

# Evolving of Low-wage Migrant Workers' Health Information Seeking Roles Pre and Post Covid-19

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## Abstract

An estimated 164 million people work as migrant workers, and many of them are low-income individuals who face a significant risk of virus transmission as a result of contact to the environment and during work. This study intends to provide light on how the behavior and roles of migrant low-income workers in seeking out health information have evolved over time, both before and after the COVID-19 pandemic. We used semi-structured interviews as part of an exploratory qualitative study to learn more about the low-wage migrant Thai workers' experiences in Taiwan. Thematic analysis was used to examine the interview data. In response to the COVID-19 pandemic, migrant Thai workers evolved unique health information habits and roles. Due to their perceived dangers, they also expanded their care to include those in their immediate social circle and switched from seeking health information as sufferers to doing so as caregivers. This study recognizes and responds to the needs of the society's most vulnerable migrant workers. The results of this study would direct the government and technological solutions to meet their requirements for health information in the right ways.

**Keywords** Health literacy; Health information seeking behavior; Covid-19; Health crisis; Migrant worker; Low-income worker

*Received: August 24, 2023*

*Revised: October 25, 2023*

*Accepted: May 8, 2024*

## Introduction

COVID-19, also referred to as the coronavirus disease 2019, is an illness caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It was initially discovered in December 2019. The virus mainly spreads through droplets when an individual who is infected coughs, sneezes, talks, or breathes. Since its identification, it has quickly spread across the globe, resulting in a pandemic with substantial health, economic, and societal consequences. The COVID-19 crisis amplified the preexisting migratory vulnerabilities, making it imperative to address the health requirements of migrant workers (Lange et al., 2020). Due to their exposure to the environment and at work (Moyce et al., 2018) and their employment in so-called “3-D: dirty, dangerous, and demanding” jobs (Liem et al., 2020), international migrant workers are at a significant risk of transmitting viruses. Additionally, recent research highlights that inadequate living conditions contributed to the swift transmission of COVID-19 among migrant laborers (Wordbank, 2020).

The impact of COVID-19 on migrant populations is a diverse matter shedding light on the connection between health inequalities, socioeconomic aspects, and healthcare accessibility. Migrants, including refugees, asylum seekers, and undocumented migrant people, frequently encounter distinctive obstacles that can affect their vulnerability to COVID-19 transmission, the severity of their illness, and their ability to access healthcare services. Migrant workers often face risks and vulnerabilities, which are commonly associated with their socio-economic status (Guadagno et al., 2020), language and communication barriers (Bradby et al., 2015), limited understanding of healthcare coverage (Brown et al., 2002), and restricted access to health insurance in the country they reside in (Guinto et al., 2015).

During crises like a pandemic, the inequalities arising from socio-economic status become more apparent, as economically disadvantaged individuals are often ill-prepared and lack sufficient resources to respond effectively (Teo et al., 2018). Linguistic differences pose various challenges to the well-being of migrant workers, including difficulties in seeking health information online (Millar et al., 2020) and struggling to adapt to stress (Hattar-Pollara et al., 1995). Unfamiliarity with the healthcare services is typically a result of disparities between the healthcare systems of the migrant workers' home country and the country they are residing in, along with language barriers. Although numerous studies have examined the barriers to seeking health information, the implications in terms of health literacy and competencies have been rarely explored.

The accessibility of health information for marginalized groups, including low-income and low-skilled migrant workers, has improved due to the advancement of information and communication technologies (ICTs) such as computers, mobile devices, and the Internet. This has led to enhanced health literacy (Lautenschlager et al., 2006; Lagoe et al., 2015; Zhang et al., 2018). Among the various ICTs utilized for health information seeking, social media plays a crucial role in the information-seeking behavior of migrants, offering several advantages such as connecting with others who have similar healthcare experiences, broadening access to health information, and facilitating the sharing of experiences and gathering of opinions from others (Moorhead et al., 2013; Harper et al., 2009). Through interactive exchanges between information seekers and sharers, health consumers engage with others and receive social support (De Choudhury, 2014; Bender, 2011).

This research, centered around Taiwan, holds significant implications for the global public health community. We focus on a country that has implemented highly effective interventions in containing the pandemic (Lai et al., 2023) and shed light on how low-income migrant workers seek health information within this specific context. Our study provides detailed observations on a case that has received limited documentation from international organizations such as the World Health Organization and the International Labour Organization. Taiwan's inability to participate in these international organizations and exchange information with the global community poses a threat to global public health (Rowen et al., 2020; Banyan, 2020).

