

Health Information Behavior of Indonesians During the COVID-19 Pandemic: A Sensemaking Perspective

Rusdan Kamil* 

Department of Library and Information Science, Faculty of Humanities,
Universitas Indonesia, Kota Depok, Indonesia
E-mail: rusdan.kamil@ui.ac.id

Laksmi Laksmi 

Department of Library and Information Science, Faculty of Humanities,
Universitas Indonesia, Kota Depok, Indonesia
E-mail: laksmi@ui.ac.id

ABSTRACT

Information behavior played a significant role in minimizing the risks of the COVID-19 pandemic. When faced with such a situation, an individual needs information for decision-making and in order to determine the best course of action relating to their health. This study aims to explore information behavior during each phase of the COVID-19 pandemic in Indonesia, which is known for its close-knit collective culture. A sensemaking approach is used, which emphasizes the process individuals go through to understand their situation and give meaning to the information they are getting from their environment. Data was collected through in-depth interviews with 10 participants to obtain a description of their information behaviors during the pandemic. Data analysis was carried out using open, axial, and selective coding. We propose a sensemaking-based information behavior strategy framework for mitigating risk and reducing ongoing health crises. Changes in information behavior strategies, including search, prevention, and restriction of information exposure, were random at the beginning of the pandemic, but became more regular in later phases. This was influenced by the “knowledge gap fulfillment” and “use of local knowledge” among the participants throughout the pandemic. In conclusion, the participants developed a sensemaking process including an understanding of the pandemic situation and the risks that they faced. They used a number of information behavior strategies to prevent transmission, and their perception of the risks changed across the course of the pandemic, up til the situation began to be considered back to normal again in Indonesia.

Keywords: COVID-19 pandemic, health information behavior, local knowledge, risk, sensemaking

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***Corresponding Author:** Rusdan Kamil
 <https://orcid.org/0009-0005-0895-3433>
E-mail: rusdan.kamil@ui.ac.id



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1. INTRODUCTION

There has already been plenty of research into changes in students' information behaviors in relation to learning activities in the context of the COVID-19 pandemic in Indonesia (Hajar & Rachman, 2020; Nurfadillah & Ardiansah, 2021; Safri et al., 2022). The situation also encouraged every individual to acquire more health information, especially information about the COVID-19 disease and the events that were occurring. This is a part of health literacy, which can be defined as "the degree to which individuals can obtain, process, understand, and communicate about health-related information needed to make informed health decisions" (Berkman et al., 2010, p.16). In the context of healthiness, information-seeking behavior refers to the various ways individuals seek information about health, risks, disease, and health protection (Lambert & Loiselle, 2007).

Sensemaking in relation to health information behavior involves the active effort by individuals to address their health information needs by balancing their information behavior appropriately (Mamykina et al., 2015b; Westbrook & Fourie, 2015). This can be done through coordinated information behavior, avoidance, and restrictions to information exposure, so that individuals can overcome their knowledge gap and maintain their emotional balance. During the pandemic, people were introduced to various new behaviors and habits suggested by health authorities in order to prevent infection from the SARS-CoV-2 virus.

To understand and address the pandemic, scientists from the relevant fields collaborated to create the best health management strategies, using a multidisciplinary approach (Chams et al., 2020; Holmes et al., 2020; World Health Organization, 2020). Xie et al. (2020) have argued that the scientific community needs to look into the pandemic phenomenon from an information science perspective, to test the theories and assumptions that prevailed during the crisis in terms of the various models of information behavior. The field of information behavior itself has studied human behavior and interactions with information in relation to a number of crises, be it pre-crisis, during the crisis, or post-crisis (Krakowska, 2020). Conducting a study of information behavior during a crisis allows our field to contribute to and resolve current societal issues (Montesi, 2021).

A previous study by Andalibi and Garcia (2021) identified the importance of achieving a balance between information-seeking behavior and limiting information among

women who had a miscarriage in the United States. By utilizing the sensemaking perspective, they found that the process of building emotional validation for these women required strategies of both information-seeking behavior and information avoidance on pregnancy topics. Another study by Jensen et al. (2022) in Denmark found that a combination of information avoidance, information-seeking behavior, and refraining from seeking too much information was most effective for fulfilling the information needs of people with cancer. It also helped keep patients free from the stress of information overload.

The COVID-19 pandemic stands as the main global health crisis of the twenty-first century so far. A cultural sociology perspective shows that while crises can obviously traumatize people, they can also help form long-term collective memories that can help people overcome problems during the next crisis period (Xu & Lo, 2022). Therefore, the understanding of information behavior during the COVID-19 pandemic is essential as a way of building knowledge and educating people for any possible global health crises in the future. This study aims to contribute to various studies regarding information behavior generally during a crisis, and health information behavior in particular.

2. RESEARCH QUESTIONS AND OBJECTIVES

This study aims to understand the information behavior strategies of Indonesians during the six phases of the COVID-19 pandemic. It also seeks to explore the way local knowledge possessed by the community was utilized in order to improve individual knowledge of the ongoing situation and the risks of the COVID-19 pandemic. This approach could be developed to produce information behavior strategies that could be used by individuals in the future in making health decisions and adapting to the ever-changing nature of a pandemic situation. Specifically, this research aims to answer the following questions:

RQ1. What are the individual health information behavior strategies of people during a pandemic situation such as COVID-19?

