is there a significant difference between online health information seeking, uncertainty, and cyberchondria among the clients of health and treatment networks in Ahvaz City by gender and educational level?

Literature Review

Bigdeli, Hayati, Heydari and Jokar (2016) conducted research with a sample of 400 young internet users in the city of Shiraz. The findings showed that most research population used the Internet to seek health information. Gender, education level, internet usage experience, and skills had a significant relationship with health information-seeking behavior through the internet. Consequently, using the internet to fulfill health information needs is high and requires attention to improving the quality of online health information, establishing reliable health databases, and providing comprehensive public education for evaluating the quality of online health information.

Baji, Haghighizadeh and Karimzadeh-Bardei (2019) researched health information-seeking behavior on the Internet among university students in Ahvaz city. The research method was correlational, and the target population included all students enrolled in universities in Ahvaz in 2018. The study's results indicated that health beliefs influence health information-seeking online. The internet, as the most important and accessible source of information, offers numerous advantages for students, which has increased the intensity and sensitivity of this group in using health information daily.

Sabbaghinejad, Poursovari and Karaei (2022) conducted research with a sample of 357 pregnant women attending Al-Zahra (SA) Hospital. The study showed that participating pregnant women had similar information needs regarding health information seeking online as other women in domestic and foreign studies. The high level of trust in internet information highlights the necessity of paying more attention to health education and health literacy during pregnancy by healthcare centers.

Kavosi, Vahedian, Montazeralfaraj, Dehghani Tafti and Bahrami (2020) investigated the online health information-seeking experience and quality of life. This study examined the behavioral relationship between online health information seeking and general health among female high school students in Iran. The sample for this research consisted of 295 high school students. The research tools used in this study included the Health E-Search Impact Questionnaire, designed by Kelly and colleagues in 2017 to measure online health information-seeking behavior, and the 36-item Short Form Health Survey (SF-36), designed to assess the health-related quality of life in individuals, consisting of 8 components: vitality, physical functioning, bodily pain, general health perception, physical role functioning, emotional role functioning, social role functioning, and mental health. The results showed that, on average, the participants used online health information in their health-related decisions and believed in the usefulness of the Internet for sharing their health experiences. Participants also expressed that website health information was relatively understandable and reliable. However, the results indicated that the online health information-seeking experience had no significant correlation with health-related quality of life. Participants also expressed that health information provided

on websites was relatively understandable and reliable. However, the results indicated that the online health information-seeking experience had no significant correlation with health-related quality of life (Parija, Tiwari, Sharma & Saha, 2020).

the evolutionary trend of using the internet as a source of health information between 2010 and 2017, as well as the characteristics of online health information seekers, their areas of interest, information sources used, trust in retrieved information, and potential impact on behavior in the French community investigated by Ducrot, Montagni, Nguyen Thanh, Serry and Richard (2021). The data were extracted from three national surveys (known as Health Barometers) conducted in 2010, 2014, and 2017 by the French National Public Health Agency. In this study, the participants in the three mentioned periods were 4,141 individuals in 2010, 4,811 in 2014, and 6,255 in 2017, respectively. The results showed that after a rapid growth in internet use for health information seeking during the period from 2010 to 2014, a parallel decrease in 2017 was observed, along with a decrease in trust in the quality and reliability of information available on the internet. These findings emphasize the necessity of enhancing e-health literacy among citizens and providing credible alternative sources that include a combination of popularity and access to public health information websites.

Bala, Suryavastav, Ningthoujam, Postangbam, Oinam, and Anal (2021) determine the influence of cyberchondria and information overload on preventive behaviors during the COVID-19 pandemic, with a focus on individuals in Manipur, India. The research tools used in this study were employed between June 10, 2020, and August 9, 2020, among individuals (767 participants with an average age of 45 years) who visited a regional homeopathic research institute in Imphal, India. The results of the research indicated that over 90% of the participants adopted preventive behaviors influenced by the information received through social media systems when a family member or neighbor tested positive for COVID-19. Additionally, 67% of individuals frequently searched for COVID-19-related news through social media. The mean standard deviation scores for cyberchondria and information overload were reported as 09.9 and 69.8, respectively, demonstrating a significant correlation between cyberchondria, information overload, and perceived vulnerability to COVID-19.

