

The Influence of Health Information Orientation, E-Health Literacy, and Anxiety on Health Behavior among Parents with School Age Children: Focusing on MERS Prevention Behavior

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Abstract— This study was conducted in order to examine how health information orientation, e-health literacy, and anxiety influence MERS-related health behavior in parents with school age children. A total of 146 subjects living in Seoul and Gyeonggi-do were used as valid data. According to the results, the parents' socio-economic status such as education level and monthly income level, health information orientation, e-health literacy, and MERS-related anxiety explained about 15.4% of variance in MERS infection prevention behavior. In particular, e-health literacy and anxiety about MERS infection in themselves and their families were found to be the most influential factors. Based on these findings, interventions should be designed to manage people's e-health literacy and anxiety in response to the outbreak of an unknown infectious disease like MERS.

Keywords— *Health Information Orientation; e-Health Literacy; Anxiety; Parents*

I. INTRODUCTION

A. *Necessities of Study*

People's interest in health is higher today than ever, and the digitalization of knowledge and information and the rapid spread of Internet technology make it possible for ordinary people to access a large quantity of information related to health and medical services. According to a study by the Pew Research Center, 74% of American adults use the Internet, and 80% of them, namely, 59% of the total adult population seek health information through the Internet[1]. In Korea as well, a national survey in 2010 on the use of Internet reported that 78.4% of the population were using the Internet and

75% of the respondents obtained health information from the Internet. Women's Internet use rate increased twice from 38.6% in 2000 to 72.4% in 2010, and especially housewives' Internet use rate was merely 19.6% in 2000 but tripled to 66.4% in 2010[2]. According to a study by the Korean Institute for Health and Social Affairs, 87.5% of Korean housewives had experience in using health information through the Internet, and the most frequent type of use was information search about specific diseases (38.7%), suggesting that the Internet is becoming a major tool of information collection to housewives for their family health management [3].

Health-related information influences not only the treatment and management of diseases but also ordinary people's various health-related behaviors. Health information provided through the Internet has been improved in terms of quantity and accessibility, but it also has problems in correctness, reliability, and source. Particularly because side effects resulting from self-judgment based on incorrect information can be very serious, it is quite important to find, comprehend, and utilize correct health information [4].

Health literacy is the ability to obtain, process, comprehend, and utilize information on health and medicine. In American Healthy People 2010, the concept was defined as 'an individual's level of capability to acquire, process, and comprehend health information and services necessary for making adequate health decisions' [5]. According to previous studies, those whose level of health literacy is low have difficulty in obtaining and understanding basic medical knowledge, and as a result, they often misunderstand information and fail to follow

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the doctor's instructions and consequently they may use medical services inadequately or overly frequently. In this way, health literacy is the most basic ability in seeking and using health information, and high health literacy has been reported to have a positive effect on patients' health promotion and to enhance the cost-effectiveness of health management[6]. With the advance of the Internet and various information and communication technologies, what is more, online health information exerts a huge influence on individuals' health-related knowledge, attitude, and behavior, and on the relationship between doctors and patients[7]. With regard to this, Norman & Skinner[8] defined 'e-health literacy' as 'the ability to seek, explore, comprehend, and evaluate online health information, and to apply such information in handling and solving health problems,' and developed eHEALS consisting of 8 items to measure online health information users' perceived skill, knowledge, convenience, etc[9]. eHEALS assesses individuals' e-health literacy level and subjectively perceived ability. In order for the ability to lead to actual health behavior, it is important to distinguish and utilize correctly a large amount of health information on the Internet.

Since the occurrence of a Korean MERS patient who came back to Korea after visiting Bahrain in May this year, the Korea Centers for Disease Control distributed a guideline for prevention behavior in order to prevent the additional entrance of MERS patients and the spread of the disease in Korea, and sought advice on the treatment, monitoring, and prevention of MERS from the World Health Organization and the U.S. Centers for Disease Control and Prevention[10]. In the situation that information was controlled while the disease was spreading rapidly, however, people's anxiety about disease infection was heightened, and social instability caused by MERS produced all kinds of rumors and conjectures through SNS and aggravated people's fear of MERS[11]. This spotlights the importance of infectious disease prevention behavior, and people come to take interest in prevention guidelines provided by public health organizations and various media. Particularly in this age of information when a large amount of information and knowledge is pouring out everyday, the Internet is exerting a crucial influence on health information users' use of healthcare services [12].