RQ2. What was the process of sensemaking adopted by individuals in their health information behavior regarding the situation and risks of the COVID-19 pandemic?

3. LITERATURE REVIEW

3.1. Health Information Behavior

Information behavior, also known as human information behavior, is the field that studies the way humans interact with information. Broadly speaking, it is an area that explores human interactions with information in terms of the fulfillment of needs, searching, and using information in specific contexts and situations. Information behavior in the health field covers two areas: (1) professional information behavior, which relates to the way doctors, nurses, nutritionists, or any other medical professionals acquire information and fulfil their need for knowledge and competency to improve medical measures for patient care; and (2) personal information behavior, which is undertaken by individuals seeking information to meet their own information needs in relation to preventive action and healthcare (Case & Given, 2016; Robinson, 2010). Information behavior models that have been used to examine health information behavior include the Wilson Model, the Kuhlthau Model, and the Sensemaking Model (Andalibi & Garcia, 2021; Das & Sarkar, 2014; Warner & Procaccino, 2004).

Health information behavior, according to Lambert and Loisel (2007), includes health-related knowledge searching with regard to risks, diseases, and health protection activities. In terms of scope, the study of health information behavior takes in the strategies used by people in tackling their health concerns, individuals' active involvement in their own medical decision-making, and changes in behavior and preventive health techniques. These are all investigated, moreover, as factors that influence the purpose of individual information seeking (Lambert & Loisel, 2007; Zimmerman & Shaw, 2020). The development of information technology such as smartphones and social media has expanded the focus of research into current health information behavior, which has been facilitated by digital technology (Percheski & Hargittai, 2011; Wang et al., 2021). In addition to the health information behavior of information seeking, some individuals actively avoid health information because of uncertainty, confusion over how to manage the information, or the possibility of the available sources causing them emotional distress (Barbour et al., 2012).

According to Weaver et al. (2010), there are three main motives behind why people look for health information. These can be described in the following terms: (1) curative health information seeking: This involves any kind of looking for information about how to control or treat

diseases or health problems; (2) preventive health information seeking: This includes looking for information on such topics as individual and public hygiene, environmental health, appropriate diet, or exercise; and (3) a combination of curative and preventive health information seeking, which involves looking for information about both preventive and curative health measures; survivors of serious illnesses often undertake this kind of information seeking.

Wilson (2020) developed a multiple decision model to describe individuals' decision-making in their information behavior. This model sets out the process of decision-making performed by individuals who have already understood their own information needs. Factors influencing this model include the principle of minimum effort by individuals, and patterns of information behavior that are designed to reduce stress. Ultimately, individuals may choose to seek information, avoid information, or even exhibit non-seeking behavior by limiting their own information exposure.

3.2. Sensemaking Perspective

Sensemaking is a metatheory that describes the processes used by individuals in understanding their surrounding environment through meaning-making. Sensemaking takes in the individual's active efforts to identify, interpret, internalize, and respond to information to fill in their own knowledge gap (Case & Given, 2016). This concept has been applied in a number of studies relating to health information as a way of understanding and addressing the various challenges involved. The sensemaking process aims to build a sense of identity and help individuals overcome any life disruptions (Naveh & Bronstein, 2019; Ruthven, 2019). Sensemaking can be viewed as a holistic approach to problem solving.

Sensemaking in health information behavior can be based upon individual or social understanding in relation to personal health. Westbrook and Fourie (2015) showed that factors such as environment, body condition, and lifestyle can become information sources for medical decision-making in the individual sensemaking process. Mamykina et al. (2015a) made the point that building understanding via sensemaking is not only done individually, but also takes place socially, through discussion, negotiation, and conflict resolution, as in the diverse opinions and information found in online forums.

In the framework for chronic disease management developed by Mamykina et al. (2015b), the sensemaking process consists of classification activities, information

monitoring, dealing with new experiences relating to personal health and wellness, developing and utilizing internal representations that can serve as a basis for choosing appropriate health actions, and the habitual performing of daily activities that respond to the newly received health information. According to Dervin (1983; 2015) the sense-making process can consist of four components, namely:

- **Situation and Context:** In sensemaking, this component can be defined as the situation that motivates individuals to carry out information-seeking behavior, in terms of both internal and external factors.
- **Gap of Knowledge:** Before starting the information-seeking process, individuals analyze the knowledge they already have and identify the information they require. This process will result in a description of the knowledge gap. Acquiring the required information reflects the individual's active effort to clarify the situation and context.
- **Bridge:** Individual information seeking provides a bridge between the knowledge gap and the current situation perceived by the individual. In information seeking, there are sub-components that individuals need to be aware of, specifically, information sources, information relevance, information-seeking strategies, and the quality of the information available.
- **Outcome:** After the information search, individuals utilize the search results to bridge the knowledge gap they encounter when dealing with new situations. Once the situation has been understood, individuals switch from a sensemaking mode to a habitual mode, where the knowledge gap has now been filled, and no further effort is required to comprehend the existing situation.

3.3. COVID Societies and Local Knowledge

The COVID-19 pandemic changed every aspect of society. Social distancing, mask usage, and the need to get COVID-19 vaccination were new situations that people had to deal with, in order to prevent infection and avoid the adverse effects of catching COVID-19. Lupton (2022) refers to such a society, faced with the threat of a long-term global health crisis and the risk factors posed by a mysterious viral infection in relation to social life, economics, inequality, possible stigma, and mortality, as a COVID society. In order to understand the changes that occurred at this time, Lupton and Willis (2021) conducted an analysis from a socio-material perspective of political responses, health systems, and pandemic policies in dif-

ferent parts of the world, highlighting the differences in representations and in the experiences of different social communities during the pandemic.