The reviewed studies indicate a prevalent trend of using the internet for health-related information seeking. Consequently, there is a pressing need to enhance the quality of online health information and improve users' information literacy to reduce uncertainty in their search process. International research has focused on exploring the complex relationships between variables such as online health information seeking, health anxiety, cyberchondria, and uncertainty. Findings reveal a meaningful association between health anxiety and the frequency, sources, amount, and time spent on online health information seeking. Additionally, two potential factors, anxiety sensitivity, and uncertainty intolerance, contribute to the perpetuation of cyberchondria. Individuals with low uncertainty tolerance may experience increased health anxiety when exposed to online health information, while those with high anxiety sensitivity tend to interpret anxiety-related cues as threatening, leading to heightened sensitivity towards medical websites. Consequently, this sensitivity reinforces the cyclical pattern of cyberchondria, as individuals' health anxiety drives them to conduct more online health information seeking. Overall, these studies highlight the significance of addressing online health information-seeking behaviors and understanding the interconnected factors influencing individuals' health-related perceptions and behaviors.

Material and Methods

This was a descriptive study of the correlation type, and the research community consisted of clients to health and treatment networks in Ahvaz city, who participated in the research based on the sample size formula of 260 people. The samples were selected by the method of relative stratification and randomly participated in the research. The inclusion criteria for the study were people referring to healthcare and medical networks who had a history of searching for online health information. In case of dissatisfaction and unwillingness to participate in the study, the individual was free not to complete the questionnaire. The data collection tool was three online health information search questionnaires, uncertainty, and cyberchondria. online health information search questionnaire with 20 questions was designed based on Davis, Bagozzi and Warshaw (1989) technology acceptance model. The criteria of this questionnaire include "perceived usefulness, ease of use, users' attitude towards use, and decision to use." The uncertainty tolerance questionnaire was presented by Carleton, Norton and Asmundson (2007) with 12 questions. This tool has two prospective and inhibitory dimensions. The shortened version of the Cyberchondria Severity Scale consists of 12 questions by McElroy and Shevlin (2014) and consists of four dimensions: "excessiveness, interference or compulsion, anxiety and distress, and reassurance". Scoring of all three questionnaires was done through a five-option Likert scale: very high: 5 points, high: 4 points, medium: 3 points, low: 2 points, and very low: 1 point. The reliability and validity of three instruments for the Persian language are reported to be quite favorable in the research by Sabbaghinejad et al. (2022). All the participants in this research completed the information with their consent, and a code was assigned to each participant to maintain the confidentiality of the information. After collecting the data, they were entered into SPSS software version 26 and analyzed. for data analysis, descriptive statistical tests, Kolmogorov–Smirnov test to check the normality of distribution, t-test of independent groups and Levin to compare groups, ANOVA and Post-hoc Least significant difference to compare more than two groups, Spearman correlation coefficient to check relationships between variables and Regression with entry method was used to check the intensity of the relationship.

Results

Out of 480 distributed questionnaires, 260 were completed, and the return rate of questionnaires was 54%. regarding demographic information. 60.5 (158) participants were women, and 39.1% (102) were men. these people were 21.8% (57 people), associate 8% (21 people), bachelor 38.3% in five levels (100 people), master's degree 25.3% (66 people), doctorate 1.6% (16 people). in checking normality, the distribution of Z test statistics for online health search is 0.047; uncertainty is 0.054, and 0.053 cyberchondria were obtained, which indicated a normal distribution.

According to the collected data, most respondents (31%) usually get information about health and hygiene through social networks such as WhatsApp, Telegram, etc. and a small number of respondents used printed sources and other sources. the results of the online health information seeking, uncertainty, and cyberchondria in two groups of men and women are presented in Table 1.

