


RESEARCH ARTICLE

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Complementary and alternative medicine use among outpatients during the 2015 MERS outbreak in South Korea: a cross-sectional study

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Abstract

Background: The 2015 MERS outbreak in South Korea was the largest event outside of the Middle East. Under such circumstances, individuals tend to resort to non-conventional solutions such as complementary and alternative medicine (CAM) to manage health. Thus, this study aims to examine characteristics of CAM use among outpatients in a community hospital setting during the 2015 MERS outbreak and to assess potential predictors of CAM use during the epidemic.

Methods: A cross-sectional study was conducted among 331 patients (response rate: 82.75%) at a community hospital located in Seoul, South Korea. The survey instrument included 36 questions on the use of CAM, demographic characteristics, health status, and respondents' perceptions and concerns about MERS infection. Chi-square test and logistic regression were conducted for data analysis using SPSS ver. 21.0., and a *p*-value of less than 0.05 was considered statistically significant for all analyses.

Results: 76.1% of respondents used one or more types of CAM modalities during the MERS outbreak. Consumption of easily accessible modalities such as multivitamin (51.2%) and food products (32.1%) was most popular, and the majority of CAM users relied on mass media (52.4%) and the internet (27.4%) to obtain information on CAM. The use of CAM was associated with age between 40 and 49, age over 50, prior CAM use, and dissatisfaction with the government response to the MERS outbreak.

Conclusions: CAM was commonly used by outpatients during the 2015 MERS outbreak in Korea, and mass media was the main source of information. Establishing a media platform is of paramount importance to provide reliable information and ensure the safety of its use.

Keywords: Infectious disease, MERS, Community hospital, Complementary and alternative medicine, Korea

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Background

Recent emerging infectious diseases such as Severe Acute Respiratory Syndrome (SARS), Avian Influenza, and Middle East Respiratory Syndrome related coronavirus (MERS-CoV) continue to be a major public health concern [1]. The 2015 MERS outbreak in South Korea was the largest outbreak of MERS-CoV outside of the Middle East, resulting in 186 infected cases, 38 casualties, and 16,752 people being quarantined [2–4]. The characteristics and mechanisms of MERS transmission have been well investigated since the outbreak [5–7]. Specifically, MERS deaths in Korea can be attributed to the absence of effective vaccination and treatment for MERS, weak healthcare system for epidemic control, and ill-prepared hospitals with a deficiency in professional expertise, as well as negative pressure room for isolation of MERS patients [7–10]. Furthermore, increased incidences of nosocomial infection of MERS during the outbreak in 2015 elevated the fear, panic, and anger among the general public [11, 12].

As such, individuals exposed to risks and uncertainties tend to seek self-care measures and resort to non-conventional solutions such as complementary and alternative medicine (CAM) in order to demonstrate their autonomy, mitigate the risk, and make the situation more manageable [13–15]. Also, the usage is even greater among those with a chronic condition and report poorer health status [16–19]. Thus, the use of CAM among infectious diseases patients has gained popularity over the past decades, and a growing body of literature highlights its use against the threat of new and emerging infectious diseases such as HIV/AIDS, SARS, and H1N1 [20–26]. Furthermore, it is especially important to investigate the characteristics of CAM use in countries where the practice of traditional medicine is popular.

In Korea, the use of CAM is widespread and culturally embedded as traditional Korean medicine (TKM) is recognized as a part of mainstream medicine in the Korean healthcare system. TKM is easily accessible in communities as TKM providers are available in all three levels (primary, secondary, and tertiary) of healthcare facilities. Some of its modalities, such as acupuncture, moxibustion, cupping, and herbal preparations, have been covered by the national health insurance since 1987, and patients can choose between TKM and conventional medicine based on their preferences [27]. Therefore, practice and consumption of CAM modalities, including TKM, are common among Koreans to prevent and manage acute illnesses [28, 29].

However, previous studies on CAM use during epidemics focus on the clinical efficacy of CAM modalities [23–25]. Those provide limited information about the detailed pattern of CAM use, why specific CAM modalities were chosen, and where the patients obtained the

information on CAM during the emerging infectious disease outbreak. Therefore, this study aims to examine patterns and motivations of CAM use among outpatients at a community hospital during the 2015 MERS outbreak in Korea and identify their source of information on non-conventional medicine use.