## **Theoretical Background**

### ***Low wage migrant workers***

The research study titled “Examining Vulnerabilities: The Lives of Thai Transnational Migrant Workers in Taiwan” reveals that migrant workers who earn wages have strong connections with each other and often engage in risky behaviors, such as disputes over romantic relationships, alcohol consumption, and substance abuse (Smutkupt, 2017). The study also highlights the difficulties faced by Thai workers in Taiwan when it comes to accessing important health-related information.

A significant number of Thai individuals who seek employment abroad often have to borrow money for their travel expenses. This puts them under a burden of debt. In order to embark on their journey, they are forced to take out loans amounting to over a hundred thousand baht. This financial pressure not only results in substantial debt but also leaves them with limited financial resources for essential needs like healthcare. Moreover, the Overseas Employment Administration Division of Thailand has only registered 129 recruitment agencies (National Statistics Thailand, 2017), despite there being around a thousand recruitment companies officially registered with the Thailand Ministry of Labor. This scarcity of employment options can drive workers towards illegal employment, depriving them of crucial services like healthcare and access to the Information System for healthcare.

The term “low wage” refers to workers who earn less than the income of residents in Taiwan, which typically ranges from NT\$23,800 to NT\$49,000 per month. These workers often have to work more than 8 hours a day. The minimum wage in Taiwan, determined by the Basic Wages Review committee under the Ministry of Labor in 2020, was reported as NT\$39,191 per month by the Directorate General of Budget, Accounting, and Statistics (DGBAS). In contrast, Thailand’s minimum wage, set by the Ministry of Labour, is between 308฿ and 330฿ per day or 9,000฿ per month.

### ***Competency in Health Literacy***

Health literacy is often described as the combination of knowledge and skills that can be assessed based on how an individual comprehends and utilizes health-related information. Firstly, there’s the skill of seeking out and obtaining health-related information, commonly referred to as “accessing information.” Secondly, there’s the skill of comprehending and making sense of the health information one comes across, known as “understanding information.” Thirdly, there’s the ability to evaluate and critically analyze health information, which is called “information appraisal.” Lastly, there’s the proficiency in applying one’s knowledge by communicating and making informed decisions to improve and maintain personal health (Diviani et al., 2016; Sørensen et al., 2012; Nokes et al., 2018). The significance of health literacy in accessing and utilizing health information has been acknowledged (Meppelink et al., 2015; Kugbey et al., 2019). Particularly, insufficient health literacy has adverse effects on the ability of migrant populations and their competent to manage health information and navigate the healthcare system (Tsai et al., 2016). Furthermore, low health literacy acts as a barrier to engaging in online health information seeking, as individuals may neglect their own needs (Pian, 2020) or feel overwhelmed by information overload (Khaleel et al., 2020).

### ***Seeking information related to health during a pandemic***

Crises are unforeseen and extraordinary occurrences that introduce risks and uncertainty to organizations and the people they serve. In the current age of social media, crises are now often shaped by the posts, comments, or reactions of the affected public on various social media platforms, rather than being solely influenced by organizational or traditional mass communication sources (Zhang et al., 2018).

Previous studies have primarily focused on the motivation to develop coping strategies as a means to reduce negative emotions, without distinguishing between different coping strategies. However, according to Zhang’s research (2018), the motivations behind various coping strategies may vary. For instance, information seeking may be driven by the need to comprehend self-threatening information (Witte et al., 1994), whereas support seeking and negative word-of-mouth intentions may

serve the dual purpose of alleviating negative emotions and gaining a better understanding of the situation.

Park (2016) reports that while information technology served as a crucial tool for foreign residents during crises, the potential problems associated with such reliance received limited attention. In the context of COVID-19, (Moreno et al. (2020) discovered that ICTs were the preferred means for obtaining information about public health-related outbreaks. However, their study primarily focused on information access and provided limited insights into how ICTs influence various competencies, such as understanding, processing, and applying health information. Similarly, Li et al. (2020) and Song et al. (2020) found that factors like perceived threat, perceived information overload, and understanding the risks of COVID-19 were linked to consumers' behavioral intentions regarding seeking health information on mainstream media and social media. Nevertheless, these studies still have limited findings regarding the impact of ICTs on health competencies and user behavior.

