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The Influence of eHealth Literacy and Self-Efficacy on Online Health Information-Seeking Behaviour among University Students: Cyberchondria as a Mediator

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ABSTRACT

COVID-19 has seen an increased reliance on online health information, raising concerns over cyberchondria, a condition characterised by excessive worry about health based on online information. This quantitative survey study examines the prevalence of cyberchondria and its correlation with eHealth literacy among 168 university students and their online health information-seeking behaviour. The results showed a significant negative correlation between eHealth literacy and cyberchondria, revealing that individuals with higher eHealth literacy were less likely to experience cyberchondria. This study also found that demographic factors such as age, gender, and education level were associated with cyberchondria. The findings suggest that eHealth literacy is an important protective factor against cyberchondria as individuals with higher eHealth literacy may be better able to critically evaluate online health information and avoid becoming overly anxious about their health. Thus, public health interventions should focus on improving eHealth literacy, especially for those with a heightened risk of cyberchondria, through online health information literacy courses and training healthcare providers on how to discuss cyberchondria with patients.

Keywords: cyberchondria; eHealth literacy; health communication; online health information-seeking; self-efficacy; university students

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Introduction

The World Wide Web has revolutionised the way we access information, providing us with instant access to a vast and ever-growing body of knowledge. Inevitably, online searching for information which is health-related has become a customary part of our 21st-century lifestyle, enabling non-healthcare professionals to better understand health and illnesses. This was further solidified with the 2020 COVID-19 pandemic and the appearance of Monkeypox which, according to Google Trends (n.d), ranked as one of the top 5 most searched news keywords worldwide last year. However, this ability has also led to elicited fear and uncertainty surrounding diseases, resulting in the rise of exacerbated health worries and hypothetical online syndromes such as cyberchondria.

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Cyberchondria is defined as the act of excessive or obsessive health information searching online, associated with increased anxiety and stress (Starcevic, 2017). The term was first coined by White and Horvitz (2009), who linked online search engine use with escalation in medical concerns. The phenomena of excessive or repeated online searching for health information have been further associated with increased health anxiety and unnecessary medical consultations (Menon et al., 2020). Hence, problematic searching habits are linked to a heightened tendency of health-related anxiety. Such habits have an impending impact on how medical diagnosis and care are undertaken. Hullur et al. (2020) identified a significant number of non-medical, urban populations who attempted to self-diagnose their illnesses. Consequently, those who believed their online diagnosis to be accurate were more likely to have tried to self-diagnose.

This inherent negative consequence of the digital age consequently disrupts the medical system, calling for a pressing need to promote healthy and informed online health information seeking. As a result, the implication of being critical of online information is crucial. This is associated with the concept of eHealth literacy or the ability to access, understand, and use electronic health information to make informed health decisions, and eHealth literacy has been identified as a critical factor in the effective use of eHealth services (Norman & Skinner, 2006). With the COVID-19 pandemic, eHealth literacy has become even more critical, as individuals rely heavily on online health resources to stay informed about the virus and access healthcare services. This is even more crucial given the large volumes of medical information on the Web, some of which are erroneous, misleading users who have health concerns. Fisher et al.'s (2003) Information-Motivation-Behavioral Skills (IMB) model is used as a guide to evaluate this relationship. The model proposes the interaction of factors of information, motivation and behavioural skills in bringing a change in behaviour. Therefore, it is essential to examine the relationship between eHealth literacy and cyberchondria, especially in the age of COVID-19.

Despite the growing importance of eHealth literacy, particularly in the context of the COVID-19 pandemic, there remains a significant gap in research exploring its relationship to cyberchondria in the Malaysian context. While studies have established the negative consequences of cyberchondria on individuals' mental and emotional well-being, a comprehensive understanding of how eHealth literacy can mitigate or exacerbate cyberchondriac tendencies is still lacking in media research. This research gap highlights the need for further investigation into the interplay between eHealth literacy and cyberchondria, particularly in the context of increasingly prevalent online health information-seeking behaviours. Therefore, the core aim of this study is to assess how the information level combined with the motivation of self-efficacy affects cyberchondriac tendency among respondents during online health information searching. That being said, the defined research objectives are as follows:

1. To assess the prevalence and frequency of online health information seeking among respondents

2. To evaluate the level of eHealth literacy, self-efficacy, cyberchondria severity, and health information-seeking behaviour among respondents

3. To examine the correlation between eHealth literacy, self-efficacy, cyberchondriac severity and health information-seeking behaviour among respondents

4. To investigate the mediating effect of cyberchondria on the relationship between eHealth literacy and health information-seeking behaviour among respondents

Literature Review

eHealth Literacy

Norman and Skinner (2006) define eHealth literacy as "the ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to addressing or solving a health problem" (p.1). It acts as an indicator of an individual's ability to make appropriate health judgments for themselves as well as those around them from the vast pool of data that is on the World Wide Web. This includes sources such as Internet searches and social media on various topics, from chronic illnesses to wellness and obesity (Alduraywish et al., 2020; Laranjo et al., 2015). Hence, the

Internet is becoming one of the most common sources of health-related information due to the increasing prevalence of online health websites. However, despite the ease of access and constant availability, health literacy among the general public without any medical background arises as an issue.