Methods

Study setting and participants

A descriptive cross-sectional study was conducted among patients attending the outpatient departments at a community hospital located in Seoul, South Korea. All outpatients over the age of 18 were eligible to participate in the survey. Exclusion criteria were those who were admitted to the inpatient unit at the time of the survey, unable to speak or understand the survey questionnaire.

Study size

The formula for sample size determination using confidence interval (CI) of proportion was used to calculate the sample size: $n = z_{\alpha/2}^2 \cdot \frac{pq}{d^2}$, where n is the required sample size, p is the estimated proportion of CAM use among the general population (0.692) calculated from previous studies [30, 31], d is the margin of error set on 0.05, q is the proportion of people not using CAM (1- p), and $z_{0.025}$ is 1.96 which corresponds to the confidence interval of 95%. This equation gave the minimum sample size as 328, and we distributed a total of 400 survey questionnaires assuming a 20% non-response rate.

Survey instrument

The semi-structured survey questionnaire was developed in the Korean language (See Additional file 1: Survey questionnaire). Because previous research tools on CAM use during emerging infectious disease outbreaks were unavailable, the survey instrument was developed based on earlier studies on CAM use [32–34]. In order to assess content and face validation of the survey instrument, the questionnaire was reviewed by three researchers to evaluate appropriateness, relevancy, clarity, adequacy, and organization of the questions. In addition, the questionnaire was pilot-tested on a sample of 20 participants to examine length, clarity, and difficulty of the questions, and a few items were revised based on the results.

The final version of the questionnaire included 36 items with both multiple-choice and open-ended questions, and respondents' perceptions and concerns regarding the MERS outbreak were measured using a 5-point Likert scale. The survey was divided into four major sections: The first section included eight questions on health-related characteristics (smoking and drinking experience, the practice of regular exercise, and presence

and perceived-severity of comorbidities) and the level of self-perceived interest in health-promoting behavior of respondents (1 = not at all, 5 = very much). The second section contained 11 questions regarding respondents' perceived danger and severity of MERS outbreak (1 = not at all, 5 = very much), concerns about MERS infection (1 = not at all, 5 = very much), the opinions on the trust in government response during the MERS outbreak, and source of information about MERS outbreak. The third part consisted of seven questions on CAM use (CAM use prior to the outbreak, types of modalities used during the outbreak—the respondents who checked on any modalities were categorised as CAM users, source of information, the reason for CAM use, and intention to recommend CAM to others), and the last section had nine questions on respondents' sociodemographic characteristics such as age, gender, marital status, level of education, occupation, level of income, religion, and area of residence.

Data collection

The survey was conducted from November 26th to December 2nd, 2015. Two surveyors were trained and recruited for data collection, and the information about the research was given verbally to each respondent. The respondents were asked to complete the questionnaire by themselves, but if respondents did not understand certain questions, they were able to ask the surveyors for clarification. All participants were assured of their confidentiality and completed IRB-approved written informed consent before the survey. A total of 400 self-completed questionnaires were distributed, but 69 participants did not return or complete the questionnaire (response rate: 82.75%); therefore, the data of 331 respondents were included in the final analysis.

Statistical methods

The collected data of 331 respondents were analyzed using the Statistical Package for Social Sciences (SPSS) version 21.0. Descriptive statistics were used to examine sociodemographic and health-related characteristics of respondents. Pearson's Chi-square test was performed to identify differences in sociodemographic characteristics and perceptions and concerns experienced during the MERS outbreak between CAM users and non-users. Lastly, multivariate logistic regression analysis was conducted to determine potential predictors of CAM use during the MERS outbreak. The significant factors from previous chi-square test (gender, age, religion, marital status, occupation, smoking status, alcohol consumption, degree of concern about no treatment modality available for MERS, trust in the government response, the perceived danger of the MERS outbreak on one's health, hand washing, and refraining from physical contact with

others) were subjected to the regression analysis. A p -value of less than 0.05 was considered statistically significant for all analyses.