### ***Health Information Seeking Behavior***

Health information seeking refers to an individual's deliberate actions or efforts to search for information in order to fulfill specific needs or objectives (Millar et al., 2020). Typically, this behavior arises when individuals feel vulnerable in terms of their well-being or health (Lagoe et al., 2015). Various factors are associated with negative health information seeking, such as inconsistent keyword searches, irrelevant information, and information overload. These factors are influenced by health literacy, education, cognitive effort, anxiety, low self-efficacy, limited searching skills, concerns about information quality, and lower socioeconomic status and race (Khaleel et al., 2020; Zhao et al., 2019). Consequently, health information seeking is crucial for individuals to take care of themselves, as poor health information seeking practices can lead to inadequate self-care.

To clarify this aspect, the findings from a study examining the information-seeking behaviors of a health disparities population served by a community center in North Philadelphia indicated that participants' information seeking behaviors could be categorized into three main groups: "Caregiver", "Sufferer" and "Surfer". The study also emphasized the importance of designing information services that align with the preferences and habits of the users (Dalrymple et al., 2010). Factors that influence health-promoting behaviors encompass age, race, education, socioeconomic status, region, perceived health, self-esteem, and cultural adaptation (Hulme, 2003; Wang, 1992). These factors are similar to the contextual factors observed in migrant health information seeking behavior.

A systematic review was conducted to investigate the impact of patients' internet health information seeking on the relationship between patients and physicians. The review consistently found that when patients seek health information online, it can lead to an improvement in the patient-physician relationship (Burghle, 2019). Both patients and healthcare professionals were equally inclined to initiate neutral discussions based on the information obtained online. Patients often expressed their concerns, while professionals responded by giving serious consideration to patients' online health information seeking or affirming their beliefs (Linn, 2020).

According to Diviani's research, health professionals are the most trusted source of information for caregivers. Higher levels of health literacy were associated with lower subjective caregiver burden and greater satisfaction with their own health. Caregivers seek information from various sources on different topics. However, in order for the information to truly enhance the caregiving experience, caregivers need to possess health literacy skills to comprehend and utilize it effectively (Diviani, 2020).

Diviani's study revealed that caregivers engage in information seeking across various socio-demographic groups, with one notable exception. Educational level was found to have a positive correlation with information seeking, indicating that caregivers with higher educational attainment are more likely to search for information. This suggests that individuals with lower education may face barriers in accessing information or may not fully recognize its value, leading to less proactive information seeking behavior. The study emphasizes the need for dedicated strategies by policy makers

and healthcare providers to enhance accessibility, visibility, and usefulness of relevant information, particularly for those with limited education, in order to raise awareness about its potential value (Diviani, 2020).

Morrison's study in 2014 highlighted the connection between low education and low health literacy among caregivers. Caregivers with low health literacy were found to have over three times greater odds of visiting the Emergency Department (ED) for non-urgent issues compared to those with adequate health literacy. Non-urgent ED visits were primarily attributed to acute upper respiratory infections and fevers. Such visits can lead to negative outcomes, including increased healthcare costs, unnecessary tests and treatments, and a lack of continuity in the patient-primary care provider relationship (Cohen, 2013; Uscher-Pines, 2013).

Health information seeking is crucial for caregivers because their inability to assess the severity of their family member's symptoms may prompt them to seek immediate healthcare, resulting in hospital visits or consultations with specialists that may not be necessary. Therefore, it is important to recognize that health literacy skills influence a caregiver's ability to manage mild illnesses. Identifying resources that enhance caregivers' capacity to assess and manage mild illnesses, aligning with their literacy level, should be considered as an intervention to address non-urgent ED visits (Kubicek, 2012).

A study focusing on caregivers with low literacy explored their preferred methods of education. The findings from focus groups ranked the preferred education methods as follows: first, a mobile application called Kids Doc developed by the American Academy of Pediatrics; second, a 24-hour Nurse Call Line; third, a book titled My Child is Sick! fourth, a booklet named Caring for Your Sick Child Managing Common Infections at Home; and fifth, patient education printouts specific to the diagnosis. Although the study did not find a statistically significant correlation between literacy scores and preferred education methods, participants' comments revealed two themes influencing their choices: access to information and comprehensiveness of information (Ohns, 2019).