A national survey of the Malaysian population uncovered that the majority had a considerably low level of health literacy, categorised at a lower sufficiency level across three identified domains—healthcare, disease prevention and health promotion (Jaafar et al., 2021). In parallel, similar results were found in a study of patients attending a Malaysian clinic, where low eHealth literacy was observed despite a high level of confidence in searching for health information (Wong et al., 2022). The studies indicate that the public can acquire the information with ease, but lacks the skills needed to appraise and process the quality of the information and use it to assist them in the health decision-making process. While the behaviour associated with eHealth information has been widely explored among older adults and senior citizens, the same subject matter among younger adults and their perception of health remain relatively under-researched. It refers to the available sources of health information on the web, the site of useful health resources on the Internet, methods to access the resources, the use of the Internet for responding to health issues, and finally the capacity to evaluate online health information and to identify high-quality sources (Filabadi et al., 2020).

Self-Efficacy

Bandura (1994) defines perceived self-efficacy as "individuals' perceived capabilities to attain designated types of performances and achieve specific results" (p. 12). It determines how people feel, think, motivate themselves and behave, leading to high assurance in their abilities to approach tasks and conquer challenges rather than perceiving them as a threat to be avoided. According to the concept of self-efficacy, individuals' self-esteem over their ability to achieve certain goals can be influenced by four main sources; mastery experiences, creating and strengthening self-beliefs, social persuasion and modifying self-beliefs (Bandura, 2008).

The implication of self-efficacy is evident in various areas, from education and health to information seeking. Individuals with high self-efficacy are more likely to set ambitious goals, persist in the face of challenges, and achieve success. This is in the context of understanding individuals' beliefs about their ability to succeed in various domains, regardless of their cultural background. Schwarzer and Jerusalem's (1995) General Self-Efficacy Scale (GSE) presents a robust framework, assessing self-efficacy levels across a broad range of applications. The scale measures individuals' general sense of self-efficacy across various domains, such as academic and social tasks. The conceptualisation of the scale has been evaluated and recognised as a universal construct applicable across a variety of functioning domains and broad cultural contexts around the world (Scholz et al., 2002).

Cyberchondria

The concept of cyberchondria has been derived from the term "hypochondria," with its implications clearly seen in the digital age. It refers to behavioural patterns and emotional states beyond what is considered normal as a result of continuous online health-related searches (Starcevic, 2017). Numerous studies have been conducted on the phenomenon, especially in the recent context of the novel COVID-19 pandemic (Jungmann & Witthöft, 2020; Peng et al., 2021). In a more local context, the implications of cyberchondria have been researched in Malaysia across various sociological variables. Lkhagvasuren et al. (2021) found the prevalence of cyberchondria to be relatively high among late adolescent females in Malaysia, with more than half of the participants reporting engaging in excessive online health information-seeking. The study reported a significant correlation between cyberchondria and health anxiety, suggesting that excessive online health information seeking may lead to increased health anxiety.

Research conducted by Makarla et al. (2019), primarily among young employees below the age of 35, discovered that over half of the participants had some form of cyberchondria tendency. Conducted on a sample of youth working in the IT industry, the study found cyberchondria to be more common among females, especially those with higher levels of health anxiety and past histories of medical illnesses. A similar observation was made among young dental students between the ages of 24 and 26, who have

more "heightened compulsion and distress" associated with cyberchondriac tendency (Patanapu et al., 2022). This is associated with web searches acting as a disruption to other aspects of online and real-life activities, evoking negative emotions.

Health Information-Seeking Behaviour

In the context of the COVID-19 pandemic, a great deal of research has been conducted to examine online health information seeking and its implication on health change behaviour such as disease prevention during the outbreak. A study by Ma et al. (2023) found that older adults with higher levels of self-efficacy, health literacy, and trust in online health information sources were more likely to engage in online health information-seeking behaviour. It suggested that online health information-seeking behaviour can be better understood from a social cognitive perspective and factors such as self-efficacy, health literacy, trust, social support, and perceived benefits.

Additionally, change in behaviour is heavily dependent on the quality of the source of health information acquired. These are parallel factors highlighted by multiple studies assessing the elements influencing online health information-seeking behaviour. Dutta et al. (2010) identified aspects such as quality, accuracy, currency, completeness, comprehensiveness, and coverage in evaluating health information quality. Meanwhile, the perceived credibility of information has been associated with source, medium, and message credibility (Hu & Shyam Sundar, 2010). These aspects pinpoint the medium through which the information is acquired and the form it takes in influencing online information-seeking behaviour among consumers. These factors should be considered when strategising and designing health information interventions. Similarly, other factors influencing this online health information-seeking behaviour include age, educational level, income, and perceived health status. In a study conducted in Ghana, younger participants with higher educational levels and incomes perceived themselves to be in poorer health and were more likely to engage in online health information seeking (Nangsangna & Da-Costa Vroom, 2019).

Relationship between eHealth Literacy, Self-Efficacy, Cyberchondria and Health Information-Seeking Behaviour

Research has linked eHealth literacy, self-efficacy and cyberchondria individually in pairs, but there are limited studies with a prime focus associated with these dimensions under a singular model. Firstly, the two concepts of eHealth Literacy and self-efficacy are closely related, given that individuals perceived confidence in their ability to use online health information effectively can influence their eHealth literacy skills. Research has shown a positive and statistically significant correlation between eHealth literacy and self-efficacy (Filabadi et al., 2020), such as that conducted on students with an associated positive correlation between eHealth literacy and self-efficacy, suggesting that those with higher eHealth literacy were more likely to have higher self-efficacy levels (Sögüt et al., 2022).

Similarly, self-efficacy mediates the effect of health literacy on health behavioural intentions in the context of social media, pinpointing a relatively stronger association between health literacy and self-efficacy, particularly among younger demographics, whereby self-efficacy, particularly on social media is connected to bear a mediating role in the influence of eHealth literacy (Niu et al., 2020; Sun et al., 2022). Furthermore, an individual with enhanced self-efficacy is deduced to be more likely to engage in the health information search online for "health awareness opportunities and feel empowered (being in control of one's own health)" (Efthymiou et al., 2017, p. 4). The associated links between knowledge and action prevail, with those with a high level of self-efficacy more likely to actively seek health information and empower themselves in the process.

