

Information-Seeking Pathways by Mothers in the Context of Their Children's Health*

어린이 건강과 관련한 어머니들의 정보탐색 경로

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ABSTRACT: Today, with countless health information being accessible through online and offline, the public has been able to explore health-related information in various ways. The current study focuses on the information-seeking behavior of the mothers who actively explore information related to the health of their healthy infants (aged between 0 and 3 years). The researcher had conducted in-depth interviews of 24 American, Korean, and Korean immigrant mothers living in the United States, and then analyzed the sequential order of the information sources that they have used to search for the health-related information about their children. The current research highlights that the mothers' information-seeking pathways and searched topics tended to differ in accordance with their child(ren)'s health conditions (e.g., ill vs. healthy). For instance, regarding the information sources used, more diverse health information sources (e.g., public libraries, government health agencies, daycare teachers) were used when their child(ren) was not ill. In addition, when a child was ill, mothers were likely to focus on information about specific diseases or symptoms first, whereas when the child was healthy, they used to explore information on various health topics such as growth and development, nutrition and diets, parenting, and so on. Based on the results, implications for the information professionals are discussed when designing and providing health-related information services to mothers of healthy infants and toddlers.

KEYWORDS: Health Information, Qualitative Research, Information-seeking Pathways, Information Behavior, Children's Health, Visual Research Method

요약: 오늘날, 온라인 및 오프라인 상에서 무수히 많은 건강정보가 시시각각 쏟아지면서 대중들은 다양한 방법으로 건강에 대한 정보탐색이 가능해졌다. 본 연구에서는 만 0-3세 건강한 영유아들의 건강정보를 적극적으로 탐색하는 어머니들의 건강정보 탐색행동에 초점을 맞추었다. 24명의 미국인, 한국인, 미국에 거주하는 한인 이민자 어머니들과의 심층인터뷰를 통해, 그들이 아이에 대한 건강정보를 탐색할 때 어떠한 정보원들을 순차적으로 활용하는지 탐색경로를 시간적으로 분석하였다. 연구 결과, 어머니들의 건강정보탐색 경로는 아이의 건강상태에 따라 사용하는 정보원과 탐색주제의 측면에서 눈에 띄는 차이가 나타났다. 예를 들어, 아이가 아플 때는 특정 질병이나 증상에 대한 정보를 중점적으로 먼저 탐색하지만, 아이가 아프지 않을 때는 성장, 발육, 식단, 육아 등 다양한 주제의 정보를 탐색하는 것으로 나타났다. 나아가, 활용되는 정보원과 관련하여, 아이가 아플 때보다 아프지 않을 때 더욱 다양한 건강정보원들(예컨대, 공공도서관, 정부기관, 어린이집 교사 등)이 활용되는 것으로 나타났다. 뿐만 아니라, 각 어머니들 그룹에 따라 활용되는 정보원의 차이가 나타났다. 이를 활용하여, 국내의 정보 전문가들은 어떠한 정보서비스를 기획하고 제공할 수 있을지 논의해본다.

주제어: 건강정보, 질적연구, 정보탐색경로 연구, 정보행동, 영유아 건강, 시각적 연구 방법

* This research paper is part of doctoral dissertation.

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- 논문접수: 2021년 8월 24일 • 최초심사: 2021년 9월 6일 • 게재확정: 2021년 9월 13일
- 한국도서관·정보학회지, 52(3), 21-48, 2021. <http://dx.doi.org/10.16981/kliss.52.3.202109.21>

I. Introduction

These days, the public has been freely able to explore health-related information using diverse online and offline information channels. Among several samples, scholars have confirmed that parenthood motivates women to seek health-related information more actively (Bernhardt & Felter, 2004; Guendelman et al., 2017). This study noted mothers' active information-seeking behavior considering their roles as health managers and caretakers for their children (Chae & Quick, 2015; Lee, 2018). Lee (2018) emphasized that more than 93% of the mothers had searched health-related information in relation to their children in the past six months.

Regarding health-related information sources used, previous studies found that mothers tended to use two primary sources: medical professionals (e.g., Khoo et al., 2008) and the Internet (e.g., Jaks et al., 2019; Skranes et al., 2014). Furthermore, a recent systematic review on parents' information-seeking behavior also supported the idea by highlighting parents are heavy online information seekers in the context of their children's health across diverse circumstances (Kubb & Foran, 2020).

Even though several studies focused on information sources used, a subsequent order of those sources was not profoundly investigated. However, understanding the order of those sources used can be important for information professionals when they need to assist the public for providing health-related information. For instance, if mothers tend to start searching health information on the web and move to pediatricians, developing credible health information services on the web should be prioritized to effectively offer information in a timely manner. Hence, the current study focused on the consecutive order of sources used which could be also referred as "information-seeking pathways". A theoretical framework was adapted from Johnson et al. (2006)'s study. According to Johnson et al. (2006), a pathway was defined as "the route someone follows in the pursuit of answers to questions" (p. 572). In addition, they described characteristics of the pathway as dynamic, active, and sequenced. Thus, in this study, information-seeking pathway was defined as "the sequenced information-seeking route that mothers follow in the pursuit of health-related answers to questions for their child(ren)." Utilizing this theoretical framework may be useful not only for comprehending the sequential order of sources used, but also for observing mothers' information-seeking behavior in diversified perspectives.

The aim of this study was to explore health information-seeking pathways among mothers of infants and toddlers (aged 0 to 3 years old) in accordance with urgency of the issues (e.g. ill vs. healthy). In particular, it is a comparative study across three different groups of mothers: (a) U.S.-born mothers, (b) Korean-born mothers, and (c) immigrant Korean mothers residing in the U.S. That

was because, Lee (2018) found noticeable health information-seeking behavior differences between U.S-born mothers and immigrant Korean mothers in the U.S. By adding the third group (Korean-born mothers), it is to see whether the difference was caused by immigration status, or Korean cultural backgrounds. Specific research questions are as follows:

- RQ1. Is there a sequence of steps that mothers follow when seeking health information related to their child(ren)? If so, what are those steps?
- RQ2. How are those steps different in accordance with children's conditions (ill vs. healthy)?

To answer the above research questions, semi-structured interviews with 24 mothers (8 of each group) were conducted. The current study is unique and significant in that it visually identifies mothers' information-seeking pathways in accordance with their children's health conditions (e.g., ill vs. healthy).