Indonesia is known as a society with a close-knit collective culture, factors which were all beneficial for social resilience during the pandemic (Putra, 2022). Suwignyo (2020) argued that Indonesian collective culture, with its love of gatherings and daily sharing of information and knowledge, was challenged during the pandemic due to social distancing, which hindered any large gatherings between groups for local knowledge exchange. Montesi (2021) suggested that information researchers should investigate the role of the information shared by family, neighbors, and co-workers, which is a form of “implicit knowledge” — knowledge accumulated over time and shared by community members within a particular place. This is also in line with research that has been conducted into the adaptations in information behavior in families and local knowledge during the health crisis (Montesi, 2023; Pan et al., 2020).

Local knowledge itself is unique knowledge accumulated by a community in a specific location over generations, which is utilized by the community in decision-making, and in forming strategies for coping or adapting to situations that are constantly changing. Local knowledge is made up of knowledge, practices, and beliefs. Other terms for local knowledge found in the literature are “traditional knowledge” and “indigenous knowledge” (Naess, 2013, p.100). This, including religious information with cultural and local dimensions, is part of the “information environment” as considered by Caidi (2019). In this research, “local knowledge” refers to a set of information limited to a specific geographical area and time, obtained through social and cultural practices within the local community. The local knowledge encompasses information gained from interactions with the surrounding environment, information from friends or family, and information derived from local cultural traditions, especially regarding self-care and situations of health crises.

The COVID-19 pandemic led to a fear of infection, to feelings of loneliness as it became increasingly difficult for people to meet physically, and to various other negative emotions as people's lives ground to a halt (Gan & Fu, 2022; Luchetti et al., 2020; Luo et al., 2021). To understand COVID society, Lupton (2021) identified six different phases of the pandemic, viewed from a risk perspective, as set out below:

- **Distant Threat Phase:** In this phase, world society

received the news about the outbreak of a mysterious acute respiratory syndrome in Wuhan City, China, in December 2019. The media referred to the disease as a type of SARS or MERS, which are both caused by coronaviruses. However, it was not at this time regarded as a direct threat to people outside the outbreak zone.

- **National Lockdown Phase:** In this phase, most social activities stopped, schools were closed, international flights were cancelled, and nationwide lockdowns began to be implemented to prevent mass transmission of COVID-19. Information was circulating about the risk of infection caused by physical contact with objects contaminated with the virus. Practices such as spraying disinfectants, maintaining social distance, and washing hands frequently were the focus of health campaigns.
- **COVID Zero Phase:** In this phase, the transmission rate was reduced by suppressing community mobility as much as possible, and restrictions were made at the regional level in line with daily COVID reports. The risk of infection was now understood to depend on inhaling virus particles in the air, through an aerosol mechanism. Thus in this phase, the mandatory use of masks for daily activities began to be introduced, to flatten the curve of COVID-19 positive cases.
- **Vaccine Dilemma Phase:** In this phase, the risk that developed was that people became more susceptible to contracting COVID-19 if they had not been vaccinated. The focus in this phase was on a mass vaccination campaign for everyone, in order to end the pandemic. This phase also saw many people who were hesitant about taking the COVID-19 vaccination, due to the disinformation and misinformation that was circulating.
- **Delta Response Phase:** In this phase, the main risks were the threat of a renewed growth in the daily infection rate and increased mortality in communities. This was caused by the spread of the Delta variant of SARS-CoV-2, especially among people who had not received the vaccine. In this phase, the vaccination campaign was intensified, amidst many confirmed cases and deaths.
- **Living with COVID Phase:** In this phase, people have become accustomed to living alongside COVID-19, accepting it as a daily risk, and self-isolating when infected. People are also expected to accept the idea that the COVID-19 virus will not die out; and

will continue to mutate, with the reality that positive confirmation rates and deaths will continue to occur.

4. METHOD

This research uses a qualitative approach to study health information behavior during the COVID-19 pandemic. More specifically, it follows the Grounded Theory method. Grounded Theory offers a methodology for developing theories that is based on the collection and systematic analysis of data, using a pragmatic, inductive approach that is underpinned by a theory of symbolic interaction (Birks & Mills, 2015; Corbin & Strauss, 2014). It is a method that has been widely used in information behavior research (González-Teruel & Abad-García, 2012; Hicks, 2018; Mansourian, 2006).

Participants were recruited via the social media forums of Instagram, X (formerly Twitter), and Facebook, using a purposive sampling technique. The criteria for inclusion were that participants had been living in Indonesia during the pandemic, were at least 18 years old, had been infected by the COVID-19 disease, had experienced negative emotions during the pandemic, had received the COVID-19 vaccine, and that they used the Internet and social media. Recruitment was conducted from June to August 2023. Participant screening successfully collected 20 potential respondents who filled out the questionnaire. After analysis, five people were eliminated because they claimed not to feel any negative emotions during the pandemic, four people were not willing to participate in follow-up interviews, and one person was ignored because they had lived abroad during the pandemic. In the end, 10 participants in total were interviewed in this study.

