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HEALTH INFORMATION LITERACY: THE SAVING GRACE DURING TRAUMATIC TIMES

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Abstract When it comes to engaging with health information in their daily lives, people face different challenges. In the context of COVID-19, the aim of this study is to determine whether health information literacy can assist people in making informed health-related decisions. An empirical study was conducted to investigate such an effect. Building on a dataset composed of 155 respondents, the research model was examined through structural equation modelling. The results showed that health information literacy – as an individual ability – not only influences health decision making but also has a direct impact on the awareness of the challenges imposed by the current pandemic situation. In addition, the results show that too much information leads to information fatigue, and consequently negatively impacts decision making. The findings of this paper show that the concept of health information literacy should be understood and developed separately from the health literacy concept. Theoretical contributions and practical implications are discussed.

Keywords: COVID-19 awareness, health information literacy, information fatigue, information overload, patient decision-making

1 Introduction

Being abreast of health and engagement in the health-related decision-making process is highly expected in the digital age and in digital health systems (Brabers et al., 2017). Some reasons – such as noticeable changes in the healthcare domain, a revolution in information and communication technologies (ICTs), the rapid distribution of health information, the worldwide expansion of the internet, and the availability of a tremendous amount of health-related information – have led to a higher level of patient confidence in managing their own health (Cullen, 2005; Weinhold & Gastaldi, 2015). To increase the quality and safety of the healthcare systems, the role of patient decision making, as a crux of patient-centred care, seems very critical (Godolphin, 2009). As opined by Seymour (2018), patient involvement in decision making enhances the attainment of favourable health outcomes (Seymour, 2018). However, this is not possible if patients lack an understanding of healthcare practices and issues. When patients lack knowledge and understanding, it becomes difficult for them to make appropriate health decisions independently, since they have nothing to offer (Rodríguez et al., 2013). This emphasises the significance of health information literacy (hereinafter HIL) skills, which enable individuals to enhance their understanding of healthcare issues. Individuals need to be able to understand healthcare processes, needs, and requirements in order to make informed health decisions (Cui & Chang, 2020). Additionally, the COVID-19 pandemic is exposing dysfunction and fragility in healthcare services. As such, it is critical to have the ability and required skills to find, evaluate, and use health-related information from the internet in order to make independent health-related decisions. In the case of the COVID-19 pandemic situation and in order to control the consequences, it is vital for individuals to develop a solid foundation of information and knowledge about the situation (Al-Dossary et al., 2020). Additionally, in the past, rational decisions were made based on all the available information. As such, one of the most critical challenges involved in making a decision was a lack of access to adequate information, while today, there is often far more information available than is required. With the growth in information technology and the internet, it is not surprising that patients now have access to an unlimited amount of health information. However, this overload of information adversely affects the process of independent decision making (Buchanan & Kock, 2001). The issue of information overload in the context of health has become exacerbated, owing to the expanding availability of relevant information, especially through online sources (Khaleel et al.,

2020). Once patients become overloaded from processing health-related content on the internet, they are likely to feel fatigued (Cao & Sun, 2018), which negatively affects their decision-making process. It seems that to make appropriate health decisions and to be able to take care of themselves within the digital health environment, patients need to have special skills and abilities, such as HIL (Krist et al., 2017).

All in all, this study seeks to investigate how people's health-related decision making, as a consequence of the global pandemic imposed by COVID-19, is influenced by their HIL skills and their awareness of COVID-19-related issues. The research question guiding this study is, *"To what extent do people's HIL skills impact their health-related decision making, and what is the role of information overload and information fatigue in the process of making appropriate decisions?"*.

2 Literature Review and Hypothesis Developments

2.1 Health Information Literacy and Patient Decision Making

The combination of health literacy and information literacy leads to a new concept known as health information literacy. HIL refers to "the set of abilities needed to recognise a health information need, identify information sources and use them to retrieve relevant information, assess the quality of the information and its applicability to a specific situation, analyse, understand, and use the information to make appropriate health decisions" (Shipman, 2009, p. 294). HIL is very important for people since it helps them to understand how well they can take care of themselves and make decisions regarding issues concerning their health (Eriksson-Backa et al., 2012). HIL skills may become increasingly important when the internet is the main source of finding information. The authors highlight the role of HIL skills in making appropriate health decisions. It is acknowledged that information-literate people are able to make appropriate decisions regarding issues concerning their health (Cui & Chang, 2020). Additionally, Krist et al. (2017) highlighted the positive role of being information literate in making independent health decisions; therefore, we propose the following:

