Which Individual Characteristics Influence Mothers' Health Information-seeking Behavior?*

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Contents

ABSTRACT

Historically, mothers have been noted as active health information seekers, reflecting their roles as health mangers and caregivers for their family members. However, previous studies have focused on health-related information behavior among mothers in native populations or mothers of children with specific diagnoses. To fill this research gap, this study focused on health information behavior among mothers of healthy infants and toddlers. Using Wilson's (1997) information-seeking model, this study aimed to uncover the relationships between mothers' demographic characteristics and their health information source use. Online surveys were completed by 851 mothers: 255 U.S.-born mothers, 296 Korean-born mothers, and 300 Korean immigrant mothers living in the United States. Results indicated that there were statistically significant relationships between mothers' nine demographic characteristics (mother's age, education level, household income, employment status, the number of children, years living in the U.S. (or Korea), fluency in speaking English, size of household, housing status) and their health information source use. Based on the results, the implications for information professionals at diverse organizations are discussed when they provide health information services to this specific population.

Keywords: Information-seeking Behavior, Health, Mothers, Regression, Immigrants

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1. Introduction

Mothers have been classically noted as active health information seekers considering their roles as health managers for their family members (Chae and Quick 2015; Lee 2016; Yoo 2004). Searching health information is highly important not only for mothers in native populations but also for immigrant mothers. In particular, immigrants tend to actively seek a wide range of information including health-related information to adjust to new environments (e.g., Lee 2018; Suh and Hsieh 2019; Zimmerman 2018). Furthermore, countries accepting immigrants, such as the United States (hereafter, U.S.) and Korea, should assist in their settlement by providing appropriate information resources for maintaining their health. For instance, there are credible health-related resources online provided by authoritative government health agencies in both countries, such as Centers for Disease Control and Prevention (CDC), Korea Centers for Disease Control and Prevention (KCDC), and the National Library of Medicine. However, it is less likely that immigrants would know of these invaluable resources compared to native populations both in the U.S. and in Korea. Moreover, it has been problematic that previous studies have focused on health information behavior among mothers in native populations or mothers of children with specific diagnoses. To fill this research gap, the researcher conducted a comparative study between mothers in native populations and immigrant mothers who are mothers of healthy infants and toddlers.

The purpose of this research was twofold. First, using Wilson's (1997) information-seeking model, this study aimed to identify the relationships between mothers' demographic characteristics and their health information source use. Second, the current research aimed to compare health information-seeking behavior among three distinct groups of mothers: (a) American mothers born in and currently living in the U.S., (b) Korean mothers born in Korea and currently living in Korea, and (c) Korean mothers born in Korea who have immigrated to the U.S. in the past 10 years. This study was particularly designed to answer this following research question:

How does the frequency of using each health information source relate to individual characteristics of mothers?

2. Literature Review

2.1 Socio-demographic Factors Influencing Health Information-Seeking Behavior

Factors affecting health information seeking have been studied by a number of researchers.

For instance, Ramanadhan and Viswanath (2006) claimed that key socio-demographic characteristics, such as age, gender, race or ethnicity, and socioeconomic status (SES), could influence people's health information seeking. In the context of health, active health information seekers have been highlighted as white, middle-aged women who are well-educated and have high socioeconomic status (SES) (Galarce et al. 2011; Ramanadhan and Viswanath 2006).

Other studies have also confirmed that age can be one of the important characteristics that would influence differences in people's health information seeking/use behavior. For example, younger patients tended to more actively seek cancer-related information from various sources than older patients (Jenkins, Fallowfield and Saul 2001; Pinquart and Duberstein 2004; Silliman et al. 1998), whereas older patients differ from younger patients in the amount of medical information preferred, in the content of this information, and in the sources of information they use (Pinquart and Duberstein 2004).

Previous studies also have found correlations between gender and health information-seeking behavior. As briefly mentioned in the introduction, women are inclined to be more active health information seekers online than men (Allen and Rainie 2002; Fox and Duggan 2013; Rutten, Squiers and Hesse 2006; Song et al. 2013; Yoo 2004). Allen and Rainie (2002) noted differences between mothers and fathers in terms of information seeking topics. They highlighted that mothers tended to look for health or medical information more frequently than fathers. Song et al. (2013) also supported that health information seeking is a maternal behavior related to improved health outcomes.

Differences in racial and ethnic groups lead to different patterns of information-seeking behavior related to health. For example, prior studies reported that young African American and Hispanic women tend to trust information from friends or family members more than information from health care professionals (Guendelman et al. 2017; Yee and Simon 2010). On the other hand, Oh et al. (2012) pointed out that only 6.7% of Korean Americans mentioned they trust health information from their friends or family members. Due to language barriers with English-speaking physicians and nurses, a large number of Korean Americans tend to seek health information from their ethnic media and the Internet, both of which are in the Korean language (Han, Song and Kim 1996; Oh et al. 2012).