After conducting in-depth interviews with 10 people, the decision was taken to stop recruiting new participants, as no new codes were emerging from the data. The participants ranged from 24 to 36 years of age, and all lived in major cities on Java Island, which was the epicenter of COVID-19 in Indonesia. The participants consisted of four male and six female. The average length of the interviews was 49 minutes (with a range of 35 to 107 minutes). The interview consisted of two parts. In the first part, participants were asked to describe their demographics and general health information behavior. In the second part, participants were queried about how they depicted the pandemic situation in each phase, the obstacles they encountered, how they overcame them, the information behaviors they engaged in during each phase, and the health decisions they made after obtaining information. In total,

there were 32 questions. The interviews were held online via Zoom meetings. Table 1 shows the demographic data for the participants.

The interviews were recorded via audio and video and were transcribed later. The process used for analyzing and coding the data was based on the stages of coding developed for Grounded Theory by Corbin and Strauss (2014), which consist of three phases. Inductive analysis and open coding were used to generate appropriate codes, from an examination of the data context and the research questions. Using ATLAS.ti 9.0 (ATLAS.ti Scientific Software Development GmbH, Berlin, Germany), we applied code labeling to each response to our questions as part of the open coding process, generating 72 codes. Axial coding analysis was then conducted to find the relationship between the codes and to generate broader categories and themes. We then discussed and refined the themes and reviewed any similarities and differences in data interpretation, before uniting to reach an agreement on the interpretation of the theme. We then wrote up the results of the analysis. Using the assistance of ATLAS.ti 9.0, we linked themes and codes in the axial coding stage and identified four relevant core categories to develop the framework resulting from the selective coding analysis in this research. In this study, the themes and categories were developed to answer research questions that focused, from a sense-making perspective, on information behavior strategies in relation to the situation and risks of the COVID-19 pandemic.

5. FINDINGS

The detailed findings for the different phases will be

written and organized as follows: (1) a description of the situation and the risks that emerged in each phase of the COVID-19 pandemic, from the start of the Distant Threat Phase at the end of December 2019, through to the beginning of the Living with COVID-19 Phase at the end of December 2022; (2) the identification of the information needs expressed by the participants in their interviews in relation to each phase of COVID-19; and (3) an explanation of the participants' information strategy and sense-making process in their health information, in relation to the changes in risk perception and their understanding of the health protocols in each of the different phases as part of the sensemaking process.

5.1. Distant Threat Phase

The initial phase commenced in late December 2019, marking the onset of the discovery of mysterious pneumonia cases in Wuhan City, China, until the end of February 2020, characterized by the identification of COVID-19 pandemic cases outside of China. The information then spread quickly to the rest of the world. During this phase, the risk posed by the virus was still confined to a local level. Almost all the participants (eight people) knew about the beginning of the COVID-19 pandemic in January 2020, while Budi (36, male [M]) and Indah (25, female [F]) had started following this news at the end of December 2019. Budi (36, M) commented:

“The first time I heard the news was from social media and websites; these are my primary information sources. To be precise, it was right at the beginning, around November to December 2019, when the first case appeared.”

Table 1. Participant demographics

Pseudonym	Age (yr)	Sex	City of origin	Education
Hasan	24	Male	Jakarta	Bachelor's
Dewi	26	Female	Bandung	Bachelor's
Budi	36	Male	Bogor	Postgraduate
Susi	26	Female	Jakarta	Associate degree
Ulfah	25	Female	Bandung	Bachelor's
Guntur	25	Male	Bandung	Bachelor's
Rini	31	Female	Jakarta	Postgraduate
Indah	25	Female	Tangerang	Bachelor's
Ayu	25	Female	Semarang	Bachelor's
Butet	29	Male	Bandung	Bachelor's

Meanwhile, Indah (25, F) remarked:

“The first time I know about it was at the end of December. If I’m not wrong, it was December 2019. It was early on, and it was buzzed on Twitter.”

The participants received the news from various information sources, including social media, online news portals, and in some cases, television (four people). This shows how important digital information sources are, especially social media, in spreading information. In the distant threat phase, the participants felt that the risk of infection was low in Indonesia, and doubted the possibility of the virus entering the country, while still keeping an eye on the situation.

The participants felt some negative emotions, such as fear, due to the spread of “panic” videos relating to the virus, which they found on social media, especially Twitter, Instagram, and TikTok, or as shared videos in WhatsApp groups. According to Ayu (25, F), she felt “Lowkey panic when I received the news, the spread was fast, and I was worried if it would become widespread. But at that time I was not as panicked as when it entered Indonesia, it was still in China.” Some participants avoided information during this phase, especially in view of the surge in false news and hoaxes; this was the approach taken by Dewi (26, F), Budi (36, M), Rini (31, F), and Butet (29, M) to the ongoing situation. The educational background of the participants, who had all reached university level, helped them to search for more information to discover what was actually going on, fill in their knowledge gaps, and validate the various sources of information they obtained. In the words of Dewi (26, F):

“When the news reported that the virus was only in Wuhan, it didn’t seem like there was much risk, but when the virus spread to another nation, it began to raise concerns that it would reach Indonesia as well. [... I was] reading articles about the virus, and doing as much as possible to find articles or research about the COVID virus, which turned out to be what was previously known as SARS-CoV, but unfortunately at that time there was not much research on COVID-19.”