Ethical clearance

The ethical approval of the study was obtained from the Institutional Review Board on Human Subjects Research and Ethics Committees, Hanyang University, Seoul, Korea (HYI-15-210-1).

Results

Sociodemographic characteristics of study participants

Table 1 presents the sociodemographic characteristics of respondents. The majority of respondents were women (68%), married (72.5%), received undergraduate education or higher (51.1%), have monthly household income higher than approximately 4000 USD (41.4%), and used CAM prior to the outbreak (54.7%).

76.1% of respondents have used at least one of the listed CAM modalities during the MERS outbreak, and significant differences in gender ($p = 0.003$), age ($p = 0.001$), marital status ($p = 0.035$), occupation ($p = 0.001$), religion ($p = 0.006$), smoking status ($p = 0.003$), alcohol consumption ($p = 0.041$), and prior use of CAM ($p < 0.001$) between CAM users and non-users were observed

Types of CAM modalities used during the MERS outbreak

Types of CAM modalities used by respondents during the MERS outbreak are demonstrated in Table 2. A total of 252 CAM users were identified. Among natural products, the prevalence of multivitamin consumption was the highest (51.2%), followed by whole grain, brown rice, and black bean (32.1%), and probiotics (31.0%). The exercise was the most practiced modality among the mind and body practices (27.8%), and traditional Korean medicine was used by 6.3% of CAM users.

Source of information on CAM

As presented in Table 3, the primary information source of CAM use was mass media (52.4%) and the internet (27.4%). The least popular source was pharmacists (2.8%).

Reason for CAM use and intention to recommend CAM

The most common reason for CAM use among 252 CAM users was to improve the immune system (63.1%), followed by to prevent disease and maintain/promote health (53.2%). Also, 72.6% of CAM users were willing to recommend CAM to others. As the reason for non-use of CAM among 79 non-CAM users, 27.8% responded that they do not believe that CAM is relevant to disease treatment, and 26.6% reported that they do not trust in the effectiveness of CAM (Table 3).

Table 1 Sociodemographic characteristics of respondents

Characteristics	Total n = 331 (%)	CAM users n = 252 (%)	Non-users n = 79 (%)	p-value
Gender				
Male	106 (32.0)	70 (27.8)	36 (45.6)	0.003
Female	225 (68.0)	182 (72.2)	43 (54.4)	
Age (years)				
≤ 39	104 (31.4)	66 (26.2)	38 (48.1)	0.001
40–49	93 (28.1)	72 (28.6)	21 (26.6)	
≥ 50	134 (40.5)	114 (45.2)	20 (25.3)	
Marital status				
Single	91 (27.5)	62 (24.6)	29 (36.7)	0.035
Married	240 (72.5)	190 (75.4)	50 (63.3)	
Level of education				
Up to secondary school	162 (48.9)	125 (49.6)	37 (46.8)	0.668
Undergraduate or higher	169 (51.1)	127 (50.4)	42 (53.2)	
Occupation				
Professional	77 (23.3)	65 (25.8)	12 (15.2)	0.001
Office worker	80 (24.2)	48 (19.1)	32 (40.5)	
Self-employed	69 (20.8)	57 (22.6)	12 (15.2)	
Not employed	105 (31.7)	82 (32.5)	23 (29.1)	
Monthly household income				
Low (under 1 M won)	71 (21.5)	53 (21.0)	18 (22.8)	0.348
Middle (2 M ~ 4 M won)	123 (37.2)	99 (39.3)	24 (30.4)	
High (Over 4 M won)	137 (41.4)	100 (39.7)	37 (46.8)	
Religion				
No	136 (41.1)	93 (36.9)	43 (54.4)	0.006
Yes	195 (58.9)	159 (63.1)	36 (45.6)	
Type of current illness				
Chronic disease	140 (42.3)	113 (44.8)	27 (34.2)	0.094
Acute condition	191 (57.7)	139 (55.2)	52 (65.8)	
Smoking status				
No	237 (71.6)	191 (75.8)	46 (58.2)	0.003
Yes	94 (28.4)	61 (24.2)	33 (41.8)	
Alcohol drinking				
No	88 (26.6)	74 (29.4)	14 (17.7)	0.041
Yes	243 (73.4)	178 (70.6)	65 (82.3)	
Prior CAM use				
No	150 (45.3)	78 (31.0)	72 (91.1)	< 0.001
Yes	181 (54.7)	174 (69.0)	7(8.9)	