Several studies demonstrated that income is another important factor that influences mothers' health information-seeking behavior (Braveman et al. 2001; Shieh, Broome and Stump 2010; Song et al. 2013). For instance, Braveman et al. (2001) underlined that low socio-economic status has been associated with less engagement in health information-seeking, and poor pregnancy and

infant outcomes among pregnant mothers. In terms of education, among first-time mothers in general, well-educated mothers above the age of 35 tend to seek pregnancy-related resources more actively (Viau, Padula and Eddy 2002).

Several studies have described that size of household, specifically, the number of children, could be one important factor. Baker et al. (2007) implemented structured interviews with 30 mothers (15 mothers with one child and 15 mothers with two or more children). Baker et al. (2007) found that mothers with one child treated their information needs as slightly more immediate, whereas mothers with two or more children often placed their information needs at a lower priority. Lee (2018) also supported the argument because the number of children was one of the most influential characteristics that would affect mothers' health information-seeking behavior.

Other researchers noted that first-time pregnancy was significantly associated with mothers' health information seeking (Bernhardt and Felter 2004; Carolan 2007; Gazmararian et al. 2014; Loudon et al. 2016; Shieh et al. 2010; Weiner et al. 2015). First-time mothers are provided with a great deal of information, regardless of their age (Renkert and Nutbeam 2001); however, Carolan (2007) also highlighted that a lot of first-time mothers described feeling overwhelmed by considerable health information offered by their nurses and midwives. These findings illustrate that the number of children and first-time pregnancy may be characteristics influencing mothers' health information-seeking behavior.

Overall, extant literature has revealed that several socio-demographic factors, such as age, gender, race or ethnicity, household income, education levels, the number of children, and first-time pregnancy, tended to influence people's health information-seeking behavior to a certain degree. Including these characteristics, it would be necessary to test other individual characteristics would mothers' health information-seeking behavior such as their employment status, housing status, marital status, the size of household, the number of years living in the U.S. (or in Korea), and fluency in speaking the English language.

2.2 Wilson's Information-Seeking Model

In this research, Wilson's information-seeking model was used to test the relationships between mothers' health information-seeking behavior related to their children and mothers' demographic characteristics. In Wilson's (1997) model of information behavior, information-seeking was considered as a purposive, goal-determined behavior and the concept of information processing provides a framework that might help to explain mothers' information-seeking behavior. The model maintains

more a person-centered approach, focusing on the information use by people, information needs, and the context. For example, the situation in which information needs arise and the obstacles to information seeking may have an impact on a person's information-seeking behavior (Wilson 2000).

The model is based on two important propositions (Beverley, Bath and Barber 2007; Potnis 2015). First, information needs are secondary type of needs that arise out of a set of primary needs in everyday life. Second, diverse personal and external barriers are encountered by users during the information-seeking process. The researcher of this study assumes all the above propositions and relates the research question to these propositions. Specifically, the research question was developed based on the second proposition to test the following hypothesis: *There is a relationship between the frequency of using each health information source and mothers' individual characteristics.*

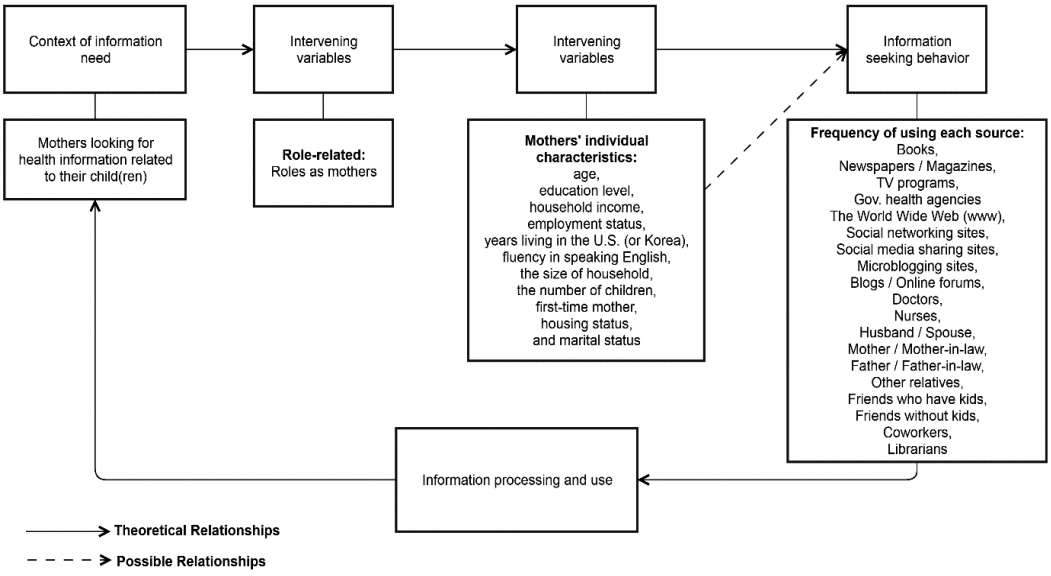
Since information needs are somewhat subjective, their consequence of seeking behaviors also varies greatly by individuals. For example, mothers might play a range of intertwined roles (e.g., parents, mentors, health managers, caregivers, etc.) and utilize diverse information resources (e.g., the Internet, healthcare providers, books, family/friends, etc.), which can be digital, conventional, or interpersonal, to meet their health information needs. Their multiple roles in the health-related context within family can be manifested differently, such as passive information consumers, or active/ongoing information seekers. The current study puts mothers in a context of health-related information seekers who play their connected roles as health managers and caregivers for their children. The specific context of information needs plays a significant role in shaping overall information-seeking behavior of the mothers.