5.2. National Lockdown Phase

When the Indonesian government officially announced the first case of COVID-19 in Indonesia, this highlighted in the minds of the public the increased risk, and there was a particular focus on the risk of infection

through physical contact with contaminated objects. This phase spanned from March 2020 until the end of April 2020. The participants received the news about the first positive case in Indonesia via social media. This also aligns with Rini’s (31, F) statement: “I think I heard the information from social media, to begin with, and then browsing through the news on TV or online.”

In this phase, the participants had to adapt to overcome the new challenges and deal with the restrictions on daily activities. They began to switch to using various forms of digital media to interact. This change in their usual habits initially felt quite tricky. However, after a little time, they began to get used to the different technology. In the words of the participant Butet (29, M): “Actually it was hard at first, because I am not from an era where I frequently use various social media platforms to interact, such as Zoom.” Sunbathing in the morning also became a new habit for some participants during the lockdown. Guntur (25, M) described Indonesians’ indifference to the initial spread of COVID-19, up to a thousand confirmed cases. He began wearing a mask due to public warnings and faced difficulty visiting certain areas.

Indah (25, F) experienced a similar situation:

“It was difficult at the beginning, due to some devices not being able to support online activities [...] to be able to communicate more effectively, as we were faced with a situation that didn’t allow it. So maybe adaptation was more about familiarization.”

During this phase, the participants searched for information on how to prevent transmission and how to boost immunity through nutrition and vitamins, including the consumption of “jamu,” which is a traditional Indonesian herbal beverage known for its efficacy in boosting the immune system to prevent diseases. They followed tips for maintaining health taken from social media or appeals from the health authorities, as well as guidance on religious worship during the lockdown period. Rini (31, F) described the information she received in these terms:

“At that time, it was all about masks, from the introduction of the masks, the problems involved and which types were effective, to the point that we needed to wear double masks, like that. Then getting familiar with washing your hands with soap, social distancing, and so on.”

5.3. COVID Zero Phase

The COVID Zero phase in Indonesia was known as Large-Scale Social Restrictions, or *Pembatasan Sosial Berskala Besar* (PSBB), and the Enforcement of Restrictions on Community Activities, or *Pemberlakuan Pembatasan Kegiatan Masyarakat* (PPKM), spanning June 2020 to January 2021. With the risk of infection from inhaling virus particles in the air (aerosol transmission) now recognized, this phase introduced the mandatory wearing of masks for daily activities, and the avoidance of any activities that would involve a crowd. During this phase, there were numerous Indonesians who were not yet familiar with the use of health protocols. In relation to this, Budi (36, M) remarked: “From the beginning of the pandemic, yes, our people have shown a low level of obedience in following the rules, socializing and such like; at least, that is how I see it, around me.”

The collective nature of Indonesians contributes to non-compliance, possibly due to their inclination towards gathering and socializing.

The participants’ strategies to meet their information needs included searching for information about symptoms, how to prevent transmission, restrictions on people’s mobility, mortality trends, and self-isolation. Indah (25, F) described the way she fulfilled her own information needs at this time in these terms: “During the activity restrictions, the number one thing was to search about how to manage COVID, what to do if infected, the medicines that could be used, other than the standard drugs, and vitamin supplements, any supplement that could suppress the virus.” Ulfah (25, F) and Rini (31, F) also searched for information about foods and vitamins that could boost immunity and prevent transmission. Dewi (26, F) noted that her information browsing took in various information sources, including Google searches, online news sites, telemedicine, and fact-checking or information evaluation sources for paramedics. Susi (26, F) described the trust she placed in the information provided by the health authorities when browsing for information:

“For me, I was looking a lot for information, is it happening or not, the truth, and what I probably believed the most was the information from the authorities, specifically the Health Ministry; the information they relayed about the current condition, that is what I believed. Even though in reality, I didn’t know.”

A similar situation was described by Budi (36, M), who referred to all the information he found about conspiracy

theories, the need he felt to verify it, and how he eventually sought to avoid such information:

“I tried looking for as much information as possible to prepare for the worst. However, when I was reading on social media or websites, at that time, there were a lot of people who did not believe in COVID — conspiracies and such. [...] It was like, I tried to verify the statements from groups opposed to the pandemic, but it confused me as to which statements were true. I didn’t find the correct statement. So, instead of making myself confused by other people’s statements, like Mr. X or Mr. Y and people who probably didn’t believe the pandemic, I purposely didn’t read the information when the names of such people popped up. Anyway, I just skipped those kinds of conspiracy theories, other than to know that there were still people out there who didn’t believe it.”

5.4. Vaccine Dilemma Phase

This phase was distinguished by the faster virus transmission caused by the new variant of COVID-19 and by the beginning of a mass vaccination campaign for the population as a means to end the pandemic, which took place from February 2021 to May 2021. The information needs of the community had changed, as the COVID-19 vaccination policy was implemented to reduce transmission and the number of cases. Apart from the potential side effects, the halal status of the vaccine was a specific concern for the majority of participants. This reflects apprehensions related to the religious aspects or beliefs regarding the vaccine’s usage. This phase was also characterized by the spread of various hoaxes and misinformation about vaccines that were introduced into the community. Hasan (24, M) looked for information relating to the vaccines, from the different types to the side effects: “I looked for the side effects of the vaccine on the receivers, using trusted sites, the indication of the vaccines, and also information about which type of vaccine had been sent to different countries. That’s what I looked at.”