Especially, parents with children, when there is not adequate information available, cope with anxiety through exchanging information with one another. Parents are the children's first teacher and role model, and their health belief, health behavior, health literacy, etc. have a significant impact not only on the children's growth and development but also on their health. Those at their school age cannot avoid a group life and children's health status is more vulnerable to airborne infectious disease, and for these reasons, they are a subject group sensitive to

such a specific health status. When the risk of infection with such an emerging infectious disease is high, people seek information and do related health behaviors in order to reduce the risk. Especially because children's health management is done through their parents' monitoring and caring, it is considered very important to understand parents' health literacy and factors influencing it.

It was reported that mothers with young children used the Internet for consulting with medical specialists on their children's health, for sharing their experiences with their peers or seniors, and for getting various types of information on children's health from communities of people with common interests, and that the level of health management behavior was higher when the quality of Internet health information was high[12]. Parents' health literacy will also influence school age children whose activities for seeking correct and safe health information are yet immature. However, previous studies were mainly about the health literacy of elders[13], patients with specific diseases[14], or vulnerable classes[15], and research papers on e-health literacy also focused on the relationship between e-health literacy and health-related behavior among adult individuals[16]. That is, few studies have been made on e-health literacy in connection to parents. Thus, this study was conducted in order to examine how health information orientation, e-health literacy, and anxiety affected MERS prevention behavior among parents with school age children who were sensitive to health information and to understand their characteristics in using Internet health information, which are believed to influence their health management for their children. The results of this study will be utilized as basic information for enhancing parents' health literacy so that they may perform efficient health management for their children, who are not able to manage their health by themselves, through the proper use of Internet information.

B. Purposes

This study aimed to examine how the health information orientation and e-health literacy of parents with school age children influence their families' MERS infection prevention behavior, and its specific goals were as follows.

- 1) To examine school age children's general characteristics.
- 2) To examine the parents' health information orientation.
- 3) To examine the parents' e-health literacy.
- 4) To examine the parents' anxiety about MERS infection.
- 5) To identify factors influencing the parents' MERS infection prevention behavior.

II. METHODS

A. Design

This study was conducted as a descriptive cross-sectional survey for examining the effects of health information orientation, e-health literacy, and anxiety about MERS infection on MERS infection prevention behavior among parents with school age children.

B. Subjects

The subjects of this study were parents with school age children living in Seoul and Gyeonggi-do, and they were sampled at random from four kindergartens and elementary schools. The number of subjects required for this study estimated using G * Power 3 was 123 on the conditions of significance level 0.05, effect size 0.15, power of test 0.90, and the number of predictors 6, and a total of 150 subjects were sampled in consideration of the dropout rate. Data were collected from the 150 subjects, and as those who answered insincerely or did not agree to participate were excluded, a total of 146 questionnaires were used as valid data.

C. Tools

1) Health information orientation

Dutta-Bergman[17] defined health information orientation as “the extent to which the individual is willing to look for health information”. In our study, health information orientation means the extent to which the individual seek the information related to health.

Health information orientation was measured using the scale developed by Dutta-Bergman[17] and used by Dong-jin Park, Myeong-soon Kwon & Jeong-hwa Choi [16] in their study. This scale consists of 8 items on a Likert scale ranging from ‘Absolutely not’ (1) to ‘Absolutely yes’ (5), and a high score means a high level of health information orientation. The reliability (Cronbach’s α) of the scale was .86 in the previous study [16] and .87 in this study.

II) Internet health literacy

Internet health literacy is defined as “the ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to addressing or solving a health problem[9]. Internet health literacy was measured using eHEALS developed by Norman & Skinner[9], and translated and used by Park, Kwon & Choi[16] in their study. This scale consists of 8 items on a Likert scale ranging from ‘Absolutely not’ (1) to ‘Absolutely yes’ (5), and a high score means a high level of Internet health literacy. The reliability (Cronbach’s α) of the scale was .87 in the previous study [16] and .91 in this study.