When explaining the overall process of information seeking, it is noteworthy that mothers' information-seeking behaviors may be affected by five diverse types of intervening variables (Case 2016). Those are summarized as follows: (a) psychological predispositions (e.g., curiosity or fear), (b) demographic characteristics (e.g., age, gender, education, or income), (c) factors related to one's role (e.g., whether one is acting as an instructor or a mother), (d) environmental variables (e.g., the resources available to disadvantaged communities), and (e) characteristics of the sources (e.g., accessibility or credibility). Among those five different types of intervening variables, the current study focused specifically on two factors-role as a mother, and mothers' demographic characteristics.

3. Research Method

3.1 Conceptual Framework

Based on the review of the literature, the researcher developed a conceptual framework of the current study (Figure 1). An important contribution of the conceptual framework is to find the relationship between individual and source characteristics under the context of mothers' information-seeking behavior related to their children's health. Possible relationships which are currently presented with broken arrows in Figure 1 will be tested using ordinal regression. Specific data analysis method will be illustrated in the following section 3.3 Data analysis.



〈Figure 1〉 Conceptual framework of this study

3.2 Data Collection

From late February to early June 2019, a web-based survey was used to collect data. The sample of this study was drawn from mothers of healthy infants and toddlers currently living in the U.S. or in Korea. A total number of 102 online communities' administrators were contacted and provided details about the study for permission to post recruitment messages on their specific sites. Participants were recruited through postings in 21 online communities of mothers.

A convenience sampling, a type of non-probability sampling, was utilized in an online survey. All of the potential participants were aged 18 years or older and had at least one child aged newborn to 3-years-old. Moreover, in order to focus on mothers of healthy children, potential participants were excluded if their child (ren) had been diagnosed with any of the following: 1) any form of chronic or recurrent pain, 2) severe learning disability, 3) the presence of a psychiatric or neurological condition, 4) serious medical illness (Schoth et al. 2016).

If a potential participant satisfied the above inclusion criteria, she was able to participate in the research by clicking the survey link. Of the 1,595 recorded responses, 249 respondents did not meet the criteria and were screened out in accordance with the selection criteria; 495 respondents did not complete the survey. Consequently, 851 mothers of healthy infants and toddlers participated in the online survey. Once the data collection was completed, gift cards ($50 each) were awarded to respondents selected by a random draw. This study was reviewed and approved by the Education and Social/Behavioral Sciences Institutional Review Board of the researcher's university.

3.3 Data Analysis

References of major items in the questionnaire are presented in Table 1. Also, data collected from the web-based questionnaire were coded and processed in SPSS 26. Descriptive and inferential statistics were conducted. First, a descriptive statistical analysis was carried out to comprehend the sample's demographic characteristics. Second, inferential statistics, such as ordinal regression analyses were used to identify any possible relationships between frequency of each information source used and the participants' demographic characteristics. In general, ordinal regression analysis was used to determine the relationships between an ordinal-level dependent variable (e.g., a five-point Likert scale) and more than one independent variable (Garson 2014; Sin and Kwon 2017). Ordinal regression also requires an adequate sample size and the absence of high multicollinearity. According to Teddlie and Tashakkori (2009), when a given population is over 10,000, a sample size should be at least 384 to maintain a 95% confidence interval (5% precision). That is, the sample in this study was large enough to be representative and reach a 95% confidence interval in all statistical analyses.