Conversely, cyberchondria and eHealth literacy interrelate as higher levels of self-efficacy are associated with lower levels of cyberchondria. Zheng et al. (2020) found an indirect moderating effect of eHealth literacy on cyberchondria, stating, "effect of affective responses on cyberchondria may be contingent on users' level of e-health literacy" (p. 2). As a result, those with relatively low eHealth literacy are vulnerable to developing problematic searching and also more likely to engage in excessive online health information seeking, especially if they are anxious or worried. This is because they may not be able to effectively evaluate the quality of the information they find online, and they may be more likely to believe in inaccurate or misleading information (Doherty-Torstrick et al., 2016). Hence, a greater level of self-efficacy comes with the presumption that individuals feel more confident in their ability to manage their health and navigate health information, reducing their tendency to engage in excessive online health information-seeking behaviour in the form of cyberchondria.

Meanwhile, Sun et al. (2022) found that eHealth literacy was positively associated with self-efficacy, and both eHealth literacy and self-efficacy were positively associated with health information-seeking behaviour. This means that those with greater confidence in their ability to find and use health information are more likely to seek out health information online. Similarly, individuals with higher levels of health anxiety were more likely to search for health information online frequently and to spend more time overall on health-related Internet activities (Singh & Brown, 2014), suggesting that health anxiety may be associated with increased online health information-seeking behaviour.

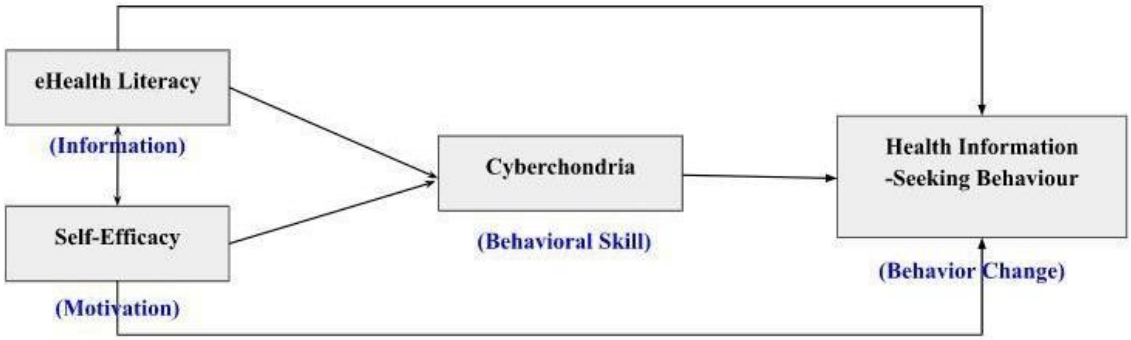
On the other side of the spectrum, studies conducted among adults in Saudi Arabia identified eHealth literacy as a significant predictor of higher cyberchondria scores (Alduraywish et al., 2020). In another similar study, cyberchondria was significantly correlated with smartphone addiction under the pretense "having a high eHealth literacy can result in believing the self-diagnosis" (El-Zayat et al., 2023, p. 166). This is in contrast to the deduced rationale that e-health literacy "helps users with affective responses to reduce the possibility of developing symptoms of cyberchondria such as unnecessary and repeated searches and escalation of distress" (Zheng et al., 2020, p. 4). As a result, people who are more anxious about their health are more likely to seek out online health information and take preventive measures against COVID-19. This is because the anxiety they experience from searching for health information online motivates them to acquire accurate information and apply it accordingly.

Research Framework

This study is guided by a modified version of the Information-Motivation-Behavioural Skills (IMB) model developed by Fisher et al. (2003). According to the model, behaviour is determined by three factors: information, motivation, and skills, and information refers to the knowledge and understanding an individual has about a particular behaviour, such as the risks and benefits associated with it. Meanwhile, motivation is the individual's desire or intention to engage in the said behaviour, influenced by attitudes, beliefs, values, and social norms. Lastly, behaviour is the ability to perform it with the knowledge of the steps involved and the confidence to carry them out. The IMB model has been widely applied in health promotion and behaviour change interventions and has been proved to be effective in improving a range of health behaviours (Fisher et al., 2003). The model is based on the notion that accurate and relevant information can increase knowledge about the behaviour and its benefits, which may in turn increase motivation to engage in the behaviour. Hence, for the purpose of this study, the behaviour change in the context is the health information-seeking behaviour assessed through the mediating effect of cyberchondria affected by eHealth literacy and self-efficacy. The conceptual model in Figure 1 illustrates the underlying intention of the research design to explore the relationship between cyberchondria, eHealth literacy, and health information-seeking behaviour.

Figure 1

Conceptual Framework



H1: There is a positive correlation between eHealth literacy and self-efficacy.

H2: There is a positive correlation between eHealth literacy and health information-seeking behaviour.

H3: There is a positive correlation between self-efficacy and health information-seeking behaviour.

H4: There is a positive correlation between cyberchondriac severity and health information-seeking behaviour.

H5: Cyberchondria mediates the relationship between eHealth literacy and health information-seeking behaviour.