H1: *Health information literacy has a positive effect on patient decision making*

2.2 COVID-19 Awareness and Health Information Literacy

As pointed out by Shehata (2020), dealing with COVID-19 requires HIL skills. In fact, when people are more health information literate, they can find and acquire more information and knowledge about COVID-19. The higher the level of HIL skills, the easier it is to gain awareness in the context of coronavirus. In other words, lack of HIL skills leads to a lesser awareness of COVID-19–related symptoms. The main reason is that such individuals are not able to find relevant information from reliable sources, such as reliable medical webpages (McCaffery et al., 2020). Consequently, a better grasp of the existing situation leads to better health decision making; hence, we propose the following:

H2: *Health information literacy has a positive effect on COVID-19 awareness*

H3: COVID-19 awareness has a positive effect on patient decision making

2.3 Information Overload and Health Information Literacy

In the process of decision making, an ever-increasing amount of information is one of the main challenges (Falschlunger et al., 2016), especially when it comes to health information. The constant increase in the amount of information makes it difficult to organise and find high-quality information effectively. According to Ruff (2002), “Once capacity is surpassed, additional information becomes noise and results in a decrease in information processing and decision quality. Having too much information is the same as not having enough”. Information overload refers to too much data, which is received too fast for a person of average cognitive ability to absorb and process (Zhang et al., 2020). This concept is defined by Wilson (2001, p. 113) as “a perception on the part of the individual (or observers of that person) that the flow of information associated with work tasks is greater than can be managed effectively and a perception that overload in this sense creates a degree of stress for which his or her coping strategies are ineffective”. Therefore, people need special skills, such as HIL skills, to deal with massive amounts of information (Kurelović et al., 2016). Jiang and Beaudoin (2016) emphasised the importance of HIL skills in coping with information overload. They argued that health information literate people are able to combat overload. These studies also highlighted that individual

who are not adroit at dealing with large amounts of information may experience overload. The higher the level of HIL skills in an individual, the better she or he can cope with information overload; hence, we propose the following:

H4: *Health information literacy has a negative effect on information overload*

2.4 Information Fatigue and Information Overload

Information fatigue is defined as the tendency for information users to back away from seeking more information when they become overwhelmed with too many pieces of content, too many contacts, too many information sources (such as websites), and too much time spent keeping up with these connections (Bright et al., 2015). Fatigue is more than feeling tired and drowsy. Thomas (1998) stated that when patients are inundated with a massive amount of health information, they may make more mistakes and misunderstand communication. In fact, an overwhelming amount of information leads to anxiety, exhaustion, and other symptoms of information fatigue. Once patients become overloaded from processing too much health-related content on the internet, they are likely to feel fatigued (Cao & Sun, 2018); hence, we propose the following:

H5: *Information overload has a positive effect on information fatigue*

2.5 Information Fatigue and Patient Decision Making

Prior studies have indicated that in the context of finding health-related information, information overload results in information fatigue, which has a diverse effect on patient decision making (Cao & Sun, 2018), since exhausted individuals will not be able to focus well and make informed decisions. Human behaviours can be altered owing to the exhaustion that results from overload. People can make hasty decisions or shut down when they have information fatigue, or their ability to make informed decisions can ultimately be depleted. As such, this may negatively impact their health-making decisions; hence, we propose:

H6: *Information fatigue has a negative effect on patient decision making*

2.6 Patient Decision Making

The growing number of studies that seek to identify effective factors relating to patients’ decision-making abilities indicated that this topic is of interest to professionals and scholars in various research fields (Brabers et al., 2017). Patients’ ability to make health decisions results in various positive outcomes, such as improved health outcomes, mortality reductions, improved satisfaction with the care experience, and reduced costs. In other words, the active engagement of patients in the process of making health decisions fosters their health and well-being and makes it possible for patients to live longer (Krist et al., 2017). The core dimension of a quality modern health service is patient-centred care. Active participation in the process of making health decisions demands well-informed patients. They should be able to access up-to-date information about their care, and the potential outcomes of their treatment. Additionally, a layer of vigilance and protection against errors can be created by making informed decisions (Sketcher-Baker, 2017). Patient decision making can be affected by various factors, and this study aims to focus on some of these. In summary, we argue that patient decision making is impacted not only by traditional social media factors such as information overload and information fatigue but also by individual-level HIL and contextual (e.g. COVID-19 awareness) related factors that equally impact the health-related decision-making process (Figure 1).