Multicollinearity diagnostics were also conducted to ensure that no predictor variables were too highly intercorrelated. A tolerance statistic lower than 0.2 or a variance inflation factor (VIF) higher than ten proposes multicollinearity problems (Field 2009). In this study, the tolerance values were all higher than 0.2. The VIF values were all lower than ten. Therefore, these results suggest

the data have no multicollinearity issues.

〈Table 1〉 References of major items in the questionnaire

	Items in the questionnaire	References
1	19 Health information sources	(Kim et al. 2014; Lee 2017; 2018; National Cancer Institute 2017)
2	Frequency of using each information source	(Lee 2018)
3	Demographic characteristics	(Lee 2017; 2018; National Cancer Institute 2017)

4. Findings

4.1 Respondent Characteristics

Among the 851 mothers of health infants and toddlers who completed the online survey, 255 were U.S. mothers, 300 were immigrant Korean mothers, and 296 were Korean mothers.

The age distribution was somewhat similar in the two Korean samples aged 21 to 45, whereas the U.S. sample had a greater number of slightly younger mothers aged 18 to 45. In terms of educational attainment, 21.2% of the U.S. mothers answered that they had attended college but did not graduate, compared to 3.7% of immigrant mothers and 2.4% of Korean mothers. Also, more than half of the two Korean samples obtained a four-year degree (Immigrant Korean mothers: 56.3%; Korean mothers: 54.7%), while 34.9% of the U.S. sample obtained a four-year degree. Regarding marital status, almost all mothers in the two Korean samples were married, whereas 7.8% of U.S. mothers stated they were single, never been married, 5.9% were living as married, 2.4% were divorced, and 0.8% were separated. When it comes to employment status, a significant difference was noted between mothers in native populations and immigrant mothers. Indeed, 54.5% of the U.S. mothers stated that they work either full-time (38.4%) or part-time (16.1%), whereas only 13.4% of the immigrant Korean mothers work full-time (7.7%) or part-time (5.7%). On the other hand, 76.3% of the immigrant Korean mothers were stay-at-home mothers, while 36.4% of the U.S. mothers and 47.6% of the Korean mothers were stay-at-home mothers. Furthermore, when the participants were asked if they were first-time mothers, more than 80% of the Korean mothers stated they were (Immigrant Korean mothers: 80.3%; Korean mothers: 84.5%), whereas only 41.6% of the U.S. mothers said they were first-time mothers.

4.2 Relationships between Frequency of Using Each Information Source and Individual Characteristics

Ordinal regression analyses were performed to identify any possible relationships between the frequency of using a specific information source and respondents' demographic characteristics. For instance, among the U.S. mothers, the researcher tested whether individual demographic characteristics would influence participants' use of government health agencies as a health information source in relation to their child(ren). In the following sections, brief explanations of the dependent / independent variables and how to interpret the results are illustrated.

Dependent Variables (DVs)

In this study, an ordinal regression analysis was performed on each information source, yielding 19 regression models in each sample. Frequency of using each information source can be considered dependent variables. There were 19 different health-related information sources developed based on the previous literature in information behavior research (Kim et al. 2014; Lee 2017; 2018). Those consisted of nine non-human information sources such as the World Wide Web, TV, government health agencies, and blogs/online forums; 10 personal information sources including doctors, nurses, husband/spouse, friends with kids, coworkers, and librarians. Respondents were asked to note their frequency of using each source in the past six months using a 5-point Likert scale: 1 = never, 2 = rarely, 3 = occasionally, 4 = frequently, and 5 = very frequently.

Independent Variables (IVs)

Eleven demographic characteristics were tested to identify the predictors of using each source among mothers of healthy infants and toddlers. Nine individual characteristics including age (of the mother), education, annual household income, employment status, first-time mother (Yes/No), housing status, years lived in the U.S. (Korea for the Korean mothers), the number of children, and the size of household were tested in all three groups. However, an independent variable—English fluency—was not tested with the U.S. sample, whereas another independent variable—marital status—was not tested with the other two Korean samples. This was because their zero frequency in a few categories made the regression model unstable.

U.S. Sample

The frequency of using the 19 information sources was tested against 10 individual demographic characteristics. Results indicated that the U.S. mothers' individual characteristics were significantly associated with the frequency of using four different sources (Table 2): the World Wide Web, other relatives, friends with kids, and coworkers. Also, it should be noted that only statistically significant individual characteristics were reported in Table 2.