Table 1
Report of mean online health information seeking, uncertainty, cyberchondria by gender

variable	gender	mean	Standard deviation	standard error of the mean
Online Health Information Seeking	woman	70.94	13.81	1.11
	man	69.09	13.98	69.09
Uncertainly	woman	96.36	8.59	96.36
	man	37.50	6.92	0.675
Cyberchondria	woman	33.79	9.17	0.73
	man	34.65	8.82	0.86

According to the data in Table 1, the average of searching for health information online in the gender of women (70.94%) is higher than that of men, with an average of (69.06%). however, to determine the significance of the existing difference, it is necessary to use T-tests. Levene's test is used to check the variance difference between two groups. The application of the test is such that if the significance level of the test is less than 0.05, then the difference in the means will be significant. The average uncertainty in women's gender is reported to be 96.36%, which is higher than men with an average of 37.50%. according to Table 1, the average cyberchondria in women is reported to be 33.79%, which is lower than in men, with an average of 34.65%.

The results of one-way ANOVA based on the reported significance level of sig=0.676 show no significant difference in the average online health information seeking in different educational levels (Table 2). To find out more details, the LSD post hoc test was conducted separately for all components and items. The results of the one-way ANOVA (sig=0.681) do not show a significant difference in the average uncertainty in different educational levels, in this regard, there is no significant difference between the educational levels. There is no follow-up test. The results do not indicate the existence of a significant difference (sig=0.412) in the average of cyberchondria in different educational levels, and in this regard, there is no significant difference between the educational levels, so the test; There is no follow-up.

Table 2
one-way ANOVA test compares the mean online health information seeking, uncertainty, and cyberchondria in all educational levels

Online health information seeking	Sum of squares	df	mean square	F	Sig.
Within groups	451.533	4	112/883	0.851	0.676
between groups	49308.27	254	194.126		
uncertainty					
Within groups	188.908	4	47.22	0.575	0.681
between groups	20928/826	255	82.07		
Cyberchondria					
Within groups	251.192	4	62.79	0.993	0.412
between groups	16125.495	255	63.23		
Total	259				

As Table 3 shows, the correlation between the variables of online health information

seeking, uncertainty, and cyberchondria is significant at the 99% confidence level (0.001 error). therefore, the relationship between these three variables is direct and meaningful.

Table 3
Correlation between three variables of online health information seeking, uncertainty, and cyberchondria

		Online health Information seeking	Uncertainly	Cyberchondria
Online health Information seeking	The correlation coefficient	1	0.324	0.280
	Sig. (2-tailed)	0.001	0.001	
	Total	260	260	260
Uncertainly	The correlation coefficient	0.324	1	0.504
	Sig. (2-tailed)	0.001		0.001
	Total	260	260	260
Cyberchondria	The correlation coefficient	0.280	0.504	1
	Sig. (2-tailed)	0.001	0.001	
	Total	286	286	286

Discussion

the research findings regarding the current health information-seeking dimensions showed that the average perceived usefulness is 13.28, ease of use is 19.53, users' attitude towards use is 13.51, and the decision to use is 23.89. therefore, the highest average is related to the decision to use, and ease of use, most participants have chosen to use the Internet to obtain health information and ease of use. The results are consistent with the conclusions drawn by Bigdeli et al. in 2016, Ghasemi, Komeili Sani, Saki Malehi & Tumari in 2016, Sabbaghinejad et al. in 2022, as well as Solhju, Naghshineh and Fahimnia in 2016.

in the examination of the average health information online seeking, the findings showed that the women's average is 70.94 and the men's is 69.06. in comparing the mean of online health information seeking, the significance level of Levin's test was reported as 0.968%, which is higher than the value of 0.05, so the difference between the means is not significant. there is no significant difference between the status of online health information seeking in two groups of men and women. In comparing averages by educational level, no significant difference was observed in different variables between educational levels.

Uncertainty

The findings of the current research showed that the average of the prospective dimension of uncertainty is 20.56 (standard deviation 5.98), and the inhibitory dimension is 13.53 (standard deviation 4.04). Therefore, in the studied sample, the prospective dimension of uncertainty is experienced more. in this dimension, one pays attention to the future and refers to one's efforts to be aware of future events. In the inhibitory dimension, a person is worried that uncertainty and doubt will prevent him from facing upcoming events. In the current research, the prospective dimension of uncertainty has been assigned a more enormous scope.

In examining the average uncertainty by gender, the findings showed that the women's average is 96.36 and men's 37.50. in the comparison of uncertainty means, the significance level value of Levin's test was reported as 0.019%, which is less than 0.05, and the mean difference is significant, and the uncertainty status in both male and female groups had a significant difference with each other.