Indah (25, F) also wanted as much information as possible about the vaccine before receiving one: “I needed a lot of information to understand about the vaccine.” Ayu (25, F) said that in order to remove her doubts about vaccination, she looked for additional information to make sure the vaccine was safe: “At that time, I was still hesitant about vaccines. We know that vaccines are a weakened virus injected into our body. The virus enters our body, so it makes us immune automatically. However, what if we’re not immune? I started overthinking like this at this time.”

The participants agreed that the vaccines were one of the things that made it possible to live a normal life again. Dewi (26, F) stated that her reason for getting vaccinated was so she would be able to restart normal activities:

“That was my initial reason, mainly for the freedom of doing normal activities again. At that moment, I thought, in the future there is no guarantee that we won’t get infected if we don’t receive a vaccine. What are the consequences for us? So, following some articles and information from health workers, we need to understand that receiving the vaccine will at least minimize the side effects if we get infected by COVID; so, from that, I concluded, oh, it’s better for me to be vaccinated now rather than not, because if I don’t and I get infected, the effects will be worse.”

In similar terms, Butet (29, M) commented:

“My reason first and foremost was because I assumed there was definite information that vaccination was the primary way out to get out of this pandemic [...], so I ought to get vaccinated.”

When the campaign started, there was some misinformation encountered by the participants. For example, Dewi (26, F) commented: “Probably the most intense ones I avoided were what people call the anti-vaccine groups.” Hasan (24, M) also avoided information that suggested people should not get vaccinated: “I avoided information relating to vaccine denial. For example, things that said that vaccines are dangerous, vaccines cause death, and vaccines have a microchip in them. I immediately avoided this. I don’t believe it anyway.” Guntur (25, M) described his strategies for limiting his exposure to vaccine misinformation before getting vaccinated: “I largely avoided this information before getting vaccinated, because such information could make me reluctant. But in the end, I couldn’t help but look for vaccine information, because I didn’t want to spread the disease either.”

5.5. Delta Response Phase

In this phase, the risks that were current related to the surge in daily infection numbers and deaths in the community brought about by the Delta variant of COVID-19. This phase took place from June 2021 and subsided by September 2021. This mainly infected people who had not been vaccinated. Thus, the vaccination campaign was intensified at this time, in response to the increasing number of confirmed cases and deaths. The kinds of health in-

formation the participants encountered during this phase differed greatly from the previous phase, especially with regard to appeals to follow health protocols, and the obligation to participate in the vaccination program.

During this phase, even though they had received the vaccine, the participants were concerned about being infected by the Delta variant because it had more severe symptoms than the previous variant. The most dangerous risk was infecting family members and causing their death. Rini (31, F) voiced her experience of losing her friends: “I was worried at this time, there were a lot of victims, and many of my friends from the same year, my close friends, passed away.” Guntur (25, M) noted that the information he avoided was the rise in the mortality rate after the arrival of the Delta variant. Speaking about the situation with the Delta variant, Dewi (26, F) remarked:

“At that point, fear of this Delta variant increased. Moreover, there were also symptoms like difficulty breathing, and there were a lot of people who hoarded portable oxygen tanks and the like. So, in my opinion, this was a serious disease that’s not to be joked about, and the pandemic set back the whole world. [...] I was clearly afraid that I was going to get infected, and spread it to those around me. That was what I was most afraid of.”

The participants also explained that they avoided information during this phase in order to keep their emotional stability. They also recognized the severe risks in ignoring the appeal to implement health protocols. This is what Hasan (24, M) had to say:

“At the time, I always avoided such information. So I didn’t panic; I didn’t fear the disease. I kept myself healthy by doing this during the Delta phase; I kept my quality of life, preventing infection by frequently washing my hands, wearing a mask, and keeping my distance.”

5.6. Living with COVID Phase

In this phase, people started going back to their normal activities; they were not looking for all the latest information as intensely as before, and were no longer avoiding information. This phase extended from October 2021 until December 2022, characterized by the relaxation of health protocols and the spread of the Omicron variant, which resulted in mild symptoms for COVID-19 patients. The participants only focused on what guidance needed to be followed when the situation got back to normal with the return of crowd activity in the community. Ulfah (25,

F) referred to the moment she realized normal activity had returned by commenting, “I could do my activities normally again, yeah, in the middle of 2022.” On the other hand, Dewi (26, F) felt that the normal situation where people were gathering on the streets or in markets only returned at the end of 2022:

“For example, people started to crowd again in the streets afterwards. From 2020 till the end of 2021, the streets were empty. The streets began bustling again around the middle of 2022, the streets were crowded again with people, and there were a lot of street vendors back. I concluded from this that the situation was back to normal.”

Butet (29, M) compared the new normal situation with the return of crowds and added the changes in people’s behavior of using masks to the time before the pandemic occurred: “I think life is back to normal, because some activities that were prohibited before are now allowed, and we can also finally do stuff directly face-to-face; and the use of masks has loosened, we don’t always have to wear a mask.” The changes in behavior in this phase of living with COVID-19 were described as a normal situation, because people had adapted to the various new habits. This was commented on by Guntur (25, M) and Susi (26, F). According to Guntur (25, M):

“Also like, everywhere you go, you still have to maintain health protocols, such as wearing a mask and social distancing. I started implementing these even before Jokowi’s President announced that we’re free from COVID. But living with COVID still has me worried; I’m worried I’ll get infected again, and that I get infected by the delta version.”