〈Table 2〉 Statistically significant regression models in the U.S. Sample

		www*	Other relatives**	Friends with kids**	Coworkers***
Age	18-30	2.13	1.69	1.13	0.95
	31-35	1.71	1.10	2.19*	2.91**
	36 or older †	1.0	1.0	1.0	1.0
Education	2-year college or less	0.35**	1.21	0.30**	1.73
	4-year college	0.58	1.07	0.89	2.29*
	Master or Doctoral degrees †	1.0	1.0	1.0	1.0
Annual household income	$0-$34,999	0.58	3.56*	1.52	1.35
	$35,000-$49,999	0.63	0.69	0.59	0.88
	$50,000-$74,999	1.15	1.06	0.82	0.66
	$75,000-$99,999	0.83	0.93	0.75	0.77
	$100,000 or more †	1.0	1.0	1.0	1.0
Employment status	Working (Full-time)	0.65	0.93	0.79	36.68***
	Working (Part-time)	0.96	1.63	2.51*	18.49***
	Other	1.55	2.79	2.44	6.15**
	Stay-at-home †	1.0	1.0	1.0	1.0
The number of children	1	4.31	1.81	7.47*	5.30
	2 or more †	1.0	1.0	1.0	1.0
Model fit: Likelihood ratio test, -2 log likelihood		544.21*	535.09**	625.43**	436.14***

Note 1. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.
Note 2. The dagger (†) indicates a reference group.
Note 3. Participants who did not clearly answer to annual household income and years lived in the U.S. questions were excluded in analyzing the data for this research question.

For the statistically significant individual characteristics, the odds ratio can be interpreted as follows: all other things being equal, a U.S. mother with a specific characteristic is more likely

to use a specific information source if that characteristic has an odds ratio higher than one (OR > 1). The higher the odds ratio, the higher the likelihood a U.S. mother with a specific characteristic is likely to use the particular source when seeking health information. For example, in a regression model named "friends with kids," the number of children "1" had an odds ratio of 7.47, indicating that a U.S. mother with one child was 7.47 times more likely to use friends with kids as her health information source than a U.S. mother with two or more children (reference group). Overall, when the U.S. mothers' other regression models were carefully examined, independent variables named age, education level, employment status, and the number of children were significant characteristics affecting U.S. mothers' health information source use. Other independent variables named annual household income and the size of household were also somewhat significant factors influencing U.S. mothers' health information-seeking behavior.

Immigrant Korean Sample

Among the 19 information sources, results indicated that immigrant Korean mothers' individual characteristics were significantly associated with the frequency of using five information sources (Table 3): TV, government health agencies, the World Wide Web, blogs/online forums, and coworkers. It is also noteworthy that demographic attributes such as age, education level, annual household income, employment status, and English fluency were statistically significant factors that would affect immigrant mothers' health information source use. Although effect sizes of three characteristics, such as years lived in the U.S., the size of household, and housing status, were not that large, these characteristics also influenced immigrant mothers' source use in blogs/online forums and books regression models.

For the significant individual characteristics, interpretations should be made with regard to the reference group (an odd ratio of 1). For instance, an immigrant Korean mother who speaks English fluently is 1.90 times more likely to utilize government health agenciesas her health information source than an immigrant Korean mother who is not fluent in English language (reference group) (OR = 1.90, $p < .05$). A continuous independent variable named "years in the U.S." was statistically significant in the blogs/online forums regression model. That is, in the immigrant Korean sample, a one-year increase in length of stay in the U.S. tended to decrease the odds that they would use blogs/online forums as their health-related information source regarding their children (OR = 0.87, $p< .01$). It was interesting to note that individual characteristics, such as first-time mothers (Yes/No) or the number of children, were not statistically significant which might influence immigrant mothers' health information source use.

〈Table 3〉 Statistically significant regression models in the Immigrant Korean Sample

		TV*	Gov. health agencies*	www*	Blogs/Online forums***	Coworkers***
Age	18-30	0.46*	1.89	1.40	1.50	0.37
	31-35	1.06	1.79*	1.06	1.26	0.78
	36 or older †	1.0	1.0	1.0	1.0	1.0
Education	2-year college or less	2.74**	2.10	1.11	1.98	1.55
	4-year college	1.06	0.86	0.75	1.37	1.34
	Master or Doctoral degrees †	1.0	1.0	1.0	1.0	1.0
Annual household income	$0-$34,999	1.31	0.94	0.98	1.23	1.26
	$35,000-$49,999	1.43	0.77	1.80	1.42	1.35
	$50,000-$74,999	1.71	1.38	1.66	1.37	2.67*
	$75,000-$99,999	2.17*	0.84	1.18	1.83	2.08
	$100,000 or more †	1.0	1.0	1.0	1.0	1.0
Employment status	Working (Full-time)	1.18	1.79	0.24**	0.55	9.33***
	Working (Part-time)	1.05	0.75	1.52	0.78	3.73*
	Other	1.39	1.87	1.33	0.57	5.03***
	Stay-at-home †	1.0	1.0	1.0	1.0	1.0
Years lived in the U.S.		0.96	0.96	0.98	0.87**	0.94
Size of household	3 or less	0.64	0.79	1.64	4.15*	3.74
	4	0.54	0.46	2.29	2.61*	1.59
	5 or more †	1.0	1.0	1.0	1.0	1.0
English fluency	Very well / Well	0.86	1.90*	0.65	0.73	2.76**
	Not well / Not at all †	1.0	1.0	1.0	1.0	1.0
Model fit: Likelihood ratio test, -2 log likelihood		638.65*	721.92*	470.53*	620.16***	409.93***

Note 1. * p 〈 0.05. ** p 〈 0.01. *** p 〈 0.001.