In examining the average uncertainty by educational level, the results of one-way ANOVA based on the reported significance level of sig=0.681 do not show a significant difference in the average uncertainty in different educational levels. in this regard, there is a significant difference between educational levels. does not have.

Chowdhury, Gibb and Landoni (2011) have paid attention to cognitive factors in creating uncertainty and believe that uncertainty in people is different according to different demographic characteristics; therefore, when measuring uncertainty, characteristics such as gender or level should considered account. Considered education. the results of the present study showed no significant difference between different groups regarding gender (male and female) and educational level regarding uncertainty, so the results are not consistent.

Cyberchondria

The findings of the present study showed that the average dimension of interference/compulsion of cyberchondria is 9.01, anxiety, and distress 9.95, reassurance 2.95, and extreme 2.39. Therefore, the highest average is related to the dimension of anxiety, and distress and the lowest average is related to the dimension of interference and coercion. the interference/coercion dimension refers to the destruction caused by online health information seeking. this dimension was reported to be less disturbing than other dimensions of cyberchondria by the studied sample. in examining the average of cyberchondria in two groups of men and women, the findings showed that the women's average was 33.79 and the men's 34.65. the significance level of Levin's test (sig) is reported as 0.606 percent, which is more than 0.05, so the difference between the means is insignificant. and there is no significant difference between male and female groups regarding average cyberchondria.

The relationship between online health information seeking, uncertainty, and cyberchondria

In examining the relationship between online health information seeking, uncertainty, and cyberchondria among the studied sample, the results of the correlation test showed that the correlation between the variables of online health information seeking, uncertainty, and cyberchondria was at the 99% confidence level (error 0.001). has Therefore, the relationship between these three variables is direct and meaningful (Anderson, 2006; Belkin, 1980; D'ambra & Wilson 2004; Dokhani, Zare, Hariri & Aletaha, 2018; Ellis, 1989; Fergus & Spada, 2017; Foster, 2004; Kuhlthau, 1997; McGee & Sawyerr, 2003; Spink, Bateman & Jansen, 1999; Wilson, 1999), They believe that searching for information in the four problems of diagnosis, definition, quality, and solving the situation leads to an increase in uncertainty, which is called continuous uncertainty. however, in the present study, the results showed that the uncertainty and unpleasant consequences caused by it increase Online health information seeking. therefore, the results are not consistent with each other.

Chowdhury et al. (2011) in their research, they concluded that uncertainty begins with the process of searching for information and is reduced only if a search is successful. in the current

research, a relationship between these two variables was seen, however type of relationship showed that the uncertainty in the user causes more searches for health information. therefore, the results are not consistent.

Concerning online health information search and cyberchondria, researchers (Eysenbach et al., 1998; McMullan, Berle, Arnáez & Starcevic, 2019; Muse, McManus, Leung, Meghreblian & Williams, 2012; Norr, Albanese, Oglesby, Allan & Schmidt, 2015; Te Poel, Baumgartner, Hartmann & Tanis, 2016; Spink et al., 1999) showed a direct relationship between these two variables, which the results of the present study are in line with. in this regard, Nowkarizi, Kashi and Sanatjoo (2017) showed an inverse relationship between these two variables. Fergus (2014) showed a weak relationship between these two variables, and McMullan et al. (2019) did not find a relationship between these two variables; therefore, the results of the present study are not in line with them. Regarding uncertainty and cyberchondria, the research by Karsazi et al. (2015) showed a direct relationship between these two variables, which the results of the present study are in line with. Regarding the three variables of health information search, uncertainty, and cyberchondria, the results of Norr, Capron and Schmidt (2014) showed a direct relationship between all three variables, and the results of the current research are in line with it.

Limitations

The current research, like all research, has limitations. The relevant sample of people referring to health centers was obtained from only one city; Therefore, the results may not be generalizable to all countries. Many variables beyond the researcher's control can influence online health information seeking.