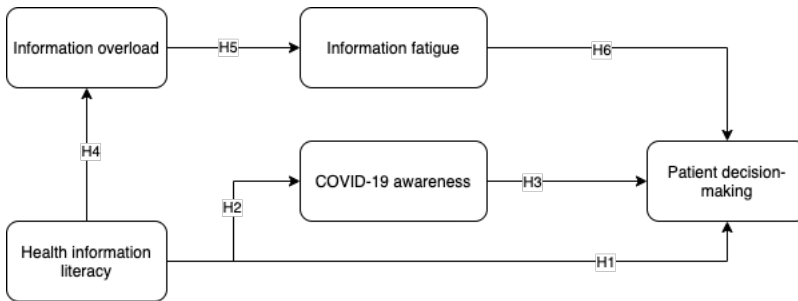


Figure 1: Proposed Conceptual Model

3 Research Methodology

3.1 Instrument and Data Collection

All items for measuring constructs were derived from previously validated measures, and if needed, some changes were made to fit the study context. Items for measuring COVID-19 awareness (5 items) were derived from Alea et al. (2020, p. 134–136) and McCaffery et al. (2020). Items for measuring information overload (12 items) and information fatigue (8 items) were derived from Whelan et al. (2020) and Norman and Skinner (2006), respectively. Items for measuring HIL (7 items) were derived from Norman and Skinner (2006). Finally, we used 5 items from Seo et al. (2016) to measure patient decision making. We used an online survey to collect data during the time of the COVID-19 pandemic: March 2021. We sent more than 230 invitations, using different channels, such as authors' personal networks and social media platforms. In total, we received 155 complete responses.

4 Results

4.1 Descriptive Results

The respondents' ages fell within the ranges of 18–25 years (12.3%), 26–35 years (47.7%), 36–45 years (20.6%), 46–55 years (18.1%), and over 55 years (1.3%). The sample comprised 78 females, 67 males, and 10 subjects who chose not to reveal their gender. The educational level of the respondents was as follows: high school diploma ($n = 6$), bachelor's degree ($n = 32$), master's degree ($n = 85$), and PhD degree ($n = 29$), and 3 indicated other educational attainments. With regard to the current occupational status of the respondents, most were students ($n = 69$), 12 respondents were employed, 13 were non-employed, 54 were self-employed, and 7 held some other occupation as their occupation. In the sample, there were 64 Finnish and 91 non-Finnish respondents. Moreover, 144 respondents lived in Finland, and 11 lived in another country. When we asked the respondents to indicate the social networking sites (SNSs) they used to access health-related information, they reported the following: the use of Facebook was mentioned by 91, Instagram by 70, Twitter by 41, and Telegram by 39 respondents, whereas the least-used SNSs were Snapchat ($n = 11$) and TikTok ($n = 12$). We also asked the participants to indicate how much time they spend per day searching and sharing health-related information on SNSs. They reported (less than 30 minutes, $n = 73$), (from 30

minutes to one hour, $n = 42$), (from one to two hours, $n = 19$), and (more than two hours, $n = 9$), and interestingly, 12 respondents indicated that they do not use SNSs for health-related information.

4.2 Measurement and Conceptual Results

PLS-SEM (partial least squares structural equation modelling) was used to investigate path relationships in the proposed conceptual model. The results showed that many items had sufficient factor loadings above the threshold value of 0.70. In total, we used 37 items to measure the five constructs and retained 27 items for further analysis. All internal reliability and validity assessments, i.e. Cronbach's alpha (α), and composite reliability (CR), for all constructs were in the range of the recommended values of 0.70 and 0.70, respectively (Hair et al., 2019) (see Table 1). The highest CR value was for information fatigue (0.89) and the lowest was for patient decision making (0.82). Also, the highest value for Cronbach's alpha (α) was for information fatigue (0.90), and the lowest value was for patient decision making (0.87). As shown in Table 2, all the average value extracted (AVE) values were above the recommended threshold of 0.50 (Hair et al., 2019), such that the highest was for patient decision making (0.80) and the lowest was for HIL (0.68).