Note 2. The dagger (†) indicates a reference group.

Note 3. Participants who did not clearly answer to annual household income and years lived in the U.S. questions were excluded in analyzing the data for this research question.

Korean Sample

Of the 19 information sources, the results showed that associations between frequency of using six information sources and Korean mothers' demographic characteristics existed (Table 4). The six information sources were as follows: books, TV, the World Wide Web, blogs/online forums, mother/mother-in-law, and coworkers. The results indicated that demographic attributes such as age, education, employment status, and fluency in English were highly significant predictors of

Korean mothers' health information source use. Other influential characteristics included annual household income, years lived in Korea, and the size of household. Like the immigrant Korean sample, two attributes such as first-time mothers (Yes/No), and the number of children were not statistically significant in all the regression models in the Korean sample.

〈Table 4〉 Statistically significant regression models in the Korean Sample

		Books**	TV***	www**	Blogs/ Online forums***	Mother/ Mother-in-law*	Coworkers**
Age	18-30	0.55	1.18	1.28	0.82	1.62	0.60
	31-35	0.82	0.47**	1.33	1.46	0.88	0.93
	36 or older †	1.0	1.0	1.0	1.0	1.0	1.0
Education	2-year college or less	0.39*	1.28	1.00	1.09	0.36**	0.49
	4-year college	0.74	1.31	1.07	0.88	0.91	0.79
	Master or Doctoral degrees †	1.0	1.0	1.0	1.0	1.0	1.0
Annual household income	₩0-₩34,999,999	2.23	1.05	0.93	1.06	0.97	0.71
	₩35,000,000-₩49,999,999	1.28	1.31	1.47	1.71	0.78	0.82
	₩50,000,000-₩74,999,999	1.27	1.14	1.03	1.66	0.73	1.36
	₩75,000,000-₩99,999,999	2.14*	0.71	1.93	1.59	0.99	0.93
	₩100,000,000 or more †	1.0	1.0	1.0	1.0	1.0	1.0
Employment status	Working (Full-time)	1.67	1.14	0.62	0.50*	0.81	3.08***
	Working (Part-time)	1.24	1.55	0.24***	0.36**	0.57	2.06
	Other	1.47	1.15	0.94	1.09	0.66	1.45
	Stay-at-home †	1.0	1.0	1.0	1.0	1.0	1.0
Years lived in Korea		1.01	1.01	0.94*	0.92**	0.99	1.02
Number of children	1	1.01	1.10	1.86	2.48	1.03	0.92
	2 or more †	1.0	1.0	1.0	1.0	1.0	1.0
Size of household	3 or less	1.56	0.27*	0.84	1.16	0.60	1.58
	4	1.12	0.39*	0.86	1.43	0.38	1.20
	5 or more †	1.0	1.0	1.0	1.0	1.0	1.0
English fluency	Very well / Well	1.57	0.43**	1.43	1.50	1.19	0.82
	Not well / Not at all †	1.0	1.0	1.0	1.0	1.0	1.0
Model fit: Likelihood ratio test, -2 log likelihood		722.28**	692.35***	538.87**	630.14***	763.39*	646.58**

Note 1. * p 〈 0.05. ** p 〈 0.01. *** p 〈 0.001.

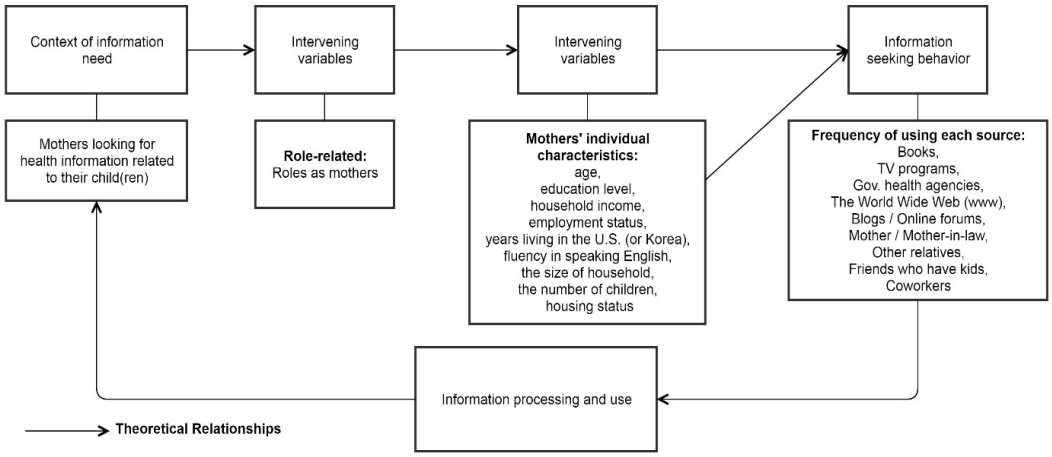
Note 2. The dagger (†) indicates a reference group.