Conclusion

A look at past research indicates that the variables of online health information seeking, uncertainty, and cyberchondria can be related. however, the nature of the relationship and the role of each variable has been reported differently in different research. the noteworthy point in examining the relationships between the variables in the present study with other studies is that in the present study, in addition to examining the presence or absence of a relationship between the variables, attention was also paid to the type and direction of the relationship. Also, by using regression, the role of variables in the cause-and-effect relationship was investigated. while other research was mostly limited to mentioning the existence or non-existence of the relationship. therefore, this point is significant when comparing the results. regarding the relationship between online health information seeking, and uncertainty, the results of the present study are in line with most of the previous studies. Nevertheless, when the role of variables is considered, the result of this research is different. In this research, cyberchondria and uncertainty were two predictive variables for online health information seeking. Therefore, online health information seeking was confirmed as a dependent variable. Among the points that can be noted in this regard, is the different nature of this variable from the other two variables. Searching for health information online is essentially action and behavior, but cyberchondria and uncertainty are subjective. therefore, this relationship and influence can be justified. a look at previous research showed that a person's doubt and uncertainty in different situations, especially situations that require obtaining health information, and his action to obtain health information through online search are directly related. here, in addition to confirming this relationship, it was found that uncertainty is a predictor of online health

information seeking. and there is little chance that a person will experience uncertainty after searching for health information online. on the other hand, the anxiety caused by health information (cyberchondria) leads to the search for more health information by the user. although these two-way relationships have been reported in most studies, this result was not achieved in the present study. In general, when a person is faced with an information need, he tries to solve his need by obtaining information, which is the result of the research in this direction. anxiety caused by encountering health information and, uncertainty and doubt in the user's condition, each as a necessity to obtain information "information need" will lead to action "online health information seeking".

Acknowledgments

This work has been supported by the Center for International Scientific Studies & Collaboration (CISSC), Ministry of Science Research and Technology (under project number 4000444).

References

Anderson, T. D. (2006). Uncertainty in action: Observing information seeking within the creative processes of scholarly research. *Information Research*, 12(1), n1. Retrieved from https://files.eric.ed.gov/fulltext/EJ1104687.pdf

Baji, F., Haghighizadeh, M., & Karimzadeh-Bardei, A. (2019). Investigation of Online Health Information Seeking Behavior among University Students in Ahvaz City, Iran. *Health Information Management* 16(4), 197–202. https://doi.org/10.22122/him.v16i4.3962 [in Persian]

Bala, R., Srivastava, A., Ningthoujam, G. D., Potsangbam, T., Oinam, A. & Anal, C. L. (2021). An observational study in Manipur state, India on preventive behavior influenced by social media during the COVID-19 pandemic mediated by cyberchondria and information overload. *Journal of Preventive Medicine and Public Health = Yebang Uihakhoe chi*, 54(1), 22–30. https://doi.org/10.3961/jpmph.20.465

Bati, A. H., Mandiracioglu, A., Govsa, F. & Çam, O. (2018). Health anxiety and cyberchondria among Ege University health science students. *Nurse Education Today*, 71, 169-173. https://doi.org/10.1016/j.nedt.2018.09.029

Belkin, N. J. (1980). Anomalous states of knowledge as a basis for information retrieval. *Canadian Journal of Information Science*, 5(1), 133-143. Retrieved from https://faculty.washington.edu/harryb/courses/INFO310/Belkin1980_ASK.pdf

Bigdeli, Z., Hayati, Z., Heidari, G., & Jowkar, T. (2016). Place of Internet in health information seeking behavior: Case of young internet users in Shiraz." *Human Information Interaction*, 3(1), 56-66. http://dorl.net/dor/20.1001.1.24237418.1395.3.1.7.1 [in Persian]

Carleton, R. N., Norton, M. A. & Asmundson, G. J. (2007). Fearing the unknown: A short version of the Intolerance of Uncertainty Scale. *Journal of Anxiety Disorders*, 21(1), 105–117. https://doi.org/10.1016/j.janxdis.2006.03.014.