Methods

Research Design

The study employs quantitative methodology, accumulating numerical data to assess eHealth literacy, self-efficacy and cyberchondriac tendency, collected through a well-structured questionnaire distributed to the targeted population. Questionnaire surveys are widely utilised in quantitative social science research due to their ability to estimate the attitudes and behaviours of large populations by converting them into numerical data for statistical comparison. This method provides an extensive insight into the prevalence, trends, and actions of people, enabling researchers to draw meaningful conclusions (Ponto, 2015). Therefore, a survey questionnaire was implemented to acquire first-hand data representing the population's cyberchondriac behaviour and achieve the research objectives of this study. A set of existing, validated scales was adopted along with a newly developed scale in the design of the questionnaire.

Sampling Procedure

This study employed a non-probability, convenient sampling method to collect data from 168 respondents affiliated with the International Islamic University Malaysia (IIUM). This sampling approach was chosen due to practical constraints in accessing respondents, and it involved conveniently selecting participants from the broader student population across the university campus. The survey was administered in Google Form and disseminated online to the identified participants. This approach facilitated the ease of data collection and subsequent analysis, leveraging the digital capabilities provided by the online platform.

Measurement

The questionnaire was divided into FIVE sections. Section A covered demographic information and respondents' source of health information, the need for health information and accounts of online health information sought in the past month. Norman and Skinner's eHEALS scale was adopted in Section B

to evaluate critical health information searching ability online and measured across eight items on a 5-point Likert scale of 1 (strongly disagree) to 5 (strongly agree), with a higher score indicating greater eHealth literacy. Schwarzer and Jerusalem's (1995) General Self-Efficacy Scale (GSE), consisting of 10 items, was adapted to assess respondents' self-efficacy in assessing health-related tasks. Respondents were instructed to rate statements like "I am confident that I can deal effectively with unexpected events" on a scale of 1 (not at all true) to 4 (exactly true), with higher scores indicating greater levels of self-efficacy. Section D adapted the shortened Cyberchondria Severity Scale (CSS-12) (McElroy et al., 2019). The scale consists of 12 items measured on a 5-point scale of 1 (never) to 5 (very often), with a higher score indicating a greater cyberchondriac tendency in terms of anxiety, worry, reassurance-seeking behaviour, and negative consequences of online health searching. Lastly, a new research instrument was constructed to measure health information-seeking behaviour in Section E. It was developed across two different measurement standards of Credibility of Source and Quality of Information, containing a total of seven items. The credibility of the source is measured across the dimension of source, medium and authorship credentials associated with the perceived expertise or trustworthiness of the source in delivering accurate information (Hu & Shyam Sundar, 2010), while the quality of information is studied over the dimensions of accuracy, references and sources, currency and disclosures of the health information acquired. These are among the key aspects linked to the Internet being a primary source of health information (Dutta et al., 2010).

Data Collection

The study was conducted on 168 respondents, conveniently sampled from the International Islamic University Malaysia (IIUM). Due to constraints of acquiring respondents, a non-probability, convenient sampling method was employed to collect data, from the pool of students across the university campus. The survey was administered in Google Form and disseminated online to ease the data collection and analysis process.

Reliability Analysis

A pilot study on 33 respondents was conducted to test the validity of the instrument prior to the actual implementation. As illustrated in Table 1, the internal consistency of the scales was tested using Cronbach's Alpha, both during the pilot study and the actual data collection. In the behavioural and social sciences, Cronbach's alpha values of 0.80 and above are generally considered good or excellent; those ranging between 0.70 and 0.79 are deemed acceptable, especially in the context of complex constructs, while values below 0.70 may warrant further investigation into potential issues (Cortina, 1993). Taking the following threshold into consideration, the scales for each variable were highly reliable, measuring above the range of 0.80. The alpha value for health literacy (HL) consisting of 8 items was .91 (α = .91), self-efficacy (SE) consisting of 10 items .86 (α = .86), cyberchondriac severity (CS) across 11 items .88 (α =.88) and health information-seeking behaviour (HISB) measured on 7 items .92 (α =.92). The reliability for three out of the four variable scales improved during the actual data collection with health literacy .92, while self-efficacy and cyberchondriac severity were both .89.

Table 1

Reliability Analysis Using Cronbach's Alpha

Variables/Scales	**No. of Items**	**Cronbach's Alpha Value**	
		Pilot (n=33)	**Actual Data (n=168)**
Health Literacy (HL)	8	.91	.92
Self-Efficacy (SE)	10	.86	.89

Cyberchondriac Severity (CS)	11	.88	.89
Health Information-Seeking Behaviour (HISB)	7	.92	.91

Data Analysis

Given the exploratory nature of the study, a combination of descriptive and inferential (correlational analysis) was conducted using SPSS Statistics 20 to assess the relationship between variables. A series of one-sample t-tests were used to determine whether the mean of the sample significantly differed from the predetermined test value on data scores of all four scales to assess the eHealth literacy, self-efficacy, health information-seeking behaviour, and cyberchondriac tendency among the respondents. Meanwhile, Kendall tau (τ) correlation analysis was used to measure the strength and direction of the relationship between the predictor variables of eHealth literacy, self-efficacy, cyberchondria severity and outcome variable of health information-seeking behaviour. With the range between -1.0 to +1.0, a value near 0 suggests no connection, while a value closer to ±1 indicates a strong association between variables (Neuman, 2014; Magiya, 2019). Following that, mediation analysis using Hayes' Macro Process via the bootstrapping method was applied to consider whether cyberchondria has a mediational effect. A mediation analysis refers to the effect of a third variable intervening in the relationship between a predictor and outcome variable of interest (Baron & Kenny, 1986). Thus, this assesses whether there is still a statistical relationship between independent variables of eHealth literacy and self-efficacy and dependent variable health information-seeking behaviour when cyberchondria is taken out of the equation.