Note 3. Participants who did not clearly answer to annual household income and years lived in the U.S. questions were excluded when analyzing the data for this research question.

Like the other two samples, detailed interpretations should be made in regard to the reference group (OR = 1). For example, a Korean mother with low education (i.e., two-years of college or less) was significantly less likely to use books as her health information source related to her child(ren) than a Korean mother with master or doctoral degrees (OR = 0.39, $p< .05$). In other regression models, Korean mothers' individual characteristics were not large enough to be significant but are still worth noting. Although the participants' individual characteristics did not significantly influence their frequency of source use to make the overall regression model statistically significant, there were some characteristics that affected mothers' frequency of using each source. For instance, a Korean mother aged 18 to 30 years was significantly more likely to seek her child(ren)'s health information using social networking sites (OR = 3.14, $p< .01$), and microblogging sites (OR = 3.90, $p < .01$) than a Korean mother aged 36 or older (OR = 1). Although age somewhat affected Korean mothers' use of social networking sites and micro-blogging sites as their health information source, the effect was not large enough to make regression models statistically significant.

5. Discussion

In terms of relationships between socio-demographic characteristics and frequency of using each information source, nine out of 11 attributes were found to be influencing mothers' specific source use and it is shown in Figure 2. Those nine characteristics are as follows: mother's age, education, annual household income, employment status, the number of children, the size of household, fluency in speaking English, housing status, and years lived in the U.S. for American and immigrant mothers or years lived in Korea for Korean mothers. This result is supported by findings from prior studies concluding that a few key demographic characteristics, such as age (e.g., Jenkins et al. 2001; Pinquart and Duberstein 2004; Ramanadhan and Viswanath 2006; Silliman et al. 1998), education levels (e.g., Galarce et al. 2011), income (e.g., Shieh et al. 2010; Song et al. 2013), the number of children (e.g., Baker et al. 2007; Lee 2018), and fluency in English (e.g., Oh et al. 2012; Oh et al. 2015), might have affected people's health information-seeking behavior.



〈Figure 2〉 Conceptual model of factors influencing mothers' health information seeking

It is worth highlighting that three characteristics, including mother's age, education, and employment status, were highly significant predictors of mothers' specific health information source use for all three groups. For instance, in this study, younger mothers tended to seek health information more actively than mothers aged 36 or older. This is consistent with extant literature that younger people tend to seek health information more actively from various sources than older people do (e.g., Jenkins et al. 2001; Oh et al. 2012; Pinquart and Duberstein 2004). There are two possible explanations. First, mother's age may have been associated with the number of children. The survey results of this study illustrated that mothers with only one child are more likely to seek health information frequently than mothers with two or more. That is, young first-time mothers might have been seeking health information more actively using many different sources (e.g., the World Wide Web, microblogging sites, books, government health agencies, doctors, nurses) than mothers aged 36 or older with two or more children. Second, there is also a possibility that younger mothers might have learned new types of information sources quickly than older mothers. Oh et al. (2012) also argued that age was highly associated with the likelihood of their Internet use as a health information source. Indeed, in the current research samples, younger mothers tended to utilize diverse social media platforms (e.g., social networking sites, microblogging sites) as their information source.

Results regarding education levels should be interpreted with caution due to disagreement of the findings in accordance with the three groups. Among the U.S. mothers, well-educated mothers (i.e., master's or doctoral degree) are likely to use the World Wide Web and friends with children

more frequently than less-educated mothers (i.e., two years of college or less). Similar finding was found in Oh et al. (2014) study. In their Korean Americans and native Korean samples, Oh et al. (2014) found that there was a significant association between health information seeking on the Internet and education levels. The authors maintained that those with higher level of education were more likely to seek health information from the Internet than those with lower level of education. Interestingly, in the current immigrant sample and native Korean sample, there was no significant association between health information seeking on the Internet and education levels. Further research may be needed to explain this trend explicitly.