CAM Complementary and Alternative Medicine

Differences in perception, degree of concerns, and trust in the government response

Differences in perceptions, degree of concerns, and trust in government response between CAM users and non-

users are demonstrated in Table 4. Majority of respondents obtained MERS-related information through mass media (58.6%), displayed a high degree of concern about contracting the disease (49.2%), not being able to visit

Table 2 Types of CAM modalities used during the MERS outbreak

CAM modalities	CAM users n = 252 (%)
Natural product^a	
Multivitamin	129 (51.2)
Whole grain/Brown rice/Black Bean	81 (32.1)
Probiotics	78 (31.0)
Ginseng/Balloon Flower Root	75 (29.8)
Garlic/Ginger	55 (21.8)
Dietary supplements	54 (21.4)
Propolis	23 (9.1)
Cinnamon	12 (4.8)
Chinese yam	10 (4.0)
Green Vegetable Juice	3 (1.2)
Mind and body Practices^a	
Exercise	70 (27.8)
Pray/Meditation	25 (9.9)
Massage	19 (7.5)
Yoga/Aerobic	9 (3.6)
Chiropractic	4 (1.6)
Other complementary health approaches^a	
Traditional Korean medicine	16 (6.3)
Acupuncture	8 (3.2)

^a Columns do not add up to 100% due to use of multiple treatments

the crowded area (47.1%), having insufficient information on MERS (42.3%), and unavailability of treatment modality for MERS infection (62.5%). However, only a few respondents rated their self-perceived likelihood of contracting the disease as high (24.2%). Hand-washing (78.5%) was the most practiced protective behavior against the MERS outbreak, followed by wearing a mask (56.2%), and refraining from going outside (44.7%).

CAM users' concern for the lack of definitive treatment for MERS infection ($p = 0.017$) and self-perceived danger of the MERS outbreak ($p = 0.017$) was significantly greater than that of non-CAM users. A more significant proportion of CAM users (48.8%) regarded government response to the MERS outbreak as inappropriate ($p = 0.020$), and CAM users practiced more hand-washing ($p = 0.011$) and refrained from physical contact with others ($p = 0.010$) compared to the non-users.

Potential predictors of CAM use during the MERS outbreak

The result of multivariate logistic regression analysis is shown in Table 5. Age between 40 and 49 (OR: 2.753, CI: 1.121–6.761), age above 50 (OR: 3.574, CI: 1.290–9.905), CAM use prior to the outbreak (OR: 20.450, CI: 8.335–50.176), dissatisfaction with the government

Table 3 Source of information, Reason for CAM/non-CAM use, and intention to recommend

Variables	n (%)
Source of information (n = 252)^a	
Mass media (Newspapers, Radio, TV)	132 (52.4)
Internet	69 (27.4)
Family or relatives	61 (24.2)
Friends or peers	50 (19.8)
Book or magazine	29 (11.5)
Others	15 (6.0)
Pharmacist	7 (2.8)
Reasons for using CAM (n = 252)^a	
To improve the immune system	159 (63.1)
To prevent disease and maintain/promote health	134 (53.2)
To assist in the treatment of disease(s)	33 (13.1)
To aid in psychological comfort	20 (7.9)
To reduce pain	7 (2.8)
To minimize the adverse effects of conventional medicine	5 (2.0)
Others	2 (0.8)
Intention to recommend (n = 252)	
Yes	183 (72.6)
No	69 (27.4)
Reason for not using CAM (n = 79)	
Do not believe that CAM is relevant to disease treatment	22 (27.8)
Do not trust in the effectiveness of CAM	21 (26.6)
Others	16 (20.3)
Do not know about CAM	14 (17.7)
Worried about the adverse effects of CAM	6 (7.6)

^a Columns do not add up to 100% due to the selection of multiple answers

response to the outbreak (OR: 2.547, CI: 1.189–5.458) were associated with CAM use during the MERS epidemic.