Results and Discussion

Demographic Information

As illustrated in Table 2, out of the 168 participants, a vast majority of 86.3% (145) respondents who participated in the survey were aged 18-25 years old, while only 1.2% were under 18 years old and 12.5% belonged to the 26-33 years old category. In terms of gender, there was a higher number of female respondents (74.4%) compared to male respondents (25.6%).

Table 2

Demographic Background of Respondents

Demographic Characteristics	Category	Frequency	Percentage (%)
Age	Below 18 years old	2	1.2
	18-25 years old	145	86.3
	26-33 years old	21	12.5
	Total	**168**	**100.0**

Gender	Male	43	25.6
	Female	125	74.4
	Total	**168**	**100.0**

Prevalence and Frequency of Health Information Seeking

As illustrated in Table 3, health information seeking was prevalent, with 80.4% of respondents reporting that they had sought health information online in the past month. In terms of online searching frequency for health information, over half (50.6%) of the respondents stated they "sometimes" queried related information, while 27.4% and 10.1% "often" and "always" sought health information online, respectively. In other words, health information searching online was generally prevalent and frequent among the respondents. This can be connected to previous studies associating searching behaviour with increasing Internet use patterns to find health information. This is evident given the ease of access and constant availability, even for those without any medical background, which was less widely available in the past (Jaafar et al., 2021; Wong et al., 2022). Overall, these findings suggest that people are able to find and use health information online, which can have a positive impact on their health. They are all important factors that can influence how people use the Internet to find health information.

Table 3

Prevalence and Searching Frequency of Health Information Seeking

	Characteristics	**Frequency**	**Percentage (%)**
Prevalence	Yes	135	80.4
	No	33	19.6
	Total	**168**	**100.0**
Searching frequency	Never	1	0.6
	Rarely	19	11.3
	Sometimes	85	50.6
	Often	46	27.4
	Always	17	10.1
	Total	**168**	**100.0**

eHealth Literacy

A one-sample t-test revealed the mean of eHealth literacy among the respondents against the mid-test value of 3.00. The eHealth literacy mean among respondents (M = 3.60, SD = 0.86) was moderately high at t (167) = 9.19, p = 0.0, with a minimum score of 3.34 and a maximum score of 3.71. Item 2, "I know how to use the Internet to answer my health questions", rated highest among the rest of the statements, while responses regarding confidence in using the information were lowest on the statement "I feel confident in using information from the Internet to make health decisions." Nevertheless, the overall statistical mean signified a generally high level of health literacy on the Internet among the respondents, which suggests that they have a good understanding of how to use the Internet to find health information. This is important, as it means that people are able to find accurate and reliable health information online. However, the values indicate that the degree to which respondents have the ability is still insufficient. This is in line with the National Survey and the study by Wong et al. (2022), which suggested that despite having the ability to acquire information with ease, the capacity to appraise and process the quality and make consequent health decision-making following the said information is still lacking. Thus, despite the availability of information, ease of access and searching confidence measure using the survey, eHealth literacy is not sufficiently considered to be high.

Table 4

One Sample t-test for Information: eHealth Literacy (HLL)

		*Test value= 3					
no.	**Items (n=168)**	**M**	**SD**	**t***	**%**	**df**	**p**
2	I know how to use the Internet to answer my health questions	3.71	0.85	10.80	74.20	167	0.00
4	I know where to find helpful health resources on the Internet	3.70	0.78	11.58	74.00	167	0.00
3	I know what health resources are available on the Internet	3.68	0.78	11.45	73.60	167	0.00
1	I know how to find helpful health resources on the Internet	3.67	0.79	11.00	73.40	167	0.00
5	I know how to use the health information I find on the Internet to help me	3.63	0.84	9.66	72.60	167	0.00
7	I can tell high quality from low-quality health resources on the Internet	3.53	1.00	6.85	70.60	167	0.00
6	I have the skills I need to evaluate the health resources I find on the Internet	3.50	0.85	7.65	70.00	167	0.00
8	I feel confident in using information from the Internet to make health decisions	3.34	0.97	4.56	66.80	167	0.00
	Overall eHealth Literacy	**3.60**	**0.86**	**9.19**	**71.90**	**167**	**0.00**

Note:1= Strongly Disagree; 2= Disagree; 3= Somewhat Agree; 4= Agree; 5= Strongly Agree

Perception of Self-efficacy

Self-efficacy among respondents (M = 2.94, SD = 0.72) was higher than the mid-value of 2.5, statistically significant at t (164) = 8.22, p = 0.0, with a minimum score of 2.76 and a maximum score of 3.27. The statement, "I can solve most problems if I put in the necessary effort" ranked the highest among the rest of the items on the scale, representing confidence regarding effort yielding. As per Schwarzer and Jerusalem's (1995) General Self-Efficacy Scale (GSE) measurements, data acquired showed a moderately significant self-efficacy, with 73.4% of respondents expressing confidence towards the statements. This suggests that they have confidence in their ability to find and use health

information online. While it is true that self-efficacy is an important factor that can influence how people use the Internet to find health information, as highlighted previously, confidence in online health searching alone does not account for their ability to use that information in the application. The statistical result suggests there is still room for improvement regarding self-efficacy in online health information seeking, with future research dedicated to assessing it in conjunction with other factors.