Chowdhury, S., Gibb, F. & Landoni, M. (2011). Uncertainty in information seeking and retrieval: A study in an academic environment. *Information Processing & Management*, 47(2), 157-175. https://doi.org/10.1016/j.ipm.2010.09.006

D'ambra, J. & Wilson, C. S. (2004). Use of the World Wide Web for international travel: Integrating the construct of uncertainty in information seeking and the task-technology fit (TTF) model. *Journal of the American Society for Information Science and Technology*, 55(8), 731-742. https://doi.org/10.1002/asi.20017

Davis, F. D., Bagozzi, R. P. & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 35(8), 982-1003. https://doi.org/10.1287/mnsc.35.8.982

Dokhani, A., Zare, F., Hariri, N. & Aletaha, A. (2018). Investigating the Uncertainty of Users in Web retrieval. *Sciences and Techniques of Information Management*, 3(4), 1-22. https://doi.org/10.22091/stim.2018.2663.1179 [in Persian]

Ducrot, P., Montagni, I., Nguyen Thanh, V., Serry, A. J. & Richard, J. B. (2021). Evolution of online health-related information seeking in France from 2010 to 2017: results from nationally representative surveys. *Journal of Medical Internet Research*, 23(4), e18799. https://doi.org/10.2196/18799

Ellis, D. (1989). A behavioural model for information retrieval system design. *Journal of Information Science*, 15(4-5), 237-247. https://doi.org/10.1177/016555158901500406

Eysenbach, G., Gray, J. M., Bonati, M., Arunachalam, S., Diepgen, T. L., Impicciatore, P. & Pandolfini, C. (1998). Towards quality management of medical information on the internet: evaluation, labelling, and filtering of informationHallmarks for quality of informationQuality on the internetAssuring quality and relevance of internet information in the real world. *BMJ (Clinical Research ed.)*, 317(7171), 1496-1502. https://doi.org/10.1136/bmj.317.7171.1496

Fergus, T. A. (2014). The cyberchondria severity scale (CSS): An examination of structure and relations with health anxiety in a community sample. *Journal of Anxiety Disorders*, 28(6), 504–510. https://doi.org/10.1016/j.janxdis.2014.05.006

Fergus, T. A. (2015). Anxiety sensitivity and intolerance of uncertainty as potential risk factors for cyberchondria: A replication and extension examining dimensions of each construct. *Journal of Affective Disorders*, 184, 305-309. https://doi.org/10.1016/j.jad.2015.06.017

Fergus, T. A. & Spada, M. M. (2017). Cyberchondria: Examining relations with problematic Internet use and metacognitive beliefs. *Clinical psychology & psychotherapy*, 24(6), 1322–1330. https://doi.org/10.1002/cpp.2102

Foster, A. (2004). A nonlinear model of information-seeking behavior. *Journal of the American Society for Information Science and Technology*, 55(3), 228-237. https://doi.org/10.1002/asi.10359

Ghasemi, A. H., Komeili Sani, H., Saki Malehi, A. & Tumari, S. (2016). The search for health information on the net among undergraduate female students at Ahvaz Jundishapur University of Medical Sciences. *Educational Development of Jundishapur*, 7(4), 318-324. Retrieved from https://edj.ajums.ac.ir/article_79813_95056fa19821e4f6c960a06ace990f86.pdf [in Persian]

Karsazi, H., Nasiri, M., Asfuri, M., Mahmood Alilou, M. (2016). Prediction of cyberchondria based on components of anxiety sensitivity and intolerance of uncertainty among students of Tabriz universities in 2015. *Journal of Shahrekord University of Medical Sciences* 18(4), 45–56. [in Persian]

Kavosi, Z., Vahedian, S., Montazeralfaraj, R., Dehghani Tafti, A. & Bahrami, M. A. (2020). The correlation of online health information–seeking experience with health-related quality of life: Cross-sectional study among non–English-speaking female students in a religious community. *JMIR Medical Informatics*, 8(12), e23854. https://doi.org/ 10.2196/23854

Kuhlthau, C. C. (1997, August). The influence of uncertainty on the information seeking behavior of a securities analyst. In *Proceedings of an international conference on Information seeking in context* (pp. 268-274). Taylor Graham Publishing, Tampere, Finland. https://dl.acm.org/doi/10.5555/267190.267206

McElroy, E. & Shevlin, M. (2014). The development and initial validation of the cyberchondria severity scale (CSS). *Journal of Anxiety Disorders*, 28(2), 259–265. https://doi.org/10.1016/j.janxdis.2013.12.007

McGee, J. E. & Sawyerr, O. O. (2003). Uncertainty and information search activities: A study of owner–managers of small high-technology manufacturing firms. *Journal of Small Business Management*, 41(4), 385-401. https://doi.org/10.1111/1540-627X.00089