Similarly, Susi (26, F) commented:

“At peace with it, I won’t say we’re at peace. I’m already used to wearing masks when there is a crowd. Although now the information is that we can remove our mask for outdoor activities, even if it’s crowded, it’s impossible and uncomfortable, because I’m just used to wearing a mask. So I keep that in mind.”

In this phase, the participants were not as engaged in searching for or avoiding information, because their information needs were changing due to the pandemic situation. They preferred to utilize the information they had already gathered, mainly about the health protocols

that were still applicable. Ayu (25, F) indicated that the pandemic had taught her to familiarize herself with a new set of habits, such as utilizing digital media, like Zoom meetings: “We’re used to Zoom meetings, and work from home, nowadays doing activities this way just feels normal.” Finally, the participants referred to the way different risks had occurred at different times during the pandemic. In the words of Rini (31, F), “Looking back to the beginning of COVID, this was really a period of uncertainty, because we still didn’t know, the world didn’t understand how to deal with it.”

6. DISCUSSION

6.1. Information Behavior When Faced with COVID-19

The information behavior strategy of the participants changed significantly as the pandemic situation and the level of risk they faced also changed. Initially, people were looking for information to understand this new and uncertain situation. The participants relied on primary information sources such as health authorities (specifically, the Ministry of Health and the World Health Organization) and news outlets to get guidelines and all the latest information. This aligns with the findings of Andalibi and Garcia (2021) about information needs mainly being fulfilled by health authorities.

Information needs significantly influenced the participants’ information behavior strategies during each phase of the pandemic, and these were also influenced by changes in the health protocols and recommended preventive actions. Individuals started to look into information about vaccines, dosage, side effects, and availability the moment they entered the Vaccine Dilemma phase. The spread of the Delta variant also triggered an increased need for information on threats relating to this variant. During this phase, individuals also avoided some information and limited their information exposure, which served as a practical approach for protecting themselves from information they could not handle, as has also been seen among cancer patients (Jensen et al., 2022).

Throughout the pandemic, the participants continued to adapt their information behavior strategies. They needed accurate and reliable information to be able to make informed health decisions. This strategy reflected people’s need to keep up-to-date with the development of the pandemic. The change in information behavior strategy, which was random at the beginning of the pandemic but later became increasingly organized, was due to the way the knowledge gap of the participants was filled as the

pandemic went on. This is reflected in a comment by one of the participants that the uncertainty of the situation gradually became clearer as events progressed.

The participants made use of considerable information from the Internet and social media. This evoked the principle of carefulness in choosing information validity, with the need to take into account the authority of the writer, quality, relevance, and objectivity influencing the participants in their search for and use of information during the pandemic. This finding is in line with Sbaffi and Rowley (2017)'s research regarding web-based information seeking, and the way the credibility level and trustworthiness of the information available on a website page influence this interaction of participants. This also applies to information seeking on social media, where the information behavior strategy needs to consider the credibility factor of the information sources themselves (Osatuyi, 2013; Soroya et al., 2021).

Based on further analysis, we found that participants developed various information behavior strategies, which we categorized into two core categories during the COVID-19 pandemic. There are two frameworks of information behavior strategies: (1) *Pandemic Crisis Understanding*: This framework provides an overview of the recurring information behavior strategy cycle of participants, starting with understanding the evolving situation and risks before the crisis occurs (phase 1), during the crisis (phases 2 to 5), and after the crisis (phase 6) until the situation returns to normal; and (2) *Information Behavior Needs and Strategies*: Individual understanding ultimately creates an information need, which is part of the process of identifying individual knowledge gaps caused by changes in threats and health protocols during the ongoing health crisis.

6.2. Local Knowledge and Sensemaking Process Amid the COVID-19 Pandemic

The sensemaking process in relation to the COVID-19 pandemic involves an individual's active behavior in understanding, identifying, interpreting, internalizing, and responding to information to resolve their knowledge gap during this period. The participants utilized information from various channels to understand the situation that was occurring. The right information behavior strategy helped individuals to understand the ever-changing nature of the pandemic quickly. In each phase, all of the participants recognized the situation and their relevant information needs, such as information about virus transmission, nutrition, health protocols, or vaccination.

Interpreting new information alongside their existing knowledge base helped them to respond to the changes that occurred throughout the six phases of the pandemic, whether in terms of preventive measures, persuasive measures, or both. Moreover, they internalized and responded to the information in order to make the best health decisions for themselves.

Paying attention to their own knowledge gap, the participants moved as the situation changed from an active sensemaking process when their knowledge base was not met, to a habitual mode when their information needs had been met, and less effort was required in relation to any health actions. This again reflects work by Mamykina et al. (2015b). This is also in line with Wilson (2020)'s position that individuals choose to make the minimum effort and consider emotional factors in deciding their information behavior strategy. In addition, the sensemaking process undertaken by the participants was one of information seeking and avoidance, which ensure a sense of normality in a situation full of uncertainty. The participants were faced with events that shook their beliefs about when they could return to normal activities, and involved various health-related decisions, such as wearing masks, getting vaccinated, or avoiding the news about deaths.

The participants utilized local knowledge as their information source to help them recognize the dangers and improve their understanding of the situation and security risks during the pandemic. This included information on the mortality rate and the number of positive cases at the time, the crowd situation in the streets or markets, or the level of mask usage in the geographical neighborhood where they lived. In addition, they also shared information about herbal remedies, especially traditional herbal concoctions or "jamu," to strengthen the body's immunity during the pandemic. The participants received this local knowledge not only through direct observation, but also from family, friends, and coworkers, which is a standard information-sharing practice among Indonesians. This is also in line with the findings of Montesi (2023)'s study in Madrid of the "new normal" situation of the pandemic, which examined changes in perceptions of the situation and the risks of the pandemic in terms of people's responses to their local environment and their use of information exchange.