Table 5

One Sample t-test for Self-Efficacy (SEL)

		*Test value= 2.5					
no.	**Items (n=168)**	**M**	**SD**	**t***	**%**	**df**	**p**
6	I can solve most problems if I put in the necessary effort.	3.27	0.65	15.34	81.75	167	0.00
8	When I am faced with a problem, I can usually find several solutions.	3.02	0.67	10.07	75.50	167	0.00
1	I can always manage to solve difficult problems if I try hard enough	3.12	0.61	13.21	78.00	167	0.00
9	If I am in trouble, I can usually think of a solution	2.98	0.69	8.92	74.50	167	0.00
7	I can remain calm when facing difficulties because I can rely on my coping abilities.	2.89	0.77	6.58	72.25	167	0.00
10	I can usually handle whatever comes my way	2.88	0.74	6.67	72.00	167	0.00
3	It is easy for me to stick to my aims and accomplish my goals.	2.82	0.74	5.66	70.50	167	0.00
2	If someone opposes me, I can find the means and ways to get what I want.	2.81	0.78	5.14	70.25	167	0.00
5	Thanks to my resourcefulness, I know how to handle unforeseen situations	2.81	0.73	5.47	70.25	167	0.00
4	I am confident that I can efficiently deal with unexpected events.	2.76	0.82	4.14	69.00	167	0.00
	Overall Self-Efficacy	**2.94**	**0.72**	**8.12**	**73.40**	**167**	**0.00**

Note: 1= Not at all true; 2= Hardly true; 3= Moderately true; 4= Exactly true

Perception of Cyberchondriac Severity

The mean for cyberchondria severity score (M = 3.19, SD = 1.13) was slightly higher than the normal score of 3.0, statistically significant at t (164) = 7.27, p = 0.0, with a minimum score of 2.60 and a maximum score of 3.89. While all other items were rated higher, item 10, which states "Researching symptoms or perceived medical conditions online interrupts my offline social activities (e.g., reduces time spent with friends/family)", received the lowest rating. In other words, 63.83% of the sample responded had a degree of cyberchondriac tendency. As a result, the data showed a moderately high cyberchondria tendency among the sampled respondents. This means that they were more likely to experience anxiety and worry about their health, and they may be more likely to search for health information online. The percentage is similar to that in past studies on young adults, which discovered that over half of the respondents displayed some degree of cyberchondriac tendency (Makarla et al., 2019; Lkhagvasuren et al., 2021). Therefore, it appears to be a concerning factor to be considered as it reflects young people's outlook on health and diseases as well as their trust towards medical practitioners.

Table 6

One Sample t-test for Cyberchondria Severity (CSL)

		*Test value= 3					
no.	**Items (n=168)**	**M**	**SD**	**t***	**%**	**df**	**p**
3	I read different web pages about the same condition	3.89	0.96	12.02	77.80	167	0.00
1	If I notice an unexplained bodily sensation I will search for it on the Internet	3.61	1.03	7.74	72.20	167	0.00
6	I enter the same symptoms into a web search on more than one occasion	3.45	1.05	5.52	69.00	167	0.00
8	I think I am fine until I read about a serious condition online	3.17	1.11	1.94	63.40	167	0.00
5	Researching symptoms or perceived medical conditions online leads me to consult with my doctor/medical practitioner	3.12	1.16	1.33	62.40	167	0.00
2	Researching symptoms or perceived medical conditions online distracts me from reading news/sports/entertainment articles online	3.06	1.17	0.66	61.20	167	0.00
4	I start to panic when I read online that a symptom I have is found in a rare/serious condition	3.03	1.15	0.34	60.60	167	0.00
9	I feel more anxious or distressed after researching symptoms or perceived medical conditions online	3.02	1.18	0.20	60.40	167	0.00
7	Researching symptoms or perceived medical conditions online interrupts my work (e.g. writing emails, working on Word documents etc.)	2.67	1.25	-3.45	53.40	167	0.09
11	I suggest to my GP/medical professional that I may need a diagnostic procedure that I read about online (e.g. a biopsy/ a specific blood test)	2.67	1.24	-3.42	53.40	167	0.09
10	Researching symptoms or perceived medical conditions online interrupts my offline social activities (e.g. reduces time spent with friends/family)	2.60	1.16	-4.44	52.00	167	0.37
	Overall Cyberchondria Severity	**3.19**	**1.13**	**1.67**	**63.83**	**167**	**0.05**

Note: 1= Never; 2= Rarely; 3= Sometimes; 4= Often; 5= Always

Level of Health Information-seeking Behaviour

One-sample t-test run on the outcome variable of health information-seeking behaviour generated a mean of (M = 3.88, SD = 0.85), which was significantly higher than the test value of 3 at t (164) = 7.27, p = 0.0. That is nearly 78% of responses responding to positive health information-seeking behaviour. The lowest score was 3.70, while the highest was 4.00 on the statement "I am more critical of the accuracy of the health information I seek". This insinuates that being critical and accurate plays an important part in respondents' behaviour towards health information seeking online, statistically reflecting a more positive health information-seeking behaviour. To summarise, factors such as criticality and accuracy of information ranked the highest among respondents, followed by selectivity and source credibility. This accounts for being meticulous in online searching regarding health information and being critical of the accuracy and credibility of the information found. Factors of accuracy and perceived credibility have been a few of the highlighted factors in past research in addition to quality, currency, completeness, comprehensiveness and coverage in the evaluation of health information quality (Dutta et al., 2010; Hu & Shyam Sundar, 2010), thus alluding to positive information-seeking behaviour in regard to online health matters.