McMullan, R. D., Berle, D., Arnáez, S. & Starcevic, V. (2019). The relationships between health anxiety, online health information seeking, and cyberchondria: Systematic review and meta-analysis. *Journal of Affective Disorders*, 245, 270–278. https://doi.org/10.1016/j.jad.2018.11.037

Muse, K., McManus, F., Leung, C., Meghreblian, B. & Williams, J. M. (2012). Cyberchondriasis: fact or fiction? A preliminary examination of the relationship between health anxiety and searching for health information on the Internet. *Journal of anxiety disorders*, 26(1), 189–196. https://doi.org/10.1016/j.janxdis.2011.11.005

Nowkarizi, M., Kashi, Z. & Sanatjoo, A. (2017). The role of librarians, information services and information literacy skills of Ferdowsi University of Mashhad (FUM) graduate students in decreasing their information seeking anxiety. *Library and Information Sciences*, 20(4), 30-55. [in Persian]

Norr, A. M., Albanese, B. J., Oglesby, M. E., Allan, N. P. & Schmidt, N. B. (2015). Anxiety sensitivity and intolerance of uncertainty as potential risk factors for cyberchondria. *Journal of Affective Disorders*, 174, 64–69. https://doi.org/10.1016/j.jad.2014.11.023

Norr, A. M., Capron, D. W. & Schmidt, N. B. (2014). Medical information seeking: impact on risk for anxiety psychopathology. *Journal of Behavior Therapy and Experimental Psychiatry*, 45(3), 402–407. https://doi.org/10.1016/j.jbtep.2014.04.003

OED (n.d.). Oxford English Dictionary. Uncertainty. Retrieved from https://www.oed.com/

Parija, P. P., Tiwari, P., Sharma, P. & Saha, S. K. (2020). Determinants of online health information-seeking behavior: A cross-sectional survey among residents of an urban settlement in Delhi. *Journal of Education and Health Promotion*, 9, 344. https://doi.org/10.4103/jehp.jehp_238_20

Rose, M. (2006). The information activity of rail passenger information staff: A foundation for information system requirements. *Information Research*, 12(1). Retrieved from https://informationr.net/ir/12-1/paper275.html

Sabbaghinejad, Z., Poursovari, R. & Karaei, A. (2022). The relationship between online health information search, uncertainty and cyberchondria in college students. *Health Information Management* 18(5), 81, 210-215. https://doi.org/ 10.22122/him.v18i1.4412 [in Persian]

Solhju, N., Naghshineh, N. & Fahimnia, F. (2016). The Internet & pet health: Case study of online health information seeking behavior of pet owners. *Journal of Information Systems and Services*, 6(1–2), 1-16. Retrieved from https://www.sid.ir/paper/218108/fa [in Persian]

Spink, A., Bateman, J. & Jansen, B. J. (1999). Searching the Web: A survey of excite users. *Internet Research*, 9(2), 117-128. https://doi.org/10.1108/10662249910264882

Starcevic, V. & Berle, D. (2013). Cyberchondria: towards a better understanding of excessive health-related Internet use. *Expert Review of Neurotherapeutics*, 13(2), 205–213. https://doi.org/10.1586/ern.12.162

Te Poel, F., Baumgartner, S. E., Hartmann, T. & Tanis, M. (2016). The curious case of cyberchondria: A longitudinal study on the reciprocal relationship between health anxiety and online health information seeking. *Journal of Anxiety Disorders*, 43, 32-40. https://doi.org/10.1016/j.janxdis.2016.07.009

Wilson, T. D., Ford, N. J., Ellis, D., Foster, A. E. & Spink, A. (2002). Information seeking and mediated searching: Part 2. Uncertainty and its correlates. *Journal of the American society for Information Science and Technology*, 53(9), 704-715. https://doi.org/10.1002/asi.10082

Wilson, T. D. (1999). Models in information behaviour research. *Journal of Documentation*, 55(3), 249-270. https://doi.org/10.1108/EUM0000000007145

Yoon, K. (1998). The use of certainty and the role of topic and comment in interpersonal information seeking interaction. *Information Research*, 4(2). Retrieved from https://informationr.net/ir/4-2/isic/yoon.html