II. Related Research

As seen from several literature review research (Kubb & Foran, 2020; Lee, 2016), mothers' health-related information behaviors have been noted by numerous scholars. For example, some researchers concentrated on information-seeking behavior of pregnant mothers (e.g., Sayakhot & Carolan-Olah, 2016) and first-time mothers (e.g., Carolan, 2007; Loudon, Buchanan, & Ruthven, 2016; Ruthven, Buchanan, & Jardine, 2018). For example, Loudon et al. (2016) highlighted that mothers were inclined to value the experiential nature of information received from peers or family members and searched for information concerning sleep, infant care, and nutrition. However, Carolan (2007) also reported first-time mothers' challenges with conflicting information and managing information sources. On the other hand, others focused on health information-seeking behavior among mothers of children with specific diagnoses including pediatric cancer (Kilicarslan-Toruner & Akgun-Citak, 2013) and asthma (Archibald et al., 2015).

It is noteworthy that mothers of healthy children were not deeply investigated. Therefore, this research also fills the gap in the body of literature concerning information-seeking pathways among mothers of healthy children which previous studies have not focused on. Thus, in this study, healthy infants and toddlers are defined as children aged newborn to 3-years-old without "(a) any form of chronic or recurrent pain; (b) severe learning disability; (c) the presence of a psychiatric or

neurological condition; and (d) serious medical illness” (Schoth et al., 2016, p. 2435).

Also, as briefly mentioned in the Introduction, previous studies confirmed that two main sources existed when mothers had sought health information related to their children: healthcare professionals (e.g., Bernhardt & Felter, 2004; Khoo et al., 2008) and the Internet (e.g., Moon et al., 2019; Skranes et al., 2014). For instance, Skranes et al. (2014) found that 98% of the mothers expressed that they had used the Internet for seeking their children’s health-related information. Lee (2018) also echoed to the above argument by highlighting the Internet was mothers’ most frequently used health information source among 13 different sources. Other studies also underlined that the Internet is a common and crucial health information source related to their child(ren)’s health (Moon et al., 2019; Plantin & Daneback, 2009).

Moreover, like many scholars have noted, several characteristics may influence mothers’ health information-seeking behavior: (a) socio-demographic attributes such as age, race/ethnicity, socioeconomic status (e.g., Lee, 2020; Ramanadhan & Viswanath, 2006), (b) first-time pregnancy (e.g., Bernhardt & Felter, 2004; Carolan, 2007). Furthermore, even though the current study’s participants were all recruited as mothers of healthy children, this study contributes the extant literature by testing if urgency of the issues (ill vs. healthy) would impact mothers’ information-seeking pathways.

Summary of the Reviewed Research

Although a substantial amount of research has been conducted to investigate information behavior among mothers, most studies have focused on mothers of children living with specific diagnoses. Furthermore, when the utilized sources were examined, the sequential order of their uses were not carefully investigated. However, understanding the pathways could be meaningful for information professionals when designing and offering health information services in a timely manner. This study is to fill the research gap.

III. Research Method

1. Research Setting

Twenty-four interviews were conducted between late May and July 2019. The length of each interview session ranged from 30 to 60 minutes. Interviewees were drawn from research

participants from another study (Lee, 2020). The researcher contacted potential participants who had shown their research interests in participating in an in-depth interview. To recruit interviewees with diverse backgrounds, three questions about the number of their family members, annual household income, and completed educational attainment were utilized. This was because household income and education levels have been found to be significant factors influencing mothers' health information-seeking behaviors (e.g., Lee, 2018; Shieh et al., 2010; Song et al., 2013). Moreover, since this study focuses on mothers' country of birth and country of residence at the time of the study, eight U.S.-born mothers, eight Korean-born mothers, and eight Korean immigrant mothers who resided in the U.S. at the time of the study were purposefully recruited. When a potential interviewee satisfied the study criteria, the researcher contacted the potential interviewees via email to set a date and time for the interviews.

Each interview was conducted either in face-to-face, telephone, or Skype format based on the interviewee's preference. During the individual interview, each interviewee was also asked to draw their information-seeking pathways in relation to their child(ren)'s health. Those drawings were collected in person or via email after each interview session was completed. For example, some interviewees had taken pictures of their drawings, attached those drawings as attachments, and sent them to the researcher via email. The current study was reviewed and approved by the Institutional Review Board of the researcher's university. Finally, each interview participant received a \$15 gift certificate as an incentive for their participation.



<Figure 1> Examples of the Participants' Drawings

2. Development of Interview Protocol

The interview protocol was developed to examine mothers' health-related information-seeking pathways related to their child(ren). The interview protocol was developed based on the previous literature (Johnson et al., 2006; Sonnenwald, 2005; Tsai, 2013). The interview started with the introduction of the study and some background questions such as age of the participant, age of her child(ren), state of residence (city/province of residence for Korean mothers), and her academic major(s). After that, the interview was divided into two different parts. First, the researcher asked each interviewee to draw her health-related information-seeking pathways when her child was ill. Then, the participant was able to describe her information-seeking behavior based on her self-drawn pathways. Second, each interviewee was asked to draw her health information-seeking pathways when her child was healthy. This was to see if there were any behavioral differences in accordance with the child's health status. That is because, even though all the participants of this study were recruited as mothers of healthy infants and toddlers, urgency of the issues may come up differently in accordance with their child(ren)'s health conditions.

3. Data Analysis

A total of 24 interviews were recorded and transcribed in Microsoft Word. Each interview participant was given an identifier, which were a letter for the specific group and a number (e.g., US1 to US8; IM1 to IM8; K1 to K8). All the transcripts were then uploaded into NVivo 12 (QSR International, Melbourne, Australia) for coding and analysis. The researcher and coding team worked together to develop the coding scheme. The coding team consisted of two other coders with graduate degrees in relevant fields.

For the interviews, inductive open coding approach was used in the study. The team initially reviewed a sample of the interview transcripts independently to see if there were any noticeable health information-seeking pathways among interviewees and to see if there were any themes to explain why each source was used in the respective step. Next, the coding team reviewed the proposed code lists together, discussing similarities and differences in the codes which were applied in an inductive and repetitive process (Neuendorf, 2017). Disagreements were resolved through discussion. While subtle differences in coding existed, the coding team did not find significant discrepancies, and a few minor discrepancies were resolved through further discussion to ensure intercoder reliability and the credibility of the analysis (Lincoln & Guba, 1985; Worrall & Oh, 2013). After negotiating the discrepancies, we reached higher than 95% intercoder agreement for the final codes.

IV. Results

1. Demographics of Interview Participants

The demographic profile of the interview participants is shown in Table 1. There were eight participants in each category of mothers: U.S.-born mothers, Korean immigrant mothers, and Korean-born mothers. Most participants were 30 to 40 years old, and their child's age varied from 2 months to 3 years old. The participants' educational attainment ranged from some college to doctoral degree. The interviewees' academic majors were considerably manifold including nursing, theology, education, vocal music, philosophy, fashion design, and statistics. The participants' annual household incomes also varied from \$0-\$9,999 to more than \$150,000, but the median household income range of each group was different: \$50,000 - \$74,999 for the U.S. sample, \$35,000 - \$49,999 for the immigrant sample, and \$75,000 - \$99,999 for the Korean sample.