Discussion

This research is the first attempt to understand the prevalence and determinants of CAM use among patients during the MERS outbreak in Seoul, South Korea. While the efficacy of many CAM therapies has yet to be demonstrated, previous studies reported that CAM was commonly used during the outbreak of infectious diseases, such as malaria, dengue, H1N1, SARS, and the common cold to improve health [21–23, 25, 32, 35, 36]. Our findings also revealed a high utilization rate of CAM (76.1%) during the MERS outbreak, yet similar prevalence was reported during a non-epidemic period in Korea, showing an overall rise in CAM use among Koreans [30, 37, 38]. Furthermore, the prevalence of CAM use during the MERS outbreak was similar to that

Table 4 Difference in perception, concerns, and government trust between CAM users and non-users

Variables	Total n = 331 (%)	CAM users n = 252 (%)	Non-users n = 79 (%)	p-value
Concern about own self and/or family members becoming infected^a				
Low (1,2)	84 (25.4)	61 (24.2)	23 (29.1)	0.314
Moderate (3)	84 (25.4)	61 (24.2)	23 (29.1)	
High (4,5)	163 (49.2)	130 (51.6)	33 (41.8)	
Concern about not being able to visit crowded area^a				
Low (1,2)	79 (23.9)	57 (22.6)	22 (27.8)	0.054
Moderate (3)	96 (29.0)	67 (26.6)	29 (36.7)	
High (4,5)	156 (47.1)	128 (50.8)	28 (35.4)	
Concern about not being able to visit health facilities^a				
Low (1,2)	109 (32.9)	79 (31.3)	30 (38.0)	0.322
Moderate (3)	94 (28.4)	70 (27.8)	24 (30.4)	
High (4,5)	128 (38.7)	103 (40.9)	25 (31.6)	
Concern about having insufficient information on MERS^a				
Low (1,2)	98 (29.6)	75 (29.8)	23 (29.1)	0.207
Moderate (3)	93 (28.1)	65 (25.8)	28 (35.4)	
High (4,5)	140 (42.3)	112 (44.4)	28 (35.4)	
Concern about no treatment modality available for MERS^a				
Low (1,2)	51 (15.4)	33 (13.1)	18 (22.8)	0.017
Moderate (3)	73 (22.1)	51 (20.2)	22 (27.8)	
High (4,5)	207 (62.5)	168 (66.7)	39 (49.4)	
Perceived likelihood of infection^o				
Low (1,2)	140 (42.3)	103 (40.9)	37 (46.8)	0.458
Moderate (3)	111 (33.5)	89 (35.3)	22 (27.8)	
High (4,5)	80 (24.2)	60 (23.8)	20 (25.3)	
Perceived danger of MERS outbreak on health¹				
Low (1,2)	29 (8.8)	22 (8.7)	7 (8.9)	0.017
Moderate (3)	124 (37.5)	84 (33.3)	40 (50.6)	
High (4,5)	178 (53.8)	146 (57.9)	32 (40.5)	
Perceived preventability of MERS infection				
Possible	257 (77.6)	197 (78.2)	60 (75.9)	0.679
Not possible	74 (22.4)	55 (21.8)	19 (24.1)	
Trust in the government response				
Appropriate	133 (40.2)	100 (39.7)	33 (41.8)	0.020
Not appropriate	151 (45.6)	123 (48.8)	28 (35.4)	
No opinion	47 (14.2)	29 (11.5)	18 (22.8)	
Protective behaviors*				
Wearing a mask	186 (56.2)	144 (57.1)	42 (53.2)	0.534
Hand-washing	260 (78.5)	206 (81.7)	54 (68.4)	0.011
Refraining from going outside	148 (44.7)	117 (46.4)	31 (39.2)	0.262
Refraining from physical contact with other people	62 (18.7)	55 (21.8)	7 (8.9)	0.010
Resting	73 (22.1)	58 (23.0)	15 (19.0)	0.451
Visiting health facilities for consultation	10 (3.0)	7 (2.8)	3 (3.8)	0.644

^a Participants were asked to rate their degree of concern (1 = Not at all, 5 = Very much)

^o Participants were asked to rate their self-perceived likelihood of contracting the disease (1 = Not at all, 5 = Very likely)

¹ Participants were asked to rate their self-perceived danger of the MERS on health (1 = Not at all, 5 = Very much)

* Columns do not add up to 100% due to the selection of multiple answers

of cancer patients [39, 40], yet higher than that of chronic disease patients in Korea [41–43].