Table 7

One Sample t-test for Behaviour: Health Information-Seeking Behaviour (HISB)

		*Test value= 3					
no.	**Items (n=168)**	**M**	**SD**	**t***	**%**	**df**	**p**
4	I am more critical of the accuracy of the health information I seek	4.00	0.77	16.75	80.00	167	0.00
1	I am more selective about the source credibility of health information I seek (eg. websites like WebMed, healthline.com, etc.)	3.99	0.81	15.95	79.80	167	0.00
2	I am more selective about the medium of health information I seek (eg. online newspapers, Youtube videos, blogs, etc.)	3.96	0.83	15.01	79.20	167	0.00
6	I am more critical about the currency or how up-to-date the health information I seek	3.89	0.83	13.86	77.80	167	0.00
3	I am more selective about the authorship of health information I seek (eg. names, affiliations, credentials of the author)	3.82	0.86	12.42	76.40	167	0.00
5	I am more critical of the listed references and sources attributed to the health information I seek	3.77	0.87	11.46	75.40	167	0.00
7	I am more critical about the presence of disclosures of the health information I seek (eg. sponsorship, funding, potential conflicts of interest)	3.70	0.97	9.35	74.00	167	0.00
	Overall Health Information-Seeking Behaviour	**3.88**	**0.85**	**13.54**	**77.51**	**167**	**0.00**

Note:1= Strongly Disagree; 2= Disagree; 3= Somewhat Agree; 4= Agree; 5= Strongly

Relationship between eHealth Literacy, Self-Efficacy, Cyberchondria and Health Information-Seeking Behaviour

One of the primary objectives of the study is to examine the correlation between eHealth literacy, self-efficacy, cyberchondriac severity and health information-seeking behaviour among respondents. The data in Table 8 show the Kendall Tau zero-order correlation between the variables. The deduced analysis of the results revealed that there was a significant positive correlation between the four variables. However, the consequential strengths of the relationship differ between some variables than others.

Firstly, eHealth literacy positively correlated with self-efficacy ($r = .304$, $p < .001$), showing a medium correlation between the two variables and insinuating a positive correlation between the two variables. This supports the idea that respondents with higher eHealth literacy displayed higher self-efficacy and vice versa. In other words, the ability to seek, understand and assess health information online contributed to greater confidence in searching for information in the form of self-efficacy and positive information-seeking behaviour. Despite a moderate correlation, the results were statistically significant, corresponding with previous research by Filabadi et al. (2020) and Sögüt et al. (2022) that discovered a similar association between these two factors, whereby individuals with greater eHealth literacy were more likely to have higher self-efficacy. Likewise, self-efficacy was found to have a role in the influence of eHealth literacy (Niu et al., 2020; Sun et al., 2022). Therefore, individuals who exhibited a heightened confidence in navigating online health information were found to possess superior eHealth literacy compared to their counterparts lacking such confidence. This can be accounted to the close relationship between the concepts, as one's confidence in their ability to use online health information can affect their ability to acquire and use the information effectively. Thus, those with high self-efficacy are more likely to seek out health information online in order to stay informed about their health and feel in control of their well-being (Efthymiou et al., 2017).

Meanwhile, the outcome variable of information-seeking behaviour positively and significantly correlated with eHealth literacy ($r = .257$, $p < .001$) and self-efficacy ($r = .204$, $p < .001$). The findings suggest that respondents who had higher eHealth literacy and self-efficacy were more likely to exhibit better information-seeking behaviour when searching for health information online. Cyberchondria, on the other hand, shows a moderate, positive correlation with positive information-seeking behaviour ($r = .202$, $p < .001$), indicating that those with higher cyberchondriac tendency were more likely to engage in improved information-seeking behaviour and being more detail-oriented in their search. This implies that heightened anxiety-driven health information-seeking leads to better information-seeking behaviour online, with greater criticality displayed in assessing online health information. This is in line with findings which found that those with higher cyberchondriac tendency and seeking online health information more often are also more likely to use information-seeking strategies, such as reading multiple sources of information and evaluating the credibility of information (Sun et al., 2022). In other words, the associated anxiety in assessing health information drives them to be more meticulous in evaluating the information acquired.

A positive but weak correlation between eHealth literacy and cyberchondria ($r = 0.120$, $p = 0.027$) or a heightened sense of information-searching-related anxiety was observed, which is in line with past studies that connected possessing better eHealth literacy to helping people who are anxious about health matters, to avoid excessive online health searches and the escalation of distress (Zheng et al., 2020; Doherty-Torstrick et al., 2016). The notion can be justified by the idea that one would reflect having experienced worsening anxiety in the form of cyberchondria after reassurance seeking on the Internet. Hence, being considerably literate in seeking online health information, people experience an elevated sense of cyberchondriac tendency. Overall, predictor variables of eHealth literacy, self-efficacy, and cyberchondria all positively correlated with outcome variable of health information-seeking behaviour. However, the correlation between eHealth literacy and cyberchondria was weak. The findings suggest that interventions that focus on improving eHealth literacy, self-efficacy, and anxiety management may be effective in reducing cyberchondria and improving health information-seeking behaviour.

Table 8

Zero-order Correlation between eHealth Literacy, Self-Efficacy, Cyberchondria and Health Information-Seeking Behaviour

Variable (N=168)		***1***	***2***	***3***	***4***
1. eHealth Literacy (HL)	Correlation	1			
	sig				
	df				
2. Self-efficacy (SE)	Correlation	.304**	1		
	sig	.000			
	df	168			
3. Cyberchondria Severity (CS)	Correlation	.120*	.119*	1	
	sig	.027	.028		
	df	167	167		
4. Health Information-seeking Behaviour (HISB)	Correlation	.257**	.204**	.202**	1
	sig	.000	.000	.000	
	df	167	167	167	

***Correlation is significant at the 0.01 level (2-tailed).*
**Correlation is significant at the 0.05 level (2-tailed).*

Meditating Effect of Cyberchondria

The mediating role of cyberchondria severity (CS) on the relationship between eHealth literacy (HL) and health information-seeking behaviour (HISB) was assessed, followed by its role in the relationship between self-efficacy (SE) and health information-seeking behaviour (HISB). Table 9 summarises the result of the mediation analysis run using Hayes' Macro Process Model 4 via the bootstrapping method, which was applied to consider whether cyberchondria severity (CS) as a mediator has a mediational effect.