<Table 1> Demographic Characteristics of Interview Participants (N = 24)

	ID	Age	Highest Level of Education Completed	Major	Household Income	State (City or Province)
1	US1	30s	4-year college degree	Nursing	\$20,000 - \$34,999	WV
2	US2	20s	4-year college degree	Biology & Nursing	\$100,000 - \$149,999	VA
3	US3	30s	4-year college degree	Information Technology	\$20,000 - \$34,999	HI
4	US4	20s	Doctoral degree	Physical Therapy	\$50,000 - \$74,999	OK
5	US5	30s	Some college (attended but did not graduate)	Computer Science	\$35,000 - \$49,999	OK
6	US6	30s	Master's degree	Plant Biology & Ecology	\$100,000 - \$149,999	MA
7	US7	30s	4-year college degree	Elementary Education	\$50,000 - \$74,999	HI
8	US8	30s	4-year college degree	Philosophy	\$75,000 - \$99,999	NC
9	IM1	30s	4-year college degree	Textiles & Fashion Design	\$ 0 - \$ 9,999	NY
10	IM2	20s	Some college (attended but did not graduate)	Wildlife Management	\$35,000 - \$49,999	MA
11	IM3	30s	Master's degree	Chinese Literature	\$20,000 - \$34,999	WI
12	IM4	30s	2-year college degree	Culinary Arts	\$50,000 - \$74,999	CA
13	IM5	30s	Doctoral degree	Special Education	\$100,000 - \$149,999	CA
14	IM6	20s	4-year college degree	Speech Therapy	\$35,000 - \$49,999	NY
15	IM7	30s	Master's degree	Early Childhood Education	\$75,000 - \$99,999	NJ
16	IM8	20s	4-year college degree	Voice & Opera	\$20,000 - \$34,999	WI
17	K1	30s	2-year college degree	Vocal Music	\$20,000 - \$34,999	Incheon
18	K2	30s	4-year college degree	Child Welfare	\$15,000 - \$19,999	Incheon
19	K3	30s	Doctoral degree	Statistics	\$150,000 or more	Daejeon
20	K4	30s	4-year college degree	Theology	\$75,000 - \$99,999	Gyeonggi
21	K5	30s	Master's degree	Commerce and Trade	\$20,000 - \$34,999	Incheon
22	K6	40s	Master's degree	Statistics	\$75,000 - \$99,999	Incheon
23	K7	30s	Master's degree	Educational Technology	\$75,000 - \$99,999	Seoul
24	K8	30s	4-year college degree	Economics	\$150,000 or more	Seoul

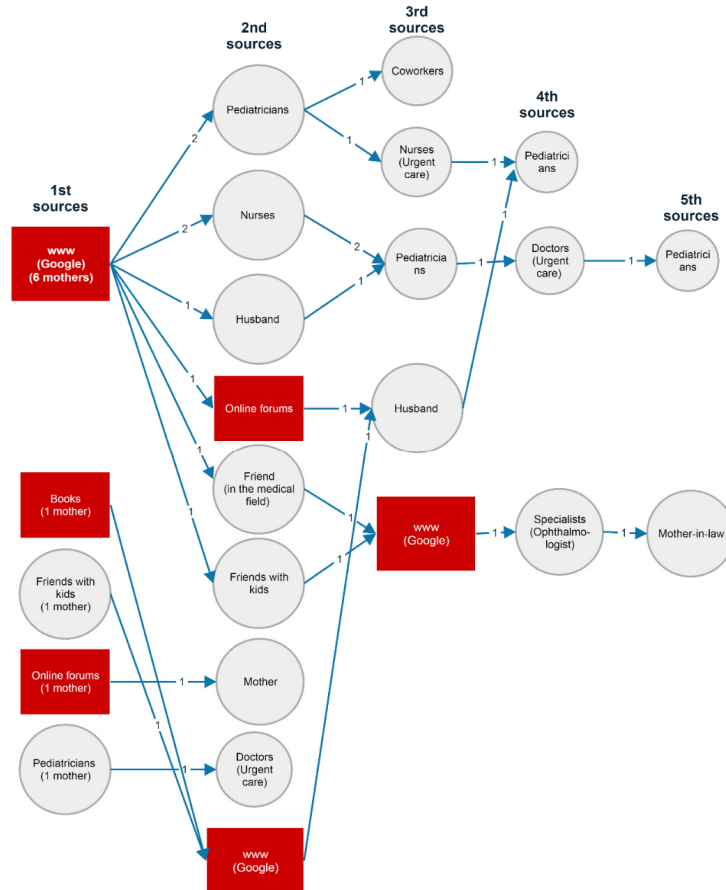
2. Mothers' Information-Seeking Pathways based on Child(ren) Health Status

Semi-structured interviews were conducted with 24 mothers of healthy infants and toddlers to understand a sequence of steps that mothers follow when seeking health information with respect to their child(ren). During the interview session, each participant was asked to draw their health information seeking patterns in relation to their child(ren) based on their previous experiences. Those drawings were analyzed to figure out mothers' information-seeking pathways.

2.1 U.S. Sample

Information-seeking pathways when their child(ren) was ill

U.S. mothers' health information-seeking pathways when their child was ill are shown in Fig. 2.



Note. Rectangles indicate non-human sources and circles indicate personal sources.

<Figure 2> U.S. Mothers' Information-Seeking Pathways when Their Child was Ill

It should be noted that mothers were able to illustrate their multiple cases of information-seeking experiences during the interviews. Overall, personal sources were more frequently used in mothers' information-seeking pathways related to their child(ren) compared to non-human sources.

Results revealed that six out of eight U.S. mothers (75%) used the World Wide Web as their first information source when their child(ren) was ill. Among a lot of resources, websites including Mayo Clinic, CDC, WebMD, Wikipedia, Kidshealth.org, Healthline.com, KellyMom.com, Babycenter.com were utilized by the U.S. mothers (Tab. 2).

<Table 2> Online Resources Used by the U.S. Mothers (n=8)

Rank	Name	URL	Frequency (%)
1	WebMD	https://www.webmd.com/	5 out of 8 (62,5%)
2	CDC	https://www.cdc.gov/	4 out of 8 (50%)
3	Mayo Clinic	https://www.mayoclinic.org/	3 out of 8 (37,5%)
	Baby Center	https://www.babycenter.com/	3 out of 8 (37,5%)
5	Medical News Today	https://www.medicalnewstoday.com/	1 out of 8 (12,5%)
	Kellymom	https://kellymom.com/	1 out of 8 (12,5%)
	Healthline	https://www.healthline.com/	1 out of 8 (12,5%)
	PubMed	https://www.ncbi.nlm.nih.gov/pubmed/	1 out of 8 (12,5%)
	NIH	https://www.nih.gov/	1 out of 8 (12,5%)
	Kids Health	https://kidshealth.org/	1 out of 8 (12,5%)
	Motherly	https://www.mother.ly/	1 out of 8 (12,5%)
	Wikipedia	https://www.wikipedia.org/	1 out of 8 (12,5%)

The major reason the U.S. sample selected the World Wide Web as their first information source was because it was easily accessible and convenient.