To date, the reasons and motivations for seeking CAM during epidemics vary across studies [14, 21, 22, 32]. However, during the MERS outbreak in Korea, the leading motivations for trying CAM were to improve the immune system and to prevent diseases. During the previous outbreaks of severe influenza, it was also documented that CAM was used for direct treatment against infectious diseases in various countries [22–24, 35, 44]. This implies that during infectious disease outbreaks, CAM is used not only to prevent the infection through the achievement of overall well-being and enhancement of immune function, but also to cure the disease directly by combating against the virus.

As there are multiple reasons behind the utilization of CAM, the use of CAM products differed among studies. In Korea, consumption of natural products such as a multivitamin, whole grain, and probiotics was popular during the MERS outbreak, which were the modalities that are widely used for the management and treatment of common cold and influenza-like illnesses [24]. Such similarities in modalities used support existing findings that people's decision to use particular CAM is influenced by specific physical symptoms experienced and self-assessed health care needs [45, 46]. Our findings also show differences in the use of self-administered modalities (multivitamin, nutritional supplements, food products, and exercise) and practitioner-administered modalities (massage, yoga, and traditional Korean medicine). Higher preference of self-administered CAM modalities in our study implies that in order to protect themselves from an outbreak event, people are more likely to rely on self-medication and minimize the risk of exposure. In fact, a high proportion of Koreans during the 2015 MERS outbreak avoided the crowded area and health facilities to prevent infection [2].

Differences in the method of obtaining CAM information were also observed. During the MERS outbreak in Korea, the most common sources were mass media (newspaper, television, radio) and the internet, which were the least popular among patients with chronic disease and non-airborne infectious disease [32, 47–49]. Observed dependence on the mass media can be attributed to many health professionals using the mass media to provide advice on precautionary and self-care measures during the outbreak of MERS. Furthermore, similar to the SARS epidemic in Hong Kong [50], the majority of respondents also reported the mass media as the main source of disease-related information during the MERS outbreak in Korea. These findings reflect the importance of mass media accessed by the public during health emergencies, as the information provided has a critical role in the

formation of risk perception and influence health behavior [51–53].

Lastly, several factors were identified as potential predictors of CAM use during the MERS outbreak. As for sociodemographic characteristics, previous studies found female gender, younger age, and tertiary education level to be associated with CAM use among people with risk of disease development [54, 55]. However, on the contrary, only the higher age groups (being 40 to 49 years of age, being over 50 years of age) were more likely to use CAM in our study. This incongruency may be due to differences in the sample size of the study and characteristics of diseases, as in the case of infectious disease outbreaks, higher perceived vulnerability among elders could influence them to engage in health-promoting behaviors [14, 56]. In the case of health belief-related factors, those who used CAM prior to the outbreak and showed dissatisfaction with the government response to the outbreak were more likely to use CAM in the present study. Similarly, previous studies found distrust in the government and dissatisfaction with the conventional health care system to be associated with CAM use [16, 57]. These results suggest that individuals who find the formal health care system to be unreliable resort to CAM to compensate for the lack of perceived-health care quality, to practice autonomy, and to protect themselves from health threats [16, 57–59]. However, the findings remain inconclusive, and further research is needed to improve our understanding of the determinants of CAM use during epidemic events.

Limitations of this study include recall bias and lack of variability in research locations. The survey was implemented in November and December of 2015, which was near the end of the MERS epidemic in Korea, so recall bias may affect the result. Also, the participants of the study were selected from patients visiting outpatient departments of a community hospital in Seoul; therefore, the result of the study may not fully represent those of other people in Korea. Lastly, cross-sectional studies can only infer the association between CAM use and potential predictor variables.