III) Anxiety about MERS

In this study, anxiety about MERS is negative emotional reaction that appears or in threat situations of emotional stress MERS infection. Anxiety about MERS was measured on a 10-point scale from ‘Not afraid at all’ (1) to ‘Very afraid’ (10) to the statement ‘I am afraid that my family and I may be infected with MERS spreading in Korea at present.’ A high score means a high level of anxiety about the person’s and his/her family’s infection with MERS.

IV) MERS prevention behavior

In this study, MERS prevention behavior means to activity undertaken by a person who believes himself/herself to be healthy for the purpose of preventing MERS. MERS prevention behavior was measured using a scale consisting of 10 types of prevention behaviors performed by individuals to prevent specific health status MERS. This self-report questionnaire asks about health behaviors performed by the subject and his/her family during the previous one month. This scale consists of 10 items including 2 about hand hygiene, 2 about cough etiquette, 5 about prevention behavior in public or crowded places, and 1 about the observation of MERS symptoms[18]. These items are: “For the last one month, I and my children washed the hands with water and soap frequently in order to prevent MERS”; “I and my children did not touch the eyes, nose and mouth with unwashed hands”; “I and my children covered the mouth and nose with tissue when coughing or sneezing, and used the inside of the elbow when tissue or a handkerchief was not available”; “I and my family avoided contacting with people who had fever or respiratory symptoms”; “I and my children made efforts not to visit areas with the risk of MERS”; “I and my children made efforts not to go to crowded places”; “I and my children put on a mask when visiting a crowded place”; “I and my children did not visit patients as much as possible”; “I checked frequently if my family and I had symptoms such as fever and cough.” For the readability and clarity of the items included in the tool, a preliminary survey was conducted with 5 parents with school age children but no phrase or sentence was revised.

This scale is answered on a Likert scale ranging from ‘Absolutely not’ (1) to ‘Absolutely yes’ (5), and a high score means a high performance of health behaviors. The reliability (Cronbach α) of the scale was .88 in this study.

D. Data collection

This study was first approved by the Institutional Review Board of Hannam University (15-02-01-0722), and then the visitor visited the subject areas, explained the purposes, meanings, and ethical issues of the study, and sought the subjects’ consent to data collection. Then, the researcher distributed and recovered the questionnaires in

person during the period from the 20th to 24th of July, 2015. Each questionnaire included explanations about the purposes and background of research, and a consent form was provided together, which explained voluntary participation and dropout. In addition, those who participated in this study were given a gift.

E. Data analysis

Collected data were analyzed as follows using SPSS Win 17.0. The subjects' general characteristics and major research variables were analyzed using frequencies, percentages, means, and standard deviations, the relationships among the major variables were analyzed through Pearson correlation coefficient, and factors influencing MERS prevention behavior were identified through multiple regression.

Of the subjects, 14.4% were fathers and 85.6% were mothers. Their mean age was 39.96±4.42, 39.0% were at the age of 31-35, 36.3% were of 36-40, and over 90% were 40 years old or younger. As to the subjects' occupations, 55.5% were housewives, 28.1% were office workers, 5.5% were self-employed, and 11.0% were freelancers or others. As to academic qualification, 69.8% of the subjects graduated from a two-year college or higher school, 19.4% were graduate school graduates. As to monthly income, 49.3% earned 5 million won or more, 24.6% 3.00-3.99 million won, and 22.3% 4.00-4.99 million won. As to the number of children, 72.4% of the subjects had two children, 22.1% had one, and 5.5% had three. The children's mean age was 10.72±3.56 in the one-child families, 7.99±3.26 in the two-child ones, and 7.75±4.26 in the three-child ones. The major sources of health information were the TV and the radio (46.4%), Internet portal sites or Internet search (41.3%), acquaintances (10.5%), and SNS (1.8%) (Table 1).