Myrick's study in 2017 examined individuals who search for health information online and their positive attitudes towards a health-specific search engine. The study also explored their intentions to take health-related actions and share valuable information with others. The findings revealed the presence of five common emotions associated with health information seeking;

*Inspiration:* Participants in this study who experienced a sense of inspiration following their health information searches were more inclined to share the information they found with others. This suggests that health-related websites that evoke feelings of inspiration have the potential to reach a wider audience.

*Contentment:* Feeling content after engaging in online searches for health information was found to be a positive indicator of attitudes towards health information seeking. Positive emotions, such as contentment, can serve as motivators for individuals to actively pursue their health-related goals.

*Interest:* The perceived personal relevance of search results and the expectations of positive outcomes associated with the search were factors related to positive attitudes towards the search engine. Participants who felt a sense of interest during their online searches reported engaging in more searches and perceived the search results to be more relevant.

*Fear:* Participants who reported feeling fearful after conducting their searches were less likely to believe that future searches would yield positive outcomes. However, they were more inclined to intend to take health-related actions, possibly as a response to their fears.

*Hope:* Hope, as an emotion, acts as a driving force that motivates individuals to strive for desired goals, including good health, even in uncertain circumstances.

According to previous research (Cotten, 2004; Dalrymple, 2010; Burghle, 2019; Diviani, 2020; Linn, 2020), individuals who seek health information tend to consider their personal preferences and habits when conducting their searches. Caregivers and sufferers, in particular, are driven by strong emotions related to their own or their loved ones' illnesses. On the other hand, "surfers" engage in more passive information seeking behaviors, exploring various sources out of personal interest. However, the level of health literacy still plays a crucial role in determining which health information they trust.

Although Taiwan provides universal healthcare, migrant workers often face health disparities due to linguistic and financial barriers (Kuan et al., 2020; Tsai et al., 2016). The Ministry of Labor in Taiwan reports that there are approximately 70,000 migrant workers, primarily from Southeast Asian countries such as Indonesia (37.6%), Vietnam (32.9%), Philippines (21.4%), and Thailand (8.3%). Many undocumented migrant workers in Taiwan are considered "missing workers" who have left their employers. These vulnerable workers may take on greater job risks, lack proper training or protective equipment, and hesitate to report unsafe working conditions. Understanding and addressing the health information needs of these marginalized migrant workers during the pandemic is crucial.

In this study, we conducted in-depth interviews to explore the specific practices of health information seeking among low-income workers. Our research expands upon previous work by examining the barriers they face and how these barriers are either overcome or intensified during a pandemic. We reflect on the implications of our findings, highlighting the importance of improving health competencies through the use of the Internet and information communication technologies (ICT). These findings not only support the health information seeking of Thai low-income workers but also provide insights for relevant organizations to develop suitable content and employ appropriate information technology that meets the needs of this population.

## Methods

### Study design

Our research involved conducting semi-structured interviews with migrant workers to gain insights into their behavior when seeking health information. We conducted a structured interview to gather information about how participants' roles in seeking information were affected before and during the COVID-19 pandemic. We chose this interview format because it allows for flexibility in gathering insights while still aligning with the main objective of the study. The study procedures and interview protocol were reviewed and approved by the Research Ethics Review Committee of National Tsing Hua University (REC10907HS074). All participants voluntarily participated in the study, and each participant provided informed consent by acknowledging and signing a consent form. To assess the effectiveness of interview topics and questions in minimizing messages and misunderstandings, we utilized a process known as interview topic testing. We conducted interviews with Thai workers to review all the topics and questions, addressing any issues of irrelevance, misunderstanding, or unclear messaging that arose during this initial testing phase.

### Study participants

The study focused on migrant Thai low-income workers residing in Taiwan who met specific criteria, including receiving the minimum wage set by the Taiwan Ministry of Labor and being employed as migrant workers in Taiwan. To overcome the challenges of reaching out to this population, particularly undocumented workers who tend to avoid contact with outsiders due to language barriers and fear of deportation, we employed a snowball sampling method. Participants were recruited through three approaches: 1) posting recruitment advertisements on private Facebook groups for Thai low-income workers in Taiwan, 2) receiving referrals from Thai students who had previously worked as interpreters for migrant workers, and 3) leveraging contacts within the community who were also migrant Thai low-income workers.