Um, honestly because it was the middle of the night. Once my kids were asleep, I actually had time to sit down and think about it and look into it. (US5)

Of those mothers, two highlighted the crosschecking of multiple sources of information to help them determine credibility of resources. On the other hand, there was another group of mothers (two out of eight, 25%) who disliked the World Wide Web as their first information source; instead they used books (e.g., US8) or pediatricians (e.g., US7) as their first information source.

I didn't really want to look at a screen, I think. [Not] to disrupt my sleep, or my idea was like there's a lot of information on the Internet, um, I don't want to get scared, let me look at the hard and fast resources that I have at my disposal to start there. (US8)

My kid got an immunization and had a reaction to it. I don't [didn't] know if he had some kind of GI [gastrointestinal] issues, and he woke up from his nap screaming like a knife was being stabbed into his gut. So, of course, I called my doctor [pediatrician] immediately. (US7)

As seen from the U.S. mothers' information-seeking pathways (Fig. 2), diverse types of medical professionals, such as pediatricians, nurses, doctors/nurses at urgent care clinics, and specialists (e.g., ophthalmologists), were used. To sum up, while several information sources were used among the U.S. mothers, a greater number of the interviewees started their information seeking online, and their seeking behavior tended to end after they communicated with medical professionals.

Information-seeking pathways when their child(ren) was healthy

When the U.S. participants' child was healthy, mothers tended to seek information on a variety of health topics, such as growth and development (e.g., US1, US3, US4, US6), breastfeeding (e.g., US2), parenting styles (e.g., US8), and nutrition and diets (e.g., US4).

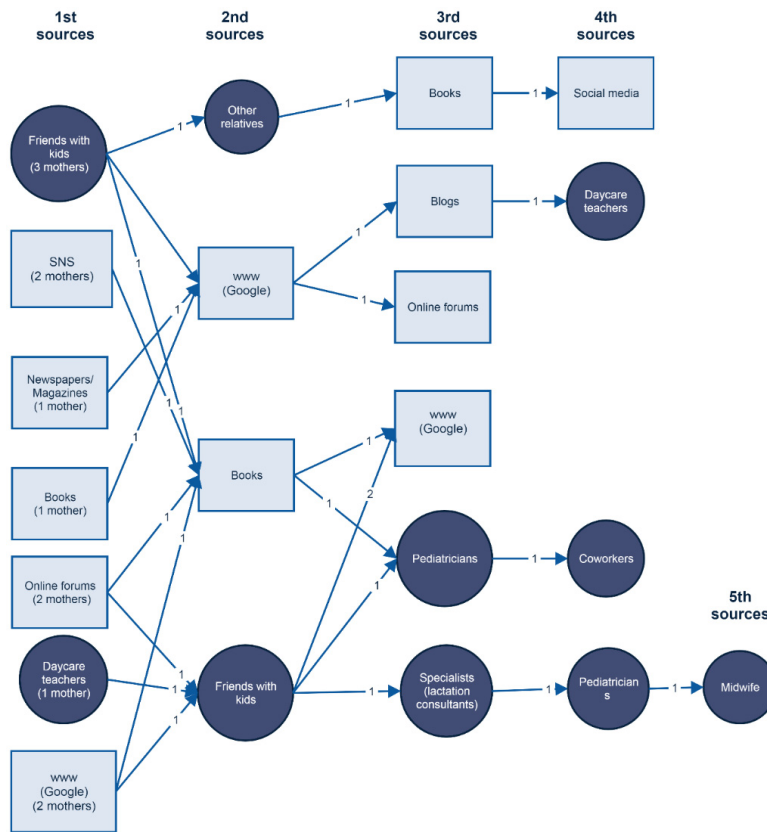
So, in this case, I was looking for information regarding breastfeeding. (US2)

I might just be reading something about child development or child wellbeing. (US3)

I would say it's one of the main things that I have sought information about or seek training in introducing solids and then to a lesser extent, like developmental milestones and what is normal. (US4)

For the U.S. sample, mothers' information seeking tended to start from several various sources (Fig. 3), such as friends with kids, social networking sites (e.g., Facebook), newspapers/magazines, books, online forums, daycare teachers, and the World Wide Web.

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Note. Rectangles indicate non-human sources, whereas circles indicate personal sources.

<Figure 3> U.S. Mothers' Information-Seeking Pathways when Their Child was Healthy

It is worth noting that a higher number of non-human sources appeared in their health-related information-seeking pathways. Also, diverse types of social media platforms including social networking sites (e.g., Facebook), blogs, and online forums rather than medical professionals were likely to play an important role as their information sources. Three online forum users also emphasized their familiarity with the source as one of the reasons for choosing it.

Well, the Facebook groups, I have been in them for a couple of years, because I have an older child as well. (US5)

Also, when their child(ren) was healthy, two U.S. participants (25%) mentioned daycare teachers as one of their most accurate/credible health information sources related to child development topics.

I consult with daycare teachers a lot, because they have a lot of child development, psychology degrees. (US3)

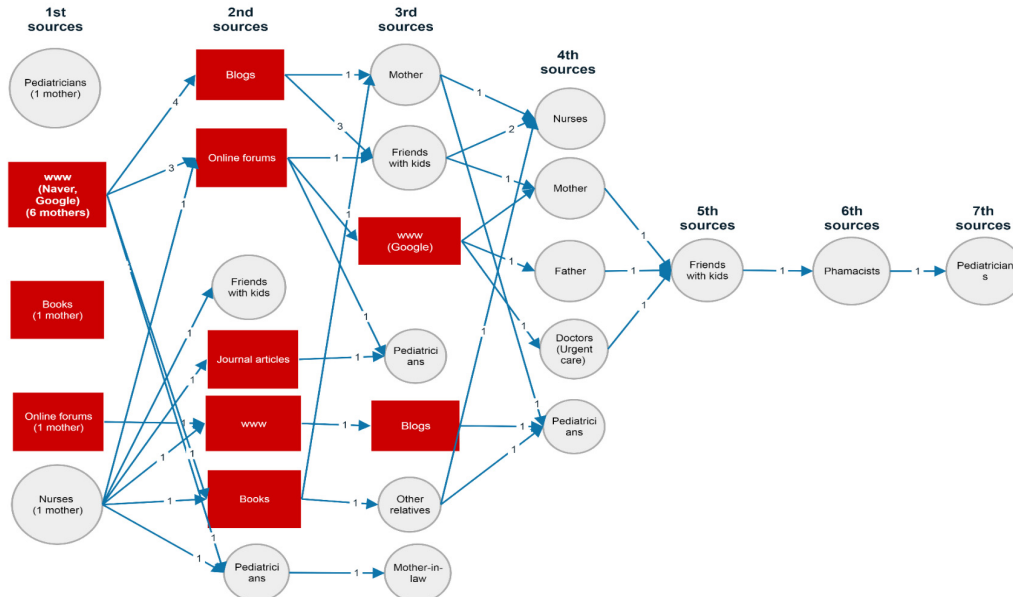
A daycare provider probably has seen a ton of examples throughout her 24 years career... (US6)