III. RESULTS

A. *The subjects' general characteristics and MERS-related anxiety*

TABLE 1. General Characteristics of Subjects (N=146)

Characteristics (Mean ± SD)		Items	Number(n) or Mean±SD	Percent (%) or minimum~maximum
Demographic Characteristics	Age(year) (39.96±4.42)	≤30	23	15.8
		31-35	57	39.0
		36-40	53	36.3
		41≤	13	8.9
	Gender	Female	125	85.6
		Male	21	14.4
	Occupation	Housewife	81	55.5
		Office worker	41	28.1
		Self employment	8	5.5
		Etc.	16	11.0
	Educational level	High school	15	10.8
		Diploma or Bachelor	97	69.8
		More than master	27	19.4
Income level (unit : 10,000 Korean won)	≤399	37	28.7	
	400-499	29	22.5	
	500≤	63	48.8	
Children Characteristics	Number of children (1.83±.50) (unit: person)	1	32	22.1
		2	105	72.4
		3	8	5.5
	Age(yr)	1 st	10.72±3.56	4~21
		2 nd	7.99±3.26	1~17
		3 rd	7.75±4.26	1~13
Information sources	Mainly used health information source	Tlevision/Radio	53	46.4
		Article from internet portal site/internet search	47	41.3
		Other people	12	10.5
		Social network service	2	1.8

Reliability of each health information sources*	Tlevision/Radio	2.78±0.57	1~4
	Article from internet portal site	2.71±0.51	
	internet search	2.70±0.55	
	other peoples	2.68±0.67	
	Social network service	2.41±0.63	

On the other hand, the parents' MERS-related anxiety was 6.70±2.40 on a 10-point VAS (Table 2).

TABLE 2. Anxiety about MERS

Items	Mean±SD	minimum~maximum
Anxiety about MERS	6.70±2.40	0-10

B. Health information orientation, e-health literacy, and MERS prevention behavior

In the subjects' health information orientation, the item showing the highest score was 'I need to know health-related issues for my and my family's health' (3.56±0.59), and next 'It is important for me to know health-related issues' (3.56±0.84), and 'I search for all related information before making a health-related decision' (3.54±0.86). The items showing a low score were 'I often read or watch health-related information' (3.17±0.83), and 'I like to learn about health-related issues' (3.17±0.83).

The subjects' mean score of e-health literacy was 3.30±0.61, and the item showing the highest score was 'I know how to use the Internet in order to find answers to my questions on MERS' (3.49±0.80), and next 'I know what information on MERS is on the Internet' (3.41±0.69), and 'I know how to get health information useful for MERS prevention from the Internet' (3.36±0.72). The items showing a score lower than the average were 'I utilized Internet health information for making decisions related to MERS prevention' (3.14±0.61), 'I can distinguish reliable health information on MERS found on the Internet' (3.17±0.81), and 'I am able to evaluate health information on MERS obtained from the Internet' (3.17±0.81).

The subjects' mean score of MERS prevention performance was 4.12±0.61, and the highest item was MERS symptom monitoring (4.27±0.76), and next, hand hygiene (4.27±0.70). The lowest item was cough etiquette (3.85±0.8), showing a score below the average (Table 3).

TABLE 3. Descriptive data of Health Information Orientation, e-Health Literacy, and MERS Prevention Behavior

Items	M±SD
Health Information Orientation**	
I need to know about health issues so I can keep myself and my family healthy	3.82±0.76
To be and stay healthy, it is critical to be informed about health issues	3.57±0.80
It's important to me to be informed about health issues	3.56±0.84
Before making a decision about my health, I find out everything I can about this issue	3.54±0.86
The amount of health information available today makes it easier for me to take care of my health	3.48±0.68
When I take medicine, I try to get as much information as possible about its benefits and side effects	3.32±0.91
I really enjoy learning about health issues	3.19±0.83
I make a point to read and watch stories about health	3.17±0.83
Overall	3.46±.59
eHealth Literacy**	
I know where to find helpful health resources on the Internet	3.49±0.80
I know how to find helpful health resources on the Internet	3.41±0.69
I know how to use the health information I find on the Internet to help me	3.36±0.77
I know what health resources are available on the Internet	3.36±0.72
I know how to use the Internet to answer my health questions	3.28±0.74
I have the skills I need to evaluate the health resources I find on the Internet	3.19±0.82
I can tell high quality from low quality health resources on the Internet	3.17±0.81
I feel confident in using information from the Internet to make health decisions	3.14±0.84
Overall	3.30±0.61
MERS prevention behavior	
monitor of MERS signs/symptoms	4.27±0.76
hand hygiene	4.27±0.70
general precaution against public area or crowd	4.12±0.72
proper coughing manner	3.85±0.88
Overall	4.12±0.61