### Data collection and analysis

Data for this study was collected through two processes. Initially, a questionnaire was administered prior to the interviews to gather demographic information such as gender, age, occupation, immigration status, and duration of stay in Taiwan. Subsequently, in-depth, semi-structured interviews were conducted to delve into the participants' health information seeking behavior and the difficulties they encountered when seeking health information as migrant workers. The interview questions aimed to explore their experiences with health information seeking, their behavior and strategies in seeking information, and their health information seeking practices during the COVID-19 pandemic, allowing for a deeper understanding of health information seeking in the context of a pandemic.

The interview protocol primarily focused on two key areas: 1) general health information seeking behavior and challenges, and 2) health information seeking specifically related to the COVID-19 situation as outlined in Figure 1.

1. Background Information: Participants' gender, occupation, level of education, immigration status, and length of time living in Taiwan.
2. Behavior of seeking health information:
  - ☐ How do they typically search for health information?
  - ☐ Are there any challenges or differences when seeking health information in Taiwan compared to Thailand?
3. Behavior of seeking health information during the COVID-19 situation:
  - ☐ What steps do you take when you want to find information about COVID-19?
  - ☐ Which sources do you prefer for obtaining COVID-19 information?

**Figure 1** The items of the qualitative interview guide organized by topic.

From August to October 2020, we conducted a 6-phase thematic analysis process (Braun et al., 2012). Thematic analysis was employed using a top-down, theoretically driven approach. The interview transcripts were transcribed and coded using ATLAS.ti 9 software by the interviewer. Initially, open coding was performed, where each phrase was tagged with free-phrased labels to generate initial codes. Another author participated in the coding process, reviewing and finalizing the initial codes. Ultimately, the two authors reached agreement on the identified themes and discussed the findings in relation to each research question.

### Results

We conducted a total of 13 semi-structured interviews, with 10 interviews conducted face-to-face and 3 interviews conducted online using audio through an instant messaging application, specifically to ensure confidentiality for the undocumented workers. Our participants consisted of native Thai speakers employed in different industries, comprising five male workers and eight female workers (see Table 1). The interviews lasted between 20 to 45 minutes each and were recorded in audio format. Transcriptions of the interviews were prepared in both Thai and English languages for analysis purposes.

To address the small sample size effect and the issue of participant saturation, which can significantly impact the results, we use three main factors in computation and assessment. These factors are as follows: Run Length, Base Size, and New Information Threshold (Guest, 2020). "Base size" refers to the defined scope within which the existing data in a dataset is enclosed. It serves as a

reference for calculations. In the context of interviews, “run length” denotes the number of interviews required to discover and compute information. The total count of themes identified during the run determines the numerator for the saturation ratio. Instead of using a fixed threshold, we initially suggest a new information acceptance threshold called the “New Information Threshold.” This threshold represents the proportion of discovered information that we would consider as evidence that saturation has been achieved during a specific phase of data collection.

**Table 1** Study participants’ background information.

	Age	Gender	Industry	Education	Immigration status	Residency
1	38	Male	Manufacturing	Middle High	Legal	12
2	47	Female	Elderly care	High School	Legal	11
3	28	Male	Food service	High School	Legal	1.5
4	42	Female	Food processing	Middle High	Legal	7
5	37	Female	Food processing	Undergraduate	Undocumented	2.5
6	25	Female	Unemployed	Undergraduate	Legal	4
7	35	Female	Food service	High Diploma	Undocumented	1
8	31	Male	Manufacturing	High School	Undocumented	3
9	48	Male	Manufacturing	Primary School	Legal	3
10	54	Female	Elderly care	Incomplete	Undocumented	15-16
11	39	Male	Construction	Middle High	Undocumented	2.8
12	38	Female	Manufacturing	High School	Legal	5
13	54	Female	Food processing	Incomplete	Legal	27

In this section, we present the results of our study regarding the health information seeking behavior of Thai low-income workers in Taiwan, focusing on the effects of the COVID-19 pandemic on this specific group. We also examine the workers’ risk perception and management strategies, as well as the development of health literacy in the context of COVID-19.

### Health literacy challenges prior to the pandemic

This study identified irregular work schedules, economic status, educational background, language barriers, length of residency, and residency status as key factors that impact the health literacy of migrant workers. Each of these factors was found to have different effects on various health competences, including accessing, understanding, appraising, and applying health information.