Likewise, friends with kids were also frequently used sources among the U.S. mothers regardless of their child's health conditions (i.e., both ill and healthy). The mothers tended to value other mothers' experiences from real life. In sum, results indicated that U.S.-born mothers' information-seeking pathways tended to differ by their child(ren)'s health status (i.e., ill vs. healthy).

2.2 Immigrant Korean Sample

Information-seeking pathways when their child(ren) was ill

Eight immigrant Korean mothers' finalized health information-seeking pathways when their child was ill are shown in Fig. 4. Compared to the U.S. sample, immigrant mothers tended to utilize a greater number of non-human information sources. This could be illuminated by one of the new themes that appeared among the immigrant mothers.



Note. Rectangles indicate non-human sources and circles indicate personal sources.

<Figure 4> Immigrant Korean Mothers' Information-Seeking Pathways when Their Child was Ill

Three out of 8 immigrant mothers (37.5%) underlined that language barriers tended to influence their health information seeking behavior.

Talking with health professionals is also uncomfortable due to language barriers. (IM1)

An immigrant mother specifically explained difficulties in searching on Google due to the language barriers. Therefore, she was inclined to search using one of the Korean search engines named Naver.

If I needed to use Google, you know, I have to use English language, but since I'm not that good at English it is hard for me to pick search terms... Using Naver, however, I can search in more specific ways. By adding more key terms while searching, I prefer to search using Naver to Google. I can find more detailed things using Naver. (IM2)

Six of the eight immigrant mothers (75%) were likely to select the World Wide Web as their first health information source. Among those six immigrant mothers, four of them stated that they utilized both Google and Naver, as well as websites, such as Mayo Clinic, BabyCenter, Parents.com, Momjunction.com (see Tab. 3). Compared to the U.S. sample, immigrant Korean mothers' resources were considerably limited. No resources provided by government health agencies were used by the immigrant Korean sample.

<Table 3> Online Resources Used by the Immigrant Korean Mothers (n=8)

Rank	Name	URL	Frequency (%)
1	Mayo Clinic	https://www.mayoclinic.org/	1 out of 8 (12.5%)
	Baby Center	https://www.babycenter.com/	1 out of 8 (12.5%)
	Parents.com	https://www.parents.com/	1 out of 8 (12.5%)
	Momjunction.com	https://www.momjunction.com/	1 out of 8 (12.5%)

Five out of 8 immigrant mothers (62.5%) selected accessible/convenient as the reasons for using the World Wide Web as their information source.

I think the accessibility matters. If I wanted to ask one of my friends, I need to send a message to her and wait for response. That takes time. Also, with my little one, I feel like my free time is somewhat limited. Thus, I like to search online using my mobile device when my child is asleep. (IM3)

Five out of 8 mothers (62.5%) expressed their difficulties in accessing healthcare professionals as an information source. It was noteworthy that mothers had tried to seek information from healthcare professionals only by meeting them in person or via phone. Thus, making an appointment with pediatricians has been one of the major reasons why they consider healthcare professionals inaccessible.

It takes time to make an appointment with pediatricians. I also feel like they are not treating my baby promptly. Also, when I call the pediatrics and explain my child's symptoms, the nurses tell me other alternative ways for treatments, but they never ask me to visit the clinic. (IM8)

In my case, it takes approximately 25 minutes to get to the pediatrics [pediatric clinics] by car. Although I get there, waiting takes time, approximately 1 to 2 hrs. (IM4)

On the other hand, there was an immigrant mother who used nurses as her first information source and had a satisfying information seeking experience. She said that easy accessibility, urgency of the issue, and support from health professionals had affected her information seeking behavior.

When it was urgent situation, I did not have time to search online or utilize books. I needed immediate advice from medical professionals, so I called the pediatrics promptly. ... Nurses also let me know a few ways to treat my little one and told me feel free to call back if those ways do not work. At that time, I felt like I was collaborating with the medical professionals to make my child gets better. (IM7)

Overall, results showed there were a few noticeable differences between U.S.-born and immigrant Korean mothers' information-seeking pathways when their child(ren) was ill.

Information-seeking pathways when their child(ren) was healthy

Information-seeking pathways by eight immigrant mothers were drawn in Fig. 5. Like the U.S. sample, the immigrant mothers tended to search health information from relatively diverse sources when their child was healthy including the World Wide Web, books, blogs, online forums, library, pediatricians, mother, and father (Tab. 4). A few unique sources came up in their health information seeking pathways such as father, library, journal articles, social media sharing sites (e.g., YouTube), and elderly people at church.

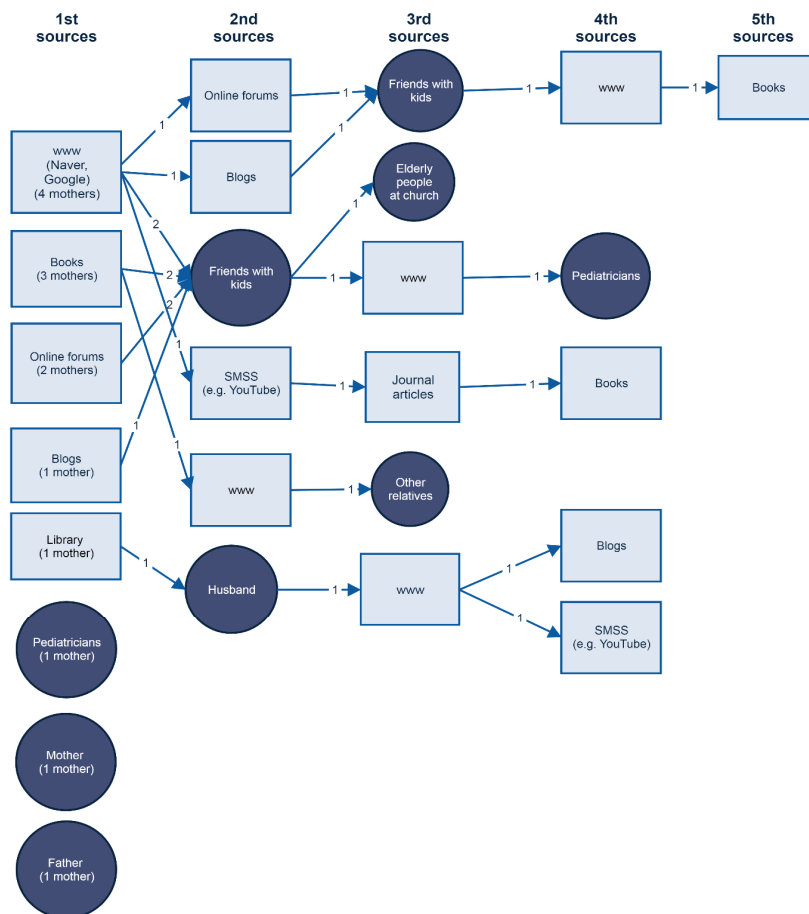
Information-Seeking Pathways by Mothers in the Context of Their Children's Health