Conclusion

During the 2015 MERS outbreak in Korea, the prevalence of CAM use was considerably high among patients with older age, prior CAM use, and dissatisfaction with the government response to the MERS outbreak. Also, the majority of respondents reported the mass media and the internet as the main source of CAM and disease-related information. In the era where emerging infectious diseases continue to be a major public health concern, the effective use of mass media and information and communication technology should be considered to achieve efficient delivery

Table 5 Multivariate logistic regression analysis for determining factors affecting CAM use during MERS

Variables	OR	95% CI	p-value
Gender			
Male	1	Ref	
Female	1.328	0.506–3.486	0.564
Age (years)			
≤ 39	1	Ref	
40–49	2.753	1.121–6.761	0.027
≥ 50	3.574	1.290–9.905	0.014
Religion			
No	1	Ref	
Yes	1.387	0.678–2.837	0.370
Marital status			
Married	1	Ref	
Single	1.321	0.546–3.199	0.537
Occupation			
Not employed	1	Ref	
Self-employed	2.275	0.806–6.423	0.121
Office worker	0.763	0.283–2.054	0.592
Professional	1.274	0.459–3.533	0.642
Smoking status			
No	1	Ref	
Yes	0.610	0.240–1.553	0.300
Alcohol drinking			
No	1	Ref	
Yes	1.389	0.566–3.406	0.473
Prior CAM use			
No	1	Ref	
Yes	20.450	8.335–50.176	< 0.001
Concern about no treatment modality available for MERS^a			
Low	1	Ref	
Moderate	1.204	0.425–3.407	0.727
High	1.625	0.612–4.310	0.330
Trust in the government response			
Appropriate	1	Ref	
Inappropriate	2.547	1.189–5.458	0.016
No opinion	1.170	0.420–3.263	0.764
Perceived danger of MERS outbreak on health^b			
Low	1	Ref	
Moderate	0.850	0.228–2.844	0.736
High	1.066	0.298–3.816	0.922
Frequent hand washing during the outbreak			
No	1	Ref	
Yes	2.017	0.922–4.413	0.079
Refraining from physical contact with others			

Table 5 Multivariate logistic regression analysis for determining factors affecting CAM use during MERS (*Continued*)

Variables	OR	95% CI	p-value
No	1	Ref	
Yes	2.029	0.727–5.659	0.176

^a Participants were asked to rate their degree of concern (1 = Not at all, 5 = Very much)

^b Participants were asked to rate their self-perceived danger of the MERS on health (1 = Not at all, 5 = Very much)

of health information and to promote behavior changes in situations of vulnerability. Therefore, public health authorities should build an integrated platform that provides proven and reliable information during public health emergencies to protect the health of citizens.

Supplementary information

Supplementary information accompanies this paper at <https://doi.org/10.1186/s12906-020-02945-0>.

Additional file 1. Survey questionnaire. Survey questionnaire developed to examine the pattern of CAM use among Koreans during the 2015 MERS outbreak in Korea.

Abbreviations

CAM: complementary and alternative medicine; H1N1: Influenza A virus subtype H1N1; MERS: Middle East respiratory syndrome; OPD: Outpatient department; SARS: Severe Acute Respiratory Syndrome

Acknowledgments

The authors would like to express their sincere gratitude to all the participants for their cooperation and willingness to share their experience.

Authors' contributions

YS, HB, SJ, and DW were responsible for the study concept and design. HB, YS, and DW analyzed the data and drafted the manuscript. HJ and DW contributed to the designing of data collection tools and data collection. JH, HB, YS, and DW critically reviewed the manuscript and contributed intellectual content. All authors read and approved the final manuscript.

Funding

None.

Availability of data and materials

The data will be accessible by contacting the corresponding author of this study.

Ethics approval and consent to participate

Ethical approval for the study was acquired from the Institutional Review Board on Human Subjects Research and Ethics Committees, Hanyang University (HYI-15-210-1). Enrollment of the respondents was voluntary, and all patients gave written consent to participate in the study.

Consent for publication

Not applicable.

Competing interests

The authors have no conflicts of interest to declare.

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Received: 15 August 2019 Accepted: 7 May 2020

Published online: 13 May 2020

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