The reliance of migrant workers on medications brought from their home countries to manage illnesses leads to significant consequences. This includes the potential misuse of medications without proper instructions or following non-professional advice to self-treat and seek quick recovery.

“In the event of a severe illness, I would opt to use medication that I have brought with me from Thailand. As an undocumented worker, going to the hospital poses too much risk, so I prefer to take medicine and rest instead.” [Participant 08]

The ability to access healthcare information and services is influenced by one’s immigration status. Many workers lack knowledge regarding their eligibility for healthcare services, and this is particularly concerning for undocumented workers who are uncertain about their qualification for national health insurance coverage. For example, some participants are unaware that foreign nationals who have resided legally in Taiwan for more than six months or have legal employment are entitled to the National Health Insurance (NHI).



**Perceptions of risk during the Covid-19 pandemic vary among migrant workers.**

The majority of interviewed migrant workers consider themselves at high risk of contracting the coronavirus due to various factors such as language barriers, limited medical knowledge, long working hours, and a less protected working and living environment. Their irregular time off limits their ability to stay updated with the latest news. Their limited knowledge and experiences in healthcare contribute to a heightened sense of danger when faced with health crises. Moreover, their unfamiliarity with their rights to healthcare services in the host country further increases their perceived risk of infection.

On the other hand, some migrant workers feel more secure and, as a result, may underestimate the threat of Covid-19. They have stronger social support networks and are more familiar with the host country. They trust that they have people to rely on, such as guardians or local family members, who will take care of them and handle necessary matters. Another influencing factor on their perception of risk is the length of their residency. Those who have been residing in the host country for a longer period have a stronger familiarity with the environment, a larger social network, and a better understanding of the healthcare system and local authorities. Their experiences with the healthcare system contribute to a higher level of trust in local authorities. Some participants also commend the effective handling of the Covid-19 situation by the Taiwanese government, which alleviates their worries.

Despite the varying perceptions of risk, most participants emphasize the importance of self-care and personal hygiene practices. They view themselves as potential sufferers and are highly concerned about protecting their own health. Undocumented workers, in particular, feel more vulnerable as they worry about exposing themselves and have fewer opportunities to familiarize themselves with the healthcare system.

“Throughout the pandemic, I experienced significant concern regarding acquiring face masks. As an undocumented worker, I faced uncertainty about how and where to obtain them. My primary worry was the risk of infection, compounded by the fact that I lack National Health Insurance (NHI). Not only would this hinder my ability to work, but it also posed the possibility of being deported to Thailand, which is an even worse outcome.” [Participant 11]

**Easier access of more comprehensive information to care for others**

Considering the widespread awareness of the pandemic, our participants have ample opportunities to gather comprehensive information from multiple sources such as news media, local authorities, and their social networks. They perceive COVID-19 information as more accessible and readily available compared to information about common illnesses, as people are eager to share COVID-19 updates. Facebook groups comprising Thai workers, as well as news television and discussions with friends and coworkers, serve as valuable sources of information.

The availability of news in Thai provided by international radio in Taiwan is highly appreciated by Thai workers. The extensive discussions surrounding COVID-19 enable migrant workers to easily access information and gather relevant keywords for further searches. Our participants express satisfaction with the ability to find necessary information from familiar sources. Furthermore, close friends and family in Taiwan play a crucial role as the primary source of COVID-19 information for the interviewed participants. This expanded access to information allows workers to stay informed about the disease, despite their limited time and energy due to long working hours.

“Finding information about COVID-19 is more convenient compared to information about common diseases due to its widespread coverage. Detailed descriptions of the disease and the constant updates in news sources make it easier to stay informed about COVID-19.” [Participant 03]

“COVID-19 is everywhere, with daily coverage on television and constant updates on social media platforms, ensuring that information about the COVID-19 situation is readily available at any time.” [Participant 04]

Furthermore, undocumented workers who are hesitant to seek information can still access reliable health advice through trustworthy individuals on social platforms, such as verified Thai doctors endorsed by social media companies or official government social media accounts.