(When my child is not ill,) I frequently go to libraries with my child and try to find books related to “nutrition and diets” or “physical exercise” topics. (IM2)

I sometimes get parenting advice from elderly church members, but sometimes it is uncomfortable because their parenting styles tend to be extremely careful and protective. (IM8)

An immigrant mother (12.5%) pointed out that books not being updated as frequently as online resources was a limitation.

I have a few parenting-related books. I do not read those books these days, because I feel like those are outdated, and not updated as frequently as the information on the Web. (IM8)



Note. Rectangles indicate non-human sources, whereas circles indicate personal sources.

<Figure 5> Immigrant Korean Mothers' Information-Seeking Pathways when Their Child was Healthy

<Table 4> Diverse Sources Used by the Immigrant Korean Mothers (n=8)

Rank	Name	Frequency (%)
1	The World Wide Web	7 out of 8 (87.5%)
2	Friends with kids	5 out of 8 (62.5%)
	Books	5 out of 8 (62.5%)
4	Blogs	3 out of 8 (37.5%)
	Online forums	3 out of 8 (37.5%)
6	Pediatricians	2 out of 8 (25%)
	Social Media Sharing Sites (e.g., YouTube)	2 out of 8 (25%)
8	Husband	1 out of 8 (12.5%)
	Mother	1 out of 8 (12.5%)
	Father	1 out of 8 (12.5%)
	Library (books)	1 out of 8 (12.5%)
	Other relatives	1 out of 8 (12.5%)
	Elderly people at church	1 out of 8 (12.5%)
	Journal articles	1 out of 8 (12.5%)

Four out of 8 mothers (50%) tended to use the World Wide Web as their health information source because a great deal of information exists on the Web, and they claimed that the amount of the information is the strength of this source.

For instance, under the topic of growth and development, there are numerous cases on the Web, so I like to get trustworthy information by compiling and synthesizing [those cases]. (IM5)

To summarize, compared to the U.S. sample, there were a variety of sources the immigrant Korean mothers used for their child(ren). Moreover, depending on which health topics they searched, the sources they used seemed to be different. For example, related to nutrition and diet topics, library, blogs, and books were utilized more, but the World Wide Web was more likely to provide information on growth and development topics.

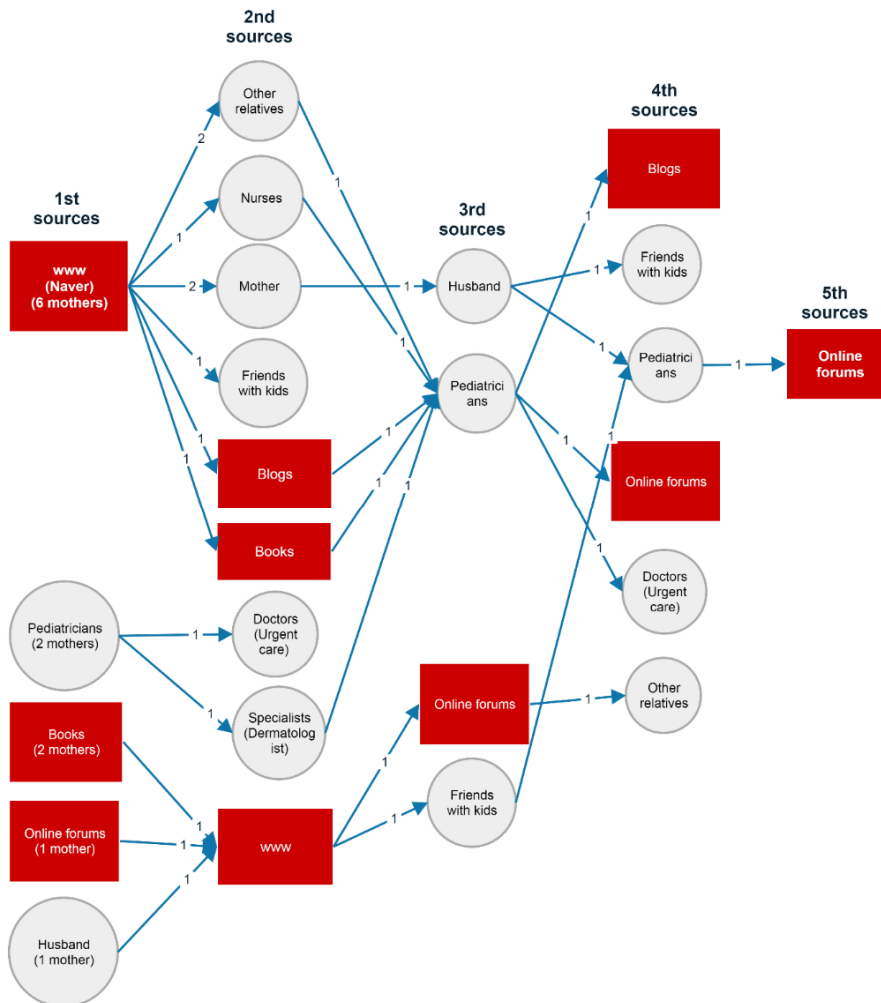
2.3 Korean-born Sample

Information-seeking pathways when their child(ren) was ill

Eight Korean-born mothers' finalized health information-seeking pathways when their child was unwell are presented in Fig. 6. Like the other two samples, six out of eight Korean mothers (75%) utilized the World Wide Web as their first health information source. All six participants mentioned that they had used Naver as a starting point to search. One mother particularly pointed out that her

information seeking pathways have been different depending on the urgency of the issues.

When my baby had a mild diaper rash, I looked up related information using a book first to find similar cases, but I could not find it. After that, I searched online using my mobile device and found the information I wanted. As another experience, my child had a bowel movement with blood. Thus, we went to urgent care immediately. My child had x-rays and received medical treatment. After consulting with healthcare professionals, I realized that it is somewhat common among 12-month-old boys. (K2)



Note. Rectangles indicate non-human sources and circles indicate personal sources.