In this study, results showed that less-educated immigrant mothers are likely to use TV and social media sharing sites (e.g., YouTube) more often as their health information sources than well-educated immigrant mothers. This also contradicts with Oh et al. (2014)'s finding. Oh et al. (2014) emphasized that education was not significantly associated to use TV for health information in both Korean Americans and native Koreans. In the current research, however, there was significant association between education and TV as a health information source.

In the case of Korean mothers, the well-educated are likely to use mother/mother-in-law, friends with kids, and books more frequently than less-educated Korean mothers. This contrasts with findings from other studies that have claimed that well-educated people are likely to seek health information more actively than less-educated people (Galarce et al. 2011; Ramanadhan and Viswanath 2006; Viau et al. 2002). Based on this study's results, this may not be true depending on two conditions: (a) which sources they are using, and (b) which sample they belong to. Thus, these sharp differences associated with education levels and specific source use should be taken into account carefully when information professionals at diverse organizations (e.g., medical libraries, government health agencies, public libraries) provide health information resources to a certain population.

In this study, results indicated that employment status was also one of the most significant characteristics that would differentiate mothers' health information-seeking behavior in all three groups. This finding is noteworthy because employment status was not noted importantly as a factor which may influence people's health information seeking in the previous literature. Instead, there are several studies which focused on the relationships between socio-economic status such as household income and people's health information-seeking behavior (e.g., Braveman et al. 2001; Shieh et al. 2010; Song et al. 2013).

In fact, the current study revealed that, in terms of employment status, working moms (i.e., full-time or part-time) were more likely to utilize coworkers as their health information source

than stay-at-home mothers in all three groups. As expected, it is unlikely for stay-at-home mothers to have coworkers, so they tended to use the World Wide Web or blogs/online forums more often than working mothers (i.e., full-time or part-time). High use of the World Wide Web and blogs/online forums implies that those two sources could be effective health-related information sources when information professionals at medical libraries, government health agencies, and public libraries provide health information resources to this specific population.

6. Conclusion and Implications

In conclusion, when the relationships between frequency of using each information source and demographic characteristics were examined, three characteristics including age, educational attainment, and employment status were statistically significant factors that may have influenced specific source use in all three groups of mothers. Furthermore, six other demographic characteristics such as household income, the number of children, years living in the U.S. (or in Korea for Korean-born mothers), English fluency, the size of household, and housing status, might have been also affected mothers' information-seeking behavior in relation to their children's health.

There were a few limitations raised from the current research. First, the results may not be generalized beyond the survey samples. Even though the overall demographics of the U.S. sample was diverse in terms of age, marital status, employment status, state of residence at the time of the study, housing status, and the number of children, it may not be representative in education level or status of health insurance. For example, 25.1% of the U.S. sample had a master's or doctoral degree, whereas only 12.4% of the U.S. population holds those degrees (U.S. Census Bureau, 2017). This limitation was unavoidable because the researcher used an online survey method with a non-probability sampling method. Since the potential participants were recruited from several online communities, it was challenging for the researcher to know their demographic characteristics in advance in order to implement other sampling techniques.

Second, any conclusions drawn about the relationships between frequency of using each information source and demographic characteristics are only generalizable to the samples of this study inasmuch as the socio-demographic characteristics were not exhaustive. Although 11 demographic characteristics were tested to see if there are any associations between frequency of using specific sources and individual attributes, there may be other variables that were not tested in this study.

Despite the above limitations, the current study has implications for information professionals

in diverse organizations in Korea. First, the current research has implications for public librarians. Although the researcher understands that there are concerns about providing health-related resources at public libraries, there is a possibility that public librarians could become an invaluable source for mothers of healthy children by instructing them on ways to evaluate health information resources for credibility. In Korea, public librarians' roles as leading the general public to credible health-related information resources have been neglected. Health information provision for patients is considered the role of healthcare professionals or medical librarians at medical or hospital libraries (Seo et al. 2008). Moreover, Noh (2011) found that only 8.3% of public libraries in Korea provided consumer health information resources to their library patrons by providing online links. Noh (2011) further found that there was no consumer health information training for public librarians in Korea, but users expected to be able to obtain free, easily accessible, and trustworthy health information resources from public libraries (Noh and Oh 2011). Therefore, even though there had been existing concerns on providing health-related information resources from public libraries, there is a possibility that public libraries could become valuable resources to mothers actively seeking health information.

Lastly, this research may have implications when information professionals at other institutions (e.g., medical libraries, hospital libraries, KCDC) try to provide health information services to this population. Using the relationships between preferred information sources and mothers' characteristics, providing health information services could be performed more effectively to the targeted population. Furthermore, understanding the unique characteristics of each sample would be helpful when offering health information services to this specific population.

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