“I tend to rely on platforms like a government-operated Facebook page that shares news and important updates. Additionally, I seek information from verified Facebook pages of Thai doctors, as I trust the reliability of their content.” [Participant 01]

### **Transitioned of health information seeking roles**

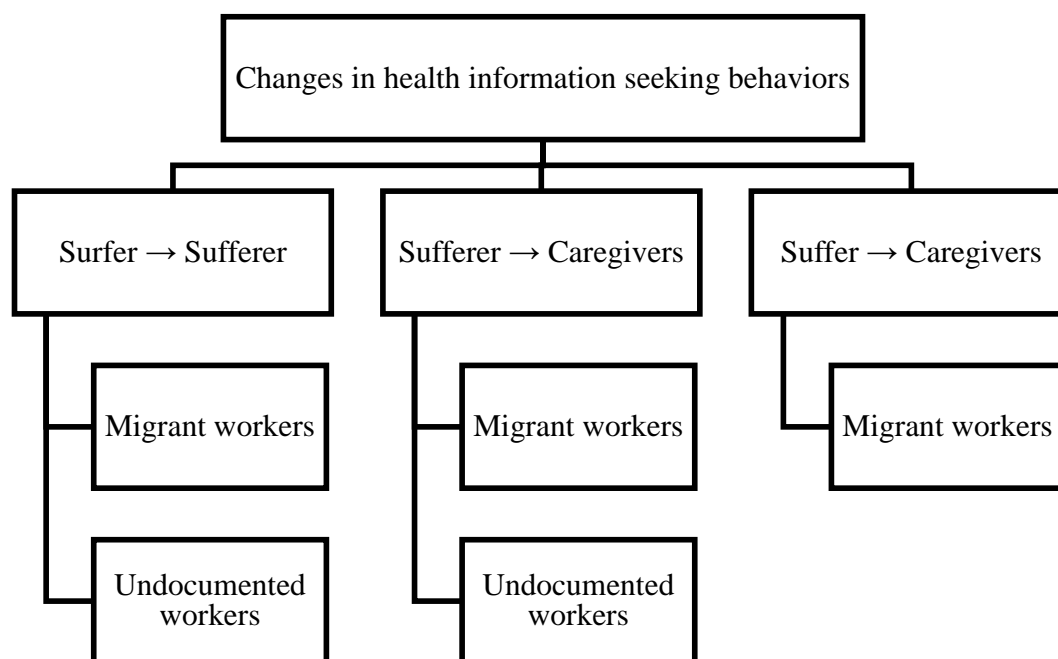
Expanding the existing literature on health information seeking (Dalrymple, Zach, & Rogers, 2010), we have identified three distinct types of health information seeking behaviors: “caregiver,” “sufferer,” and “surfer,” and have recognized the situational variations associated with each typology. Prior to the pandemic, only a few migrant workers exhibited the role of a “caregiver,” actively seeking information to care for their family, friends, and close ones. These “caregivers” were often influenced by peers who faced similar language challenges, and they primarily connected with others in similar circumstances or groups. Before the pandemic, people primarily focused on providing care to those who suffered from similar illnesses or individuals who faced language barriers. We discovered that migrant workers were more passive and less motivated to share health-related knowledge because they considered health topics to be sensitive and personal matters that should only be discussed with health experts or trusted individuals. Additionally, their lower education levels and limited language skills made them less confident in sharing information, resulting in discussions, and sharing only when they had similar experiences.

In the face of the pandemic, migrant workers began perceiving themselves as a vulnerable group and started identifying themselves as “sufferers.” Their awareness of the disease increased, leading to a heightened interest in related information. Interestingly, when directly impacted by COVID-19, our participants were motivated to share and warn their own community, as they recognized COVID-19 as a common risk rather than a purely personal issue. This shift in agency was evident in the information seekers who took steps to self-care and manage risk by actively seeking health information. The widespread availability of information empowered them to comprehend and communicate health-related information unlike before the pandemic. As a result, these information seekers became more active and viewed others as potential “sufferers” who could benefit from the information they shared. Therefore, migrant workers were motivated to exchange information and knowledge within their close circles and communities on social networks. We observed that previously passive migrant workers in seeking health information transitioned into the role of caregivers when seeking information to support the health of others.

**Table 2** The reasons why ‘Health Information Seeking’ is important to the workers.

<b>Reasons why “Health Info Seeking” is important</b>	<b>Migrant workers</b>	<b>Undocumented workers</b>
Need to help relatives and friends	✓	✓
Find possibilities to get medication and support	✓	✓
Care for the communities	✓	
Fear of being reported if get infected		✓
Afraid of the financial risk from being infected		✓

With respect to Table 2, we can infer that undocumented workers face risks in both negative health situations and offenses compared to migrant workers. We employed various questions regarding “what they would do in a situation where they required health information.” By examining information searching and web-surfing behaviors, we can categorize the changes into three main shifts in health information-seeking behaviors, as seen in the figure. These include: (1) Surfer → Sufferer, (2) Sufferer → Caregivers, and (3) Sufferer → Caregivers as shown in Figure 2.