<Figure 6> Korean Mothers' Information-Seeking Pathways when Their Child was Ill

Compared to the other two groups, online forums tended to be valued by Korean mothers more frequently as they appeared in their information seeking pathways in the first, third, fourth, and fifth steps.

These days, I just search on the online communities first. That is because my question had been already posted on the online communities by someone else. Thus, there are lots of data within the online communities. Of course, I do not trust all the information, but at least, I can get some background information before going to pediatrics. (K1)

Even though nurses are one of the core healthcare professionals, they were rarely used as Korean mothers' health information source. Four Korean mothers stated that nurses had been inaccessible sources.

Even though I ask questions to nurses, they tried to avoid answering the questions. Instead, they just tell me to consult with pediatricians. (K5)

Interview results with eight Korean mothers indicated that accessible/convenient and accurate/credible were the most important characteristics of their information selection criteria. From seven Korean mothers' interviews, the above two characteristics were identified as the major reasons for selecting specific sources.

Information-seeking pathways when their child(ren) was healthy

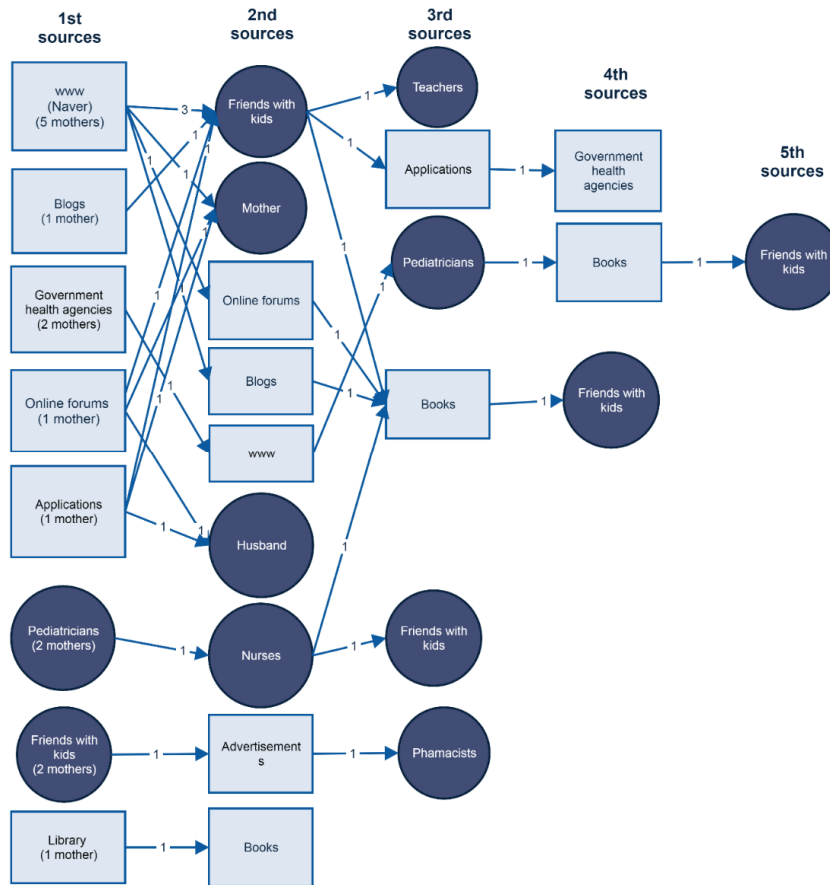
Like the other two samples, Korean mothers' information seeking was likely to start with diverse sources such as the World Wide Web, blogs, government health agencies, online forums, mobile phone applications, pediatricians, friends with kids, and library (see Fig. 7).

Five Korean mothers (62.5%) stated that they had sought health information using the World Wide Web for the two following reasons: (a) easily accessible and (b) considerable amount of information.

I searched online first because there are lots of information ... and I feel like it is more credible with considerable amount of information. (K5)

If I do not have enough time to talk with others and I needed to search needed information quickly, it is the most convenient to use the Web. (K7)

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Note. Rectangles indicate non-human sources, whereas circles indicate personal sources.

<Figure 7> Korean Mothers' Information-Seeking Pathways when Their Child was Healthy

In this group, two mothers (25%) also highlighted that they considered government health agencies as their first health information source in terms of immunization topics (e.g., K2, K6).

In my experience, there is an application named “Immunization Assistant” created and maintained by the Korea Centers for Disease Control & Prevention. My child’s immunization records are fully listed in this app. Hence, before my child’s immunizations, I get notifications in advance. After receiving the notifications, I easily seek health information using this app. It is super helpful for me. (K2)

In fact, mothers also claimed that they utilize information from the World Wide Web (e.g.,

K1, K5) because they thought the Web tended provide objective health-related information.

When it comes to the growth and development topic, I think using individuals as health information source is not objective because everyone has [seen and] experienced different cases. In that manner, I think the information from the Web is more objective. That is because [there are variations of numerous cases and] I can see the average of those cases. (K5)

Interestingly, there was also a contrasting opinion by a mother (K8) who evaluated books as objective source and thought information from the Web was not objective.

I [had] used books rather than the information from the Web, because I thought the information from books would be more objective than that from the Web. (K8)

It was noteworthy that mothers sometimes utilize public libraries as their information source. She (K8) also said that she had visited public libraries to find resources in terms of nutrition and diets.

To find books related to nutrition and diets, I went to a public library which was closer to my apartment. On the Internet, there were lots of recommended books [in this topic], but I was not sure which one is really good without looking at the real books. Thus, I've visited the public library to see a number of books [in that topic] and [after that,] I purchased a book I liked the most. (K8)

In sum, results revealed that three groups of mothers' health information-seeking pathways also differed in accordance with their child(ren)'s health status (i.e., ill vs healthy). These findings may have some implications for information professionals and information providers in diverse settings which will be discussed in Discussion.

V. Discussion

1. Mothers' information-seeking pathways when their child(ren) was ill

Results indicated that mothers divided into two groups when choosing their first stop for health

information: one group turned to non-human sources first while the other group turned to personal sources first. Twenty-two out of 24 mothers (91.7%) started seeking health information from non-human sources when their child(ren) was ill. For example, 18 mothers mentioned that they first had been seeking from the World Wide Web using search engines (e.g., Google or Naver), whereas six mothers indicated they had utilized books (e.g., US8, K2) or online forums (e.g., US7, IM6) as their first source. Two participants (IM1, K4) expressed that they tended to use the World Wide Web or books as the starting point of their information-seeking behavior depending on what they needed.