The results of the analysis revealed a significant direct effect of eHealth literacy (HL) on health information-seeking behaviour (HISB) in the absence of the mediator cyberchondria ($b = 0.255$, $p < 0.001$). Similarly, the indirect effect of eHealth literacy (HL) on health information-seeking behaviour (HISB) ($b = 0.035$, $t = 0.014$) was also significant. This is because the confidence interval for the indirect effect did not include zero, thus supporting the partially mediated relationship between eHealth literacy and health information-seeking behaviour among the respondents. This is consistent with previous research, showing that cyberchondria can be a barrier to effective health information seeking (Jungmann & Witthöft, 2020; Makarla et al., 2019). The direct effect of eHealth literacy on health information-seeking behaviour was also found significant, even when cyberchondria severity was taken into account, suggesting that eHealth literacy is an important factor in determining whether or not people will seek out health information online, even if they are also experiencing cyberchondria. Nevertheless, the result reflects the need for initiatives to improve eHealth literacy, considering the implication and prevalence of cyberchondria across different demographics.

On the other hand, cyberchondria severity (CS) had no mediating role in the relationship between self-efficacy (SE) and health information-seeking behaviour (HISB). This is indicated by the direct effect of SEL on HISB ($b = 0.208$, $p < 0.001$) while the indirect effect through CS ($b = 0.034$, $p < 0.001$) is at a confidence interval for indirect effect, which includes zero, implying that indirect effect is not significant. Thus, cyberchondria did not mediate the effect of self-efficacy on health information-seeking behaviour among respondents. The finding is somewhat surprising as previous research suggested that self-efficacy can play a role in reducing cyberchondria and decreasing confidence in the ability to manage one's own health (Alduraywish et al., 2020; Zheng et al., 2020).

However, this can be attributed to the relatively small sample size of the study, which is statistically insufficient to detect a significant mediation effect. It can also be associated with the limited research on assessing the mediating role of cyberchondria in health information seeking. Hence, future research can build the literature on the mediating role of cyberchondria in regard to health information seeking. Therefore, cyberchondria severity (CS) only had a partial mediating role in the relationship between eHealth literacy (HL) and the outcome variable of health information-seeking behaviour (HISB). In contrast, there was no mediation in the effect of self-efficacy (SE) on health information-seeking behaviour (HISB). This insinuates that the skills associated with the ability to seek health information online impact their searching behaviour in the presence of cyberchondria or the anxiety associated with health information searching online. The effect of self-efficacy on online information-seeking behaviour was not at all meditated by the factor of impending cyberchondria tendency.

Table 9

Mediation Analysis Summary

Relationship	Total effect	Direct effect	Indirect effect	Confidence interval		t- statistics	Conclusion
				Lower bound	Upper bound		

HL -> CS -> HISB	0.290 (0.000)	0.255 (0.001)	0.035	0.004	0.081	0.014	Partial Mediation
SE -> CS -> HISB	0.243 (0.001)	0.208 (0.003)	0.034	-0.001	0.087	0.007	No Mediation

Conclusion

This research sought to shed light on the relatively new phenomenology and further the literature on the prevalence of cyberchondria in the context of the youth in Malaysia. Given the rising reliance on the Internet as the primary source of information encompassing myriad issues, the public's skills and ability to decipher and utilise information found online have become increasingly important. The overall findings give a glimpse into the state of eHealth literacy, self-efficacy, cyberchondria severity, and health information-seeking behaviour among the sampled respondents. Despite the moderate results and considering the age of the demographic primarily under the age of 35, the high level of health apprehension reflects the growing anxiety towards health and well-being as well as distrust towards the health system and the cost that comes with it. Another vital finding is that the relationship between the variables of eHealth literacy, self-efficacy, and cyberchondria positively correlated with health information-seeking behaviour. However, the correlation between eHealth literacy and cyberchondria was weak. The mediating influence of cyberchondria also revealed that cyberchondria only partially mediated the relationship between eHealth literacy (HL) and health information-seeking behaviour (HISB). At the same time, it had no mediating role in the effect of self-efficacy (SE) on health information-seeking behaviour (HISB).

Besides, this study provides valuable insights into the prevalence of cyberchondria among Malaysian youth, a relatively understudied population. The study provides empirical support for the use of Fisher et al.'s (2003) IMB model in understanding the relationship between eHealth literacy, self-efficacy, cyberchondria, and health information-seeking behaviour and contributes to the media literature on the studied variables. The findings can be used to develop educational programmes and resources to help the youth become more critical consumers of online health information. Healthcare providers can use the findings to better understand and address the concerns of the youth exhibiting signs of cyberchondria. It can also inform policy decisions aimed at improving the quality and accessibility of online health information for the youth. Nonetheless, the results are widely affected by the limitation of the study sampling method and size. The study only comprised a relatively small sample size, applying convenience sampling. Thus, the findings are not generalisable. It is also possible that participants who are experiencing cyberchondria may be more likely to seek out inaccurate or misleading health information. Despite these limitations, the findings of the study provide valuable insights into the relationship between cyberchondria, eHealth literacy, and health information-seeking behaviour. Future research may investigate these relationships in more detail and with larger sample sizes through more rigorous statistical methods, such as structural equation modelling, which could be used to provide a more definitive answer about the mediation effects.

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Conflict of Interest

The author(s) have declared that no competing interests exist.

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