In interviews, participants depicted a high level of solidarity in the community, where mutual assistance is a common experience. Participants undergoing self-isolation at home often received support in the form of food, vitamins, and daily necessities from neighbors, creating

an atmosphere of mutual care. This practice supports the care of those who are unable to leave their homes freely during the pandemic.

As the population with the largest Muslim population in the world, during the pandemic, Indonesian society paid significant attention to religious information related to the ongoing pandemic situation. Muhtadi and Soderborg (2023) indicate that the level of fear and behavior during the pandemic was closely associated with religious factors among Indonesians. As described by the participants, in addition to following health authorities, they underscored the importance of religious information from the Indonesian Ulema Council (*Majelis Ulama Indonesia* or MUI) or local religious organizations in making health decisions. This includes considerations regarding the permissibility (halal status) of vaccines, procedures for burial during pandemic situations that are different from normal conditions, and directives against gathering and the use of masks during worship, as responses to the prevailing health protocol guidelines.

Based on further analysis in the sensemaking process, we developed two core categories that explain how participants engaged in the sensemaking process: (1) *Crisis Knowledge Sources*: In meeting these needs, individuals are prompted to address existing knowledge gaps using various strategies of search, avoidance, limitation, use, and evaluation of information by exploring available information resources, supported by processes of interpretation, internalization, and response to available local knowledge throughout the ongoing pandemic; and (2) *Outcomes for Deciding Health Actions*: Consequently, this results in outcomes to fill knowledge gaps as a stage of internalization, and continued alternating processes of sensemaking and habitual modes to make appropriate health decisions. These were random at the beginning of the pandemic but became more regular in later phases. This was influenced by the “knowledge gap fulfillment” and “use of local knowledge.”

7. RESEARCH LIMITATIONS

This study has described the information behavior strategies and sensemaking process used by Indonesians during the COVID-19 pandemic. Qualitative research utilizing interviews with a limited sample supports the interpretation of the findings precisely and in detail. We are aware that the small sample size of 10 participants is a limitation of this study. However, the developed research design has provided us with rich and in-depth data. This

study does not aim to generalize to the wider population, but to provide an early depiction of information-seeking strategies and sensemaking processes during this global crisis. The study suggests the transferability of these findings to other similar cases and crises (Maxwell, 2005). Another limitation of this study is the fact that the participants were all from Indonesia, and living in various cities on Java Island. We recognize that the lack of diversity in domicile and other cultural characteristics of the participants may influence the results. However, we have produced the analysis and findings from a number of themes and categories that repeatedly emerged in the interview data with the participants. Future research may address this issue by using more significant and more diverse samples.

8. CONCLUSION

The conclusion of this study states that the participants' health information behavior in the six phases of the COVID-19 pandemic underwent changes and adjustments in strategy. Their approach was random at the beginning but became increasingly organized as the situation moved towards normalcy. This is influenced by the factors of “knowledge gap fulfillment” and the “utilization of local knowledge” that communities have been following during the COVID-19 pandemic, as outlined in the framework we have developed. Furthermore, the changing risks and situations in each phase of the pandemic gradually influenced the communities' process of sensemaking, decision-making, and building their understanding regarding this protracted health crisis.

Based on the findings of our further analysis, we attempt to connect core categories and propose a framework for behavior-based information strategy understanding aimed at mitigating risks and reducing ongoing health crises. This framework comprises four components: Pandemic Crisis Understanding, Information Behavior Needs and Strategies, Crisis Knowledge Sources, and Health Action Decision Outcomes. The framework aims to enhance the individual's health decision-making processes during the crisis. The framework commences with comprehending the situation and context during the COVID-19 pandemic crisis to identify information needs, followed by identifying relevant crisis knowledge channels and sources, such as social media, television, or direct communication from family or colleagues, receiving pandemic-related information from health authorities, along with utilizing local knowledge related to self-care

during the crisis. Furthermore, active efforts to identify, interpret, internalize, and respond to required available crisis information throughout the ongoing pandemic were undertaken to make appropriate health decisions at each phase based on the risk level. This process was carried out through alternating sensemaking and habitual modes throughout the COVID-19 pandemic crisis phases. Amid a community often neglectful of health protocols, and the spread of misinformation and conspiracy theories which was widespread during the crisis, this framework was crucial in integrating individual sensemaking understanding with social processes such as dialogue with others. This aimed to enhance individual's understanding of the crisis risk situation they faced and the necessary health decisions to be made.

This study provides empirical evidence of the utilization of a knowledge base derived from the participants' experiences in health information behavior during the health crisis, as their understanding of the situation, risks, and the management of health protocols changed. This shows the value of Montesi (2021)'s proposal for further study into the COVID-19 pandemic. Furthermore, this study also answers the challenges raised by Krakowska (2020) regarding the lack of research on information behavior in crises, especially on the changes in people's individual information behaviors when faced with a health crisis, which are not commonly covered in the literature. These preliminary findings can be used for future research to study how the described changes in the information behavior strategies of individuals may be relevant to other crises, such as natural disasters, economic crises, or socio-political crises in particular regions.

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CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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