Table 1: Descriptive Statistics

| Construct | Item | Loading | Mea | Std | (α) | CR | AV |
|-------------------------|--------|---------|------|------|--------------|------|------|
| | | s | n | . | | | E |
| COVID_19 awareness | COV_A1 | 0.87 | 4.63 | 0.68 | 0.89 | 0.85 | 0.75 |
| | COV_A2 | 0.86 | 4.48 | 0.79 | | | |
| | COV_A3 | 0.87 | 4.36 | 0.86 | | | |
| | COV_A4 | 0.86 | 4.34 | 0.96 | | | |
| | COV_A5 | 0.88 | 4.48 | 0.87 | | | |
| Patient decision making | DECM3 | 0.88 | 2.93 | 1.36 | 0.87 | 0.82 | 0.80 |
| | DECM4 | 0.90 | 2.81 | 1.42 | | | |
| | DECM5 | 0.89 | 1.92 | 1.30 | | | |
| | HIL1 | 0.81 | 3.46 | 1.31 | | | |

| | | | | | | | |
|-----------------------------|--------|------|------|------|------|------|------|
| Health information literacy | HIL2 | 0.86 | 3.32 | 1.29 | | | |
| | HIL3 | 0.84 | 3.39 | 1.25 | | | |
| | HIL5 | 0.83 | 3.01 | 1.27 | | | |
| | HIL6 | 0.74 | 3.36 | 1.28 | | | |
| | HIL7 | 0.87 | 3.39 | 1.18 | | | |
| Information fatigue | INFA2 | 0.83 | 3.29 | 1.30 | | | |
| | INFA4 | 0.86 | 3.12 | 1.29 | | | |
| | INFA5 | 0.88 | 2.95 | 1.36 | 0.90 | 0.89 | 0.79 |
| | INFA6 | 0.92 | 3.06 | 1.33 | | | |
| | INFA7 | 0.92 | 3.06 | 1.30 | | | |
| Information overload | INFA8 | 0.93 | 3.01 | 1.28 | | | |
| | INOV1 | 0.91 | 3.06 | 1.21 | | | |
| | INOV12 | 0.77 | 2.94 | 1.26 | | | |
| | INOV2 | 0.91 | 3.02 | 1.30 | | | |
| | INOV3 | 0.88 | 3.03 | 1.32 | 0.84 | 0.85 | 0.73 |
| | INOV4 | 0.91 | 3.11 | 1.36 | | | |
| | INOV5 | 0.89 | 2.97 | 1.33 | | | |
| | INOV9 | 0.73 | 2.91 | 1.21 | | | |

4.3 Discriminant Validity

To establish the discriminant validity, we examined the AVE scores, and all AVE values were lower than the shared variance for all model constructs; therefore, the discriminant validity was established in this research (Fornell & Larcker, 1981).

Table 2: Discriminant validity (Fornell and Larcker criterion)

| Constructs | CAWA | HIL | INFA | INOV | PDM |
|-----------------------------|-------------|-------------|-------------|-------------|-------------|
| COVID 19 challenges | 0.87 | | | | |
| Health information literacy | 0.32 | 0.83 | | | |
| Information fatigue | -0.01 | -0.20 | 0.89 | | |
| Information overload | -0.05 | -0.18 | 0.57 | 0.85 | |
| Patient decision making | 0.15 | 0.53 | -0.27 | -0.22 | 0.89 |

4.4 Structural Results

The structural results showed that the independent variable, i.e. patient decision making, has been explained by a variance of 38%. The predictor variables, i.e. information fatigue and COVID-19 awareness, have been explained by variance of

36% and 12%, respectively. The SEM results showed that HIL had a direct and strong positive effect ($\beta = 0.57$; $t = 6.001$; $p = 0.001$) on patient decision making; thus, H1 was accepted in the model. The results also provided theoretical support for H2, where it was expected that HIL positively affects COVID-19 awareness. The SEM results showed that this path was significant ($\beta = 0.35$; $t = 4.211$; $p = 0.001$). Moreover, the results showed that HIL had a significant and – as we expected – negative impact on information overload ($\beta = -0.19$; $t = 2.039$; $p = 0.05$). This indicates that the respondents with higher HIL are more capable of distinguishing between true and fake information; thus, they are less impacted by indecisiveness in regard to health-related information overload. Hence, H4 was supported in the model. However, the results did not provide theoretical support for H3, where we postulated that COVID-19 awareness affects patient decision making. The SEM results showed that, as we predicted, information overload had a positive and significant effect ($\beta = 0.60$; $t = 9.144$; $p = 0.001$) on information fatigue, thus providing theoretical support to accept H5. Similarly, the SEM results showed information fatigue ($\beta = -0.17$; $t = 2.006$; $p = 0.05$) had a significant influence on patient decision making, but the effect, as expected, was negative. Thus, H6 was supported by the model.