** 1 to 5 scale with 1 representing "strongly disagree" and 5 representing "strongly agree."

C. Correlations between MERS prevention behavior and major variables

The subjects' health behavior was in the highest positive correlation with e-health literacy ($r=0.40$, $p<.001$), and showed a significant positive correlation also with health information orientation ($r=0.25$, $p=.025$) and anxiety about MERS ($r=0.21$, $p=.010$) (Table 4).

TABLE 4. Correlation between MERS Prevention Behaviors and Anxiety about MERS, Health Information Orientation, eHealth Literacy

	Anxiety about MERS (p)	Health information Orientation (p)	eHealth Literacy (p)
Health behavior	0.21 (.010)	0.25 (.002)	0.40 (<.001)

D. Factors influencing MERS prevention behavior

In order to identify factors influencing the subjects' MERS prevention behavior, this study performed regression analysis using demographic variables such as educational level and monthly income level, MERS-related anxiety, health information orientation, and e-health literacy, and obtained results as in Table 5.

When educational level and monthly income level, anxiety about MERS, health information orientation, and e-health literacy were used as input variables for explaining the subjects' MERS prevention behavior, the explanatory power of the model was about 15.4% (Adj. $R^2= .154$, $F=4.26$, $p<.001$).

The factors having a relatively high influence on the subjects' MERS prevention behavior were e-health literacy ($\beta=.26$, $p=.007$) and anxiety about MERS ($\beta=.19$, $p=.022$), and education level, economic status, health information orientation did not have a significant effect on MERS prevention behavior. That is, MERS infection prevention behavior was active when the subjects' health literacy was high and when their anxiety about MERS was high.

TABLE 5. Regression Analysis for Variables Influencing MERS Prevention Behavior (enter method)

Variables	B	β	t	p	R^2	Adj. R^2	F	p
Constant	2.23	-	6.02	<.001	.202	.154	4.263	<.001
Educational level Diploma/ Bachelor	.20	.15	1.20	.231				
Educational level More than Master	.23	.14	1.11	.265				
Income level 400-499	.08	.05	.58	.558				

Income level 500≤	.13	.11	1.13	.260				
Anxiety about MERS	.05	.19	2.31	.022				
Health information orientation	.10	.10	1.04	.298				
eHealth Literacy	.27	.26	2.74	.007				

Reference group : Educational level - high school, income level - ≤399

IV. DISCUSSION

Faced with MERS that broke out in Korea from May to July this year, the health problem that the Korean people had never experienced, this study was conducted in order to examine the effects of health information orientation, e-health literacy, and anxiety on MERS prevention behavior among parents with school age children.

With regard to the sources of health information used by the subjects, 41.3% of the respondents answered that they had obtained health information on MERS through Internet search or from articles in portal sites. This is second highest to the TV/radio (46.4%). According to previous studies, the Internet is the most commonly used source of health information in the U.S. and Australia[19]. While the users receive one-way information provided by media passively in the traditional information sources TV and radio, they have to find relevant information actively among extensive materials in electronic information sources such as the Internet and therefore the information users should make specific and active interventions. According to an online health survey with American adults in 2013, 59% of adults sought health information on the Internet[20], and 84% of Korean Internet users also experienced the use of health information on the Internet[3]. These reports suggest that demand for electronic information sources is high.

In addition to their ability to use information, how much the subjects trusted each information source, and according to the results, the mean reliability of the major information sources was 2.78 out of 4 for information from the TV and radio, and 2.70 for information from the Internet. In additional analysis for more in-depth discussion, 46.1% of those who chose the Internet as their major information source replied that they did not trust information from the Internet. This implies that people seek health information through the Internet but they have difficulty in distinguishing and using reliable information. In their research in 2007 on how patients searched and evaluated Internet health information, Sillence et al. reported that most of the subjects questioned the quality

of Internet information[21]. Because the use of incorrect health information may bring a serious trouble to the user's health, it is considered important to acquire correct information. In particular, credible public institutions should provide correct and material health information in a way suitable for information users' characteristics so that health information acquired through the Internet may be as accurate and understandable as it is accessible.