Earlier studies on mother's health information-seeking behavior confirmed that the Internet is a common and crucial health information source related to their child(ren)'s health (Moon et al., 2019; Skranes et al., 2014). The current study's finding further specifies the above finding in that the World Wide Web used to be the first source when mothers sought health information for their children. That is, it is necessary to develop credible online health information services which could be utilized as a starting point for searching information on specific symptoms or diagnoses among mothers of healthy infants and toddlers (aged newborn to 3 years).

When examining the reasons why the World Wide Web was used as the first source, mothers tended to quickly crowdsource information and be prepared before talking to personal sources, especially prior to consulting healthcare professionals such as pediatricians or nurses. This tendency was also consistent with previous research (Tsai, 2013).

As previous scholars noted (e.g., Chung et al., 2012; Moon et al., 2019), one may be curious about how mothers would determine credibility of the online resources. When using the World Wide Web as a health information source, all three groups of mothers pointed out that crosschecking multiple sources is helpful for determining the credibility of the online sources. For example, one of the U.S. mothers commented, "I like to consult with multiple sources for [health] information and I have a few books that I trust, and I just like to compare different information" (US8). A Korean mother (K5), however, expressed that she would trust the first source shown on the search results. It might have implications for information professionals at public libraries who could provide health-related information services such as searching classes for improving people's health information literacy. Also, online resources used by immigrant Korean mothers were somewhat limited compared to those of mothers in the other two groups (U.S.-born mothers, Korean-born mothers). This study further confirmed that immigrant mothers were less likely to utilize government health agencies' resources than mothers in native

populations. It may be because immigrant mothers were not familiar with those sources. Information services for immigrants in the context of health may need to include introducing and guiding to those sources.

On the other hand, seven out of 24 mothers (29.2%) illustrated their health-information seeking experiences, which started from personal sources such as healthcare professionals (pediatricians or nurses) (e.g., US7, IM7, K1), friends with kids (e.g., US3), and husband (e.g., K5). Because of urgency of the issue, mothers were inclined to ask medical professionals directly considering reliability of the information sources. Mothers' information-seeking pathways were likely to differ in accordance with the urgency of the issue.

2. Mothers' information-seeking pathways when their child(ren) was healthy

When the participants' child(ren) was healthy, their two different health information-seeking strategies were still detected: non-human source first and personal source first strategies. Twenty-two out of 24 mothers (91.7%) shared their experiences in which they first used the non-human sources, but it is noteworthy that diverse non-human sources were also utilized in this circumstance. For example, mothers claimed that a wide range of non-human sources were used as their first health information sources including the World Wide Web, social networking sites (e.g., Facebook), government health agencies, books, library, newspapers/magazines, blogs/online forums, and mobile phone applications. A possible reason may be that this is not an urgent situation and may not impact their child(ren)'s health. Therefore, a few mothers said that their information-seeking behavior sometimes started with browsing information first. For example, one of the U.S. participants mentioned,

Generally, I just read something in the magazine that'll bring up a question like [...] different methods on how to parent or discipline or [...] in terms of] food, ways to get your kid to eat healthy food or things that should be in your kid's weekly diet. And then, I just usually go to Google to double check what the Internet says because I figured I'd never just take from one source. (US3)

Mobile phone applications may be another useful health information source that satisfies mothers' information needs. Similar findings were noted by other health information-seeking

research among mothers (e.g., Guerra-Reyes et al., 2016; Hearn, Miller, & Lester, 2014). If it is not an urgent issue, notifications from applications might also stimulate active health information seekers like mothers to start searching.

Furthermore, an emerging finding is that a social media platform such as instant messaging may become as an effective communication channel when health professionals need to interact with mothers. Mothers in this study tended to easily communicate with other friends with kids via instant messaging applications (e.g., iMessage or Kakaotalk). Surprisingly, there were only two ways that mothers communicate with healthcare professionals: in person or via telephone. A variety of communication channels between mothers and healthcare professionals might need to be considered and developed such as SNS, microblogging sites (e.g., Twitter), or instant messaging. This may be particularly informative especially for immigrant mothers who may not be familiar with the new environment and healthcare system. Sontag and Schacht's (1994) classic study would support this argument because they maintained that ethnic minorities show greater difficulty in obtaining health information for their children.

Regarding personal source first information-seeking strategies, nine out of 24 mothers (37.5%) indicated that they had used personal information sources as their starting point. Compared to when their child(ren) was ill, mothers utilized diverse information sources when their child(ren) was healthy. Those sources include friends with kids (e.g., US1, US3, K1), daycare teachers (e.g., US6), pediatricians (e.g., K3, IM5), their own mother (e.g., IM5), and their own father (e.g., IM5). Like other studies noted (e.g., Slomian et al., 2017; Weiner et al., 2015), friends and family members have been frequently used health information sources. In this study, it is also worth mentioning that daycare teachers had been considered as a reliable source in terms of growth and development topics. Two U.S. mothers used daycare teachers as their health information sources. For example, one of them described,

She [daycare teacher]'s around him so much and she's been around kids so much developmentally and she's seen it all across the board, because kids in his daycare group, who do get intervention who come in and work with them. So I figured, a daycare provider has probably has seen a ton of examples throughout her 24 years career, so I thought, maybe I'll ask her first since I've grown to trust her. (US6)

This may be partly because, mothers are likely to value daycare teachers' real experiences with numerous children in their careers. Moreover, since daycare teachers tend to spend lots

of time with their children, mothers are likely to consider them as reliable caregivers and observers whom they can consult with.

3. Limitations

There are a few limitations in this study. First, the current sample may not be representative as only 24 mothers were deeply interviewed to understand information-seeking pathways in the context of their child(ren)'s health. Therefore, the results should not be generalizable beyond the respective sample. Second, despite the researcher's effort to recruit research participants with diverse backgrounds in terms of age, education level, and household income, several interviewees were mothers in 30s with somewhat high education levels. Findings may be different with other samples such as younger mothers with different education levels. Third, as several characteristics might influence individual's information-seeking pathways (e.g., residency, child's health conditions, cultural backgrounds), other results may be shown if the similar study was conducted in different populations or research settings.

VI. Conclusion

This study confirmed that mothers' information-seeking pathways in relation to their children's health tended to be different in accordance with their children's health conditions (e.g., ill vs. healthy). For example, non-human sources (e.g., WWW) were more likely to be utilized as a starting point of their information-seeking behavior when their child was ill. When their child was healthy, various non-human and personal sources (e.g., public libraries, government health agencies, daycare teachers) were utilized in their health-related information seeking pathways. Moreover, results revealed that immigrant mothers' information-seeking pathways and sources used were somewhat limited and different compared to mothers in native populations. A possible reason could be immigrants may not be familiar with the sources in the new environment (e.g., government health agencies). In health-related information services, introducing and guiding to those sources would be helpful for this specific population.

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