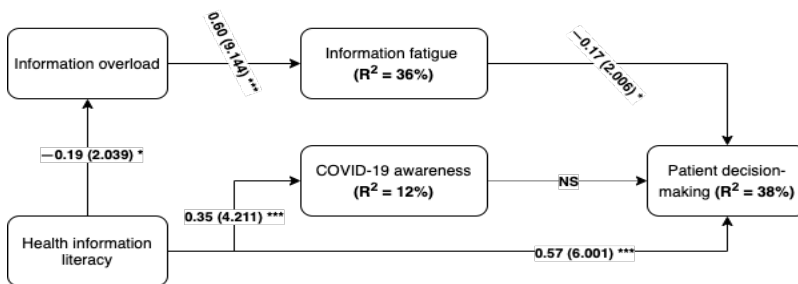


Figure 2: Structural model results. Note: * $p < 0.05$. ** $p < 0.01$. *** $p < .001$

5 Discussions and Conclusion

This study focuses on the relationship between health information literacy and patient decision making in the context of the COVID-19 pandemic, examining how patient utilises digital health services. The COVID-19 pandemic has severely limited patients' access to health information, as the traditional methods used to acquire information – like face-to-face visits with healthcare providers – are no longer an

option. Therefore, digital health services and digital health service platforms seem far more suitable (Gálvez et al., 2020). However, using these kinds of digital services to find the required information demands special skills. As highlighted by Seo et al. (2016), essential skills – such as the ability to seek, find, evaluate, and use health information from digital platforms – may affect patients' decision-making preferences. The results of this study are consistent with Seo et al.'s (2016) findings. In the present research we show that individuals with higher HIL skills may have a considerable advantage when seeking health information from digital sources, and may therefore be able to make more informed health decisions, when faced with the limitations (e.g. having face-to-face interactions with doctors) imposed by COVID-19 restrictions. In addition, the results reveal that a higher level of HIL skill leads to an improvement in individuals' consciousness regarding COVID-19. HIL skills augment people's knowledge regarding the seriousness of the epidemic and the dangers it poses, along with possible preventive strategies. Since most scientific and reliable information regarding COVID-19 is uploaded to digital platforms, we argue that to take advantage of the available information, HIL is the saving grace during this traumatic time.

However, such pure knowledge and skills do not in themselves lead to the ability to make an independent and appropriate health decision during challenging times such as the COVID-19 pandemic, as these kinds of decisions demand a higher level of medical and pharmaceutical knowledge. In addition, digital health platforms may act like a double-edged sword. While these platforms provide individuals with noteworthy health information, the huge amount of supplied health information can lead to health information overload. The results of this research show that patients' decision making can be retrogressed by the exhaustion that results from being overloaded with information from online channels. These results are consistent with those obtained by Cao and Sun (2018). Based on our own findings, HIL skills empower people to control their uptake of the available information and to cope with the overload of health information. This means that higher HIL skills lead to a lesser overload of health information. This result is consistent with the results obtained by Jiang and Beaudoin (2016). This study provides some practical implications, too. For example, a patient's decision-making ability – when viewed in the light of high HIL skills – reduces the burden on the healthcare providers and shares the risk of decision making between patients and healthcare professionals. Additionally, the ability to make informed health decisions reduces the time patients

spend accessing physical health services, such as emergency rooms, which benefits both governments and patients. So, empowering individuals with HIL skills is an acceptable solution to facilitate an informed decision-making process in regard to digital health systems. This paper has some limitations. The findings may not be applicable in another context, as we studied decision making in the context of health-related issues during the COVID-19 pandemic. Thus, we cannot claim that the results can be generalised to other contexts. In addition, this study does not consider age or education distribution in its multi-group analysis. Moreover, we conceptualised that fatigue, as a result of information overload, negatively impacts health-related decision making, while recognising that other variable, such as individual characteristics or peer pressure, can also affect fatigue.

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