According to the results of this study, the parents' educational level and economic status, health information orientation, e-health literacy, and MERS-related anxiety explained about 15.4% of variance in their MERS prevention behavior. In particular, e-health literacy and anxiety about the risk of MERS infection in themselves and their families were found to be the most influential factors.

This finding is important in that this study was conducted with its focus on MERS-related information and MERS prevention behavior. Data were collected while MERS infected patients were occurring in Korea and people's interest in MERS prevention was quite high. In particular, the subjects of this study who were parents with school age children had to consider the health management of their children who were leading a group life, and their health behavior may have a significant effect on their children's health behavior. Because MERS is transmitted from person to person, moreover, it is important to observe prevention guidelines to stop its spread. According to the pattern of spread of emerging airborne diseases that have broken out throughout the world, ordinary people's preventive health behavior during the early stage of outbreak is extremely crucial for the control of the disease [22, 23]. In this context, the unexperienced health-threatening situation is believed to have contributed to the finding of this study that the subjects' e-health literacy and anxiety were the most influential factors for their MERS prevention behavior.

Khoo, Bolt, Babl, Jury, and Goldman[24] found that about 52% of the subjects, mothers, sought information through the Internet when they were faced with a change such as a change in their children's health status or the onset of new symptoms. In 2009, Goldman & Macpherson [25] also reported that about 10% of parents visiting the pediatric emergency room sought health information through the Internet before visiting the emergency room. Both of the two studies suggest that parents show an active information seeking behavior when they are faced with a change in their children's health status or symptoms. Moreover, the subjects of this study were relatively high in socio-economic status and academic qualification, so were expected to be strong in e-health literacy. In 2011, Knapp, Madden, Wang, Sloyer, and Shenkman reported that those living in an urban area and high in the socio-economic level and academic qualification sought health information actively and had

high efficacy in health information[26]. They showed e-health literacy higher than the medium on a 5-point scale. According to Kim, Oh, Lee, health literacy may vary depending on what context the health information is related to, and it is influenced by the person's health status and health belief and is associated with the quality of health information and the individual's socio-economic status related to his/her learning and cognitive abilities[27]. In particular, the use of health information and health behavior based on the information are highly influenced by the individual's comprehension of health information, and with regard to this, a number of previous studies reported that health literacy had a direct or indirect effect on the subjects' health behavior such as self-care behavior[28], and the use of health-related applications[29]. In another study as well, e-health literacy was found to be a significant influential factor to online and offline health-related behavior[16]. But in current study, the socio-economic status such as education level and monthly income level were not associated with MERS prevention behavior. This results can be based on the characteristics of current research subjects. The research subjects of current study were relatively high in socio-economic status and academic qualification, and also relatively homogeneous in terms of academic qualification and economic status.

In this study, anxiety about MERS infection in them and their families was the second most influential variable for the subjects' MERS prevention behavior. Taking interest in the relationship between individuals' psychological state and their preventive health behavior against an emerging airborne disease, Liao, Cowling, Lam, Ng, and Fielding[23] studied individuals' psycho-behavioural response to the outbreak of A/H1N1 influenza in Hong Kong in 2009, and found that, in a situation when a new airborne disease might break out, individuals' psychological state was highly correlated with their infection prevention behavior according to the stage of outbreak. They reported that airborne diseases such as influenza A/H1N1 and SARS are unknown for treatment method, transmission method, and pathological characteristics, and they spread easily among people, and for these reasons, people's anxiety about the diseases, which is an emotional state easily changeable according to situation rather than a cognitive state, has a more significant effect on their infection prevention behavior. Kardemas, Bati, Karkania, Georgiou, and Sofokleous[22], who studied people's perception of and response to the outbreak of influenza A (H1N1) in Greece, reported that the perceived locus of control and emotional response influenced people's prevention behavior at the early stage of outbreak of the emerging airborne disease.