**Figure 2** The categorization of changes in health information-seeking behaviors.

## Discussion

The global COVID-19 outbreak has presented unique difficulties for the health of migrants worldwide. Taiwan is no exception, experiencing a surge in coronavirus infections among migrant workers arriving from Southeast Asian countries. In February 2020, the confirmation of an undocumented Indonesian caregiver as one of Taiwan’s earliest COVID-19 patients (Chen, 2020) brought increased attention to the need for preventive and surveillance measures among migrant workers. This study focuses on addressing the health information seeking behavior of migrant workers overtime before and during the pandemic and uncovering the changes and challenges associated with seeking health information in this context.

### **Dependence on information and communication technology (ICT) and social media platforms for seeking health information.**

During the COVID-19 pandemic, Information and Communication Technology (ICT) has played a pivotal role in facilitating health information seeking, providing individuals with accessible and timely information to navigate the challenges posed by the virus. This contribution can be observed in several key aspects (e.g., timely dissemination of information, data sharing, etc.).

Our findings demonstrated a significant preference for and utilization of the Internet when seeking health information among migrant workers. Given the association between health literacy and health outcomes, we investigated the relationship between health literacy and health information

seeking roles. Interestingly, we discovered that the migrant workers exhibited improved competencies in accessing, understanding, appraising, and applying health information. The widespread availability of the Internet has played a crucial role in facilitating the ease of obtaining and utilizing health information for these individuals.

Consequently, we concluded that information and communication technology (ICT) has proven beneficial for vulnerable groups by connecting them with trustworthy individuals and authoritative sources. This aligns with the findings of Moorhead et al. (2013), who highlighted the growing influence of social media in health information seeking. Social media platforms serve as convenient and comprehensive hubs for both informational and emotional support. Recognizing the significance of social media, it is important for information providers to consider integrating their services within these platforms. Additionally, the implementation of tailored communication technologies could effectively empower migrant workers to stay informed, maintain preventive behaviors, and enhance communication between information seekers and healthcare providers, as noted by Kreps and Sparks (2008).

Moreover, this study suggests that migrant workers are not only aware of healthcare issues but also actively search for information both to take care of themselves and to assist their fellow individuals. This finding emphasizes the importance of this group in collaborating with authorities and the community to protect their collective interests during emergencies or pandemics. In conclusion, it is crucial for the government and healthcare providers to recognize these workers as contributors to spreading healthcare knowledge and raising awareness about health-related matters.

### Limitations

Our understanding of the experiences of migrant workers was restricted due to the limited number of interviews conducted with undocumented workers. These individuals tend to remain discreet within their familiar groups and actively avoid contact with others to minimize their chances of exposure. Additionally, communication posed a challenge during the interviews as some participants spoke non-standard Thai dialects. To mitigate this, our researchers used simplified language; however, there remains a possibility of misunderstandings and subsequent misinterpretations. Furthermore, this study focused solely on exploring the perspectives of migrant workers and their evolving of health information seeking role. However, it did not incorporate the viewpoints of healthcare information and service providers. Including opinions from these key stakeholders, such as non-governmental staff, interpreters, and agencies who frequently interact with migrant workers, would offer valuable insights into the intersection of healthcare and migrant communities. Their input could contribute to a more comprehensive understanding of health behaviors in this population.

### Conclusions

The importance of health information seeking is increasing both for individuals and public health. The findings from this exploratory study can serve as a guide for Taiwanese authorities to implement effective measures that address the needs of the most marginalized and vulnerable groups in society. By gaining insights into the intricate information-seeking behaviors of these vulnerable groups and leveraging these insights, we can develop tools that effectively cater to individuals' personal health information needs. The significant impact of ICT usage on health competencies also suggests the need for developing appropriate technological tools to support migrant workers. We highlight key areas for intervention, such as facilitating navigation within the healthcare system and enhancing communication between information seekers and providers. For the design of effective technological interventions that support migrants, future research should incorporate the perspectives

of key stakeholders who provide services and knowledge, including healthcare professionals, interpreters, and non-profit organizations.

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