These reports are consistent with the finding of this study that the emotional state of anxiety was a major influential factor for the subjects' MERS prevention

behavior. Particularly because uncertainty and the risk of infection are high in an emerging airborne disease and this raises people's concern over the health of themselves and their families in connection to the disease, their emotional response to the risk can be a more powerful predictor than other cognitive factors [30].

Based on these findings, it is suggested to develop interventions for managing people's e-health literacy and anxiety during the outbreak of an unknown infectious disease like MERS. In the situation that an infectious disease has broken out, the high accessibility and communication of correct information to people is a crucial factor activating their preventive health behavior. For this, moreover, health information should be designed to be easily understandable and applicable in order to lead ordinary people to specific prevention behaviors in their daily living, and strategies should be developed to make it easy for people to search and utilize health information through the Internet. Such strategies may include the use of noticeable banners related to infectious diseases on major portal sites and the provision of visual information such as infographic rather than long and complicated explanations.

On the other hand, health information orientation, one of the major independent variables in this study, was not found to be a significant influential factor for MERS prevention behavior. Health information orientation indicates how actively an individual seeks, evaluates, and utilizes health information [17], and according to previous studies, it was highly related to e-health literacy, and was in a significant correlation with online and offline health behavior[16]. However, online and offline health behavior was measured based on whether the subjects participated in online self-support activities of a quasi-health group, had communication with medical staff by email, confirmed online information with a doctor during offline health counseling, utilized online information in health-related decision making, etc. Different from this study that measured MERS prevention behavior, the previous study surveyed somewhat indirect behaviors such as health-related decision making and counseling, and the items of offline health behavior were limited to those related to Internet-based health information. These differences are believed to have contributed to the inconsistencies between the two studies. Another reason for the differences is that this study was conducted in connection to the specific problem of MERS rather than daily health status. With regard to people's health seeking behavior during the outbreak of influenza A/H1N1, Bults et al. reported that health information seeking was very high during the first one month and then the behavior of seeking health information was reduced rapidly after 1~3 months[31]. Thus, the finding of this study may be explained by the fact that this study was conducted in

about a month after the finding of the first patient in Korea.

Through the discussions as presented above, this study suggested that e-health literacy and anxiety influenced MERS-related prevention behavior among parents with school age children in the specific situation of the outbreak of infectious disease MERS, and this study is considered academically meaningful in that it provides basic information for future research on the outbreak of similar infectious diseases. In particular, the finding that e-health literacy was a relatively more influential factor than anxiety on MERS prevention behavior has the practical implication that more understandable and usable information should be provided correctly in response to increasing demand for health information in the future.

Liao, Cowling, Lam, Ng, and Fielding [23] pointed out that most of psycho-behavioural studies on the outbreak of an infectious respiratory disease were conducted hurriedly during the period of outbreak without a well-defined theoretical framework or measuring scale. This study was also conducted with the problems raised by previous study[23] unsolved, having no theory for explaining the parents' health behavior in the situation of the outbreak of MERS, measuring the subjects' anxiety on a simplified visual analogue scale, etc[23]. Accordingly, future research needs to raise the explanatory power by exploring related variables based on an adequate theoretical framework and using accurate measuring scales that reduce errors.

Moreover, the subjects of this study were limited to those living in Seoul and a city in Gyeonggi-do and they were relatively homogeneous in terms of academic qualification and economic status, and for this reason, the external validity of this study is low. Thus, future research needs to include a larger number of subjects of various characteristics.

Lastly, this study was based on a cross-sectional survey conducted in about a month after the finding of the first MERS patient in Korea, so it could not explain factors influencing the subjects' prevention behavior according to the stage of the outbreak of the infectious disease as suggested in previous studies. Thus, future research needs to explore the longitudinal trends.

V. CONCLUSIONS

This study was conducted in order to examine how health information orientation, e-health literacy, and anxiety influence MERS-related health behavior in parents with school age children. According to the results, the parents' health information orientation, e-health literacy, and MERS-related anxiety explained about

15.8% of variance in MERS infection prevention behavior. In particular, e-health literacy and anxiety about MERS infection in themselves and their families were found to be the most influential factors. Based on these findings, interventions should be designed to manage people's e-health literacy and anxiety in response to the outbreak of an unknown infectious disease like MERS.

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