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The primary aim of *World Journal of Clinical Cases* (WJCC, *World J Clin Cases*) is to provide scholars and readers from various fields of clinical medicine with a platform to publish high-quality clinical research articles and communicate their research findings online.

WJCC mainly publishes articles reporting research results and findings obtained in the field of clinical medicine and covering a wide range of topics, including case control studies, retrospective cohort studies, retrospective studies, clinical trials studies, observational studies, prospective studies, randomized controlled trials, randomized clinical trials, systematic reviews, meta-analysis, and case reports.

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Retrospective Study

Prevention and management of adverse events following COVID-19 vaccination using traditional Korean medicine: An online survey of public health doctors

Byungsoo Kang, Hongmin Chu, Bo-Young Youn, Jungtae Leem

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Abstract

BACKGROUND

Since February 2021, vaccination against coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 has started in Korea.

AIM

To perform a questionnaire survey about the prevention and management of adverse events of COVID-19 vaccination among public health doctors of Korean Medicine (PHKMDs).

METHODS

An online questionnaire was developed, comprising categories about adverse events of vaccination (AEVs) and perception of using Korean medicine (KM) in managing vaccine adverse events (AEs) among PHKMDs. PHKMDs' experience of AEVs, usage of Korean medicine for AEVs, and perception and attitude in using KM for AEVs were surveyed. The survey web-link was emailed to the association of PHKMDs. Online links were sent through Survey Monkey to all PHKMDs in Korea.

RESULTS

A total of 143 participants were recruited for this study; 65% of participants were vaccinated at the same of the survey ($n = 93$). Although most participants did not take any medication for prevention of the adverse events, 62% ($n = 58$) of participants had taken herbal medicine to treat the adverse events ($n = 52$). Approximately 35% of participants ($n = 33$) said that they would recommend taking herbal medicine to prevent any AEs. From various KM interventions, the participants strongly recommended taking an herbal medicine ($n = 69$, 74.19%) to treat AEs, and the second-highest was acupuncture treatment ($n = 19$, 20.43%).

CONCLUSION

Overall, this research demonstrated a high prevalence of KM usage by the PHKMDs. Hence, this study's results may serve as fundamental evidence for health professionals to consider using KM treatments when treating or preventing AEs in the near future.

Key Words: COVID-19; Vaccination; Adverse events; Herbal medicine; Korean medicine

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Core Tip: This study is the first to conduct a survey of traditional medicine doctors engaged in public health works regarding the prevention and management of adverse events utilizing traditional medicine modalities before and after the coronavirus disease 2019 vaccination.

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INTRODUCTION

Coronavirus disease 2019 (COVID-19) is a highly infectious disease, with some severe cases developing severe acute respiratory syndrome[1-3]. Because the COVID-19 pandemic is not effectively controlled, many countries' health systems are subject to an excessive burden[4]. Therefore, preemptive vaccination strategies are essential for COVID-19 control. However, as the number of vaccination administrations increases, public concerns about adverse events (AEs) have also increased. Several typical AEs after the COVID-19 vaccination have been reported in Korea, such as fatigue, muscle pain, fever, headache, local pain at the injection site, joint pain, nausea, and diarrhea[5]. These AEs are not life-threatening; however, these symptoms may linger for an extended period of time. Since there are concerns over the growing rejection of vaccination due to AEs, effective management and research of the AEs of vaccinations are significant to achieve herd immunity against COVID-19[6,7]. The effectiveness of vaccines has been proven through various studies, and a decrease in infection rate and mortality was found in the vaccinated population[8,9]. According to current guidelines about COVID-19 vaccination from the Korea Centers for Disease Control and Prevention (KCDC), those who have administered vaccination were recommended to apply cold compresses for local pain at the injection site and take acetaminophen for the prevention of having fever along with controlling AEs[10]. Until now, there have been insufficient studies in Korea on AEs after vaccination, and it is unknown whether the treatments effectively manage the vaccine AEs, reduce the duration of AEs, and facilitate returning daily life. Moreover, there are no guidelines for taking herbal medicine before and after vaccination. Herbal medicine is being well used to manage COVID-19 symptoms in China and Korea at the Korean medicine (KM) telemedicine centers[11]. Moreover, various traditional East Asian medicine modalities, including herbal medicines such as Qing-Fei-Pai-Du decoction, have been utilized to treat COVID-19 symptoms[12-17]. In addition, there is also a case in which Chinese medicine was used to manage vaccine AEs. When ginseng and influenza vaccines were administered in combination, it was reported that natural killer cell activity and antibody antagonism were higher in the combined administration group than in the single vaccine group[18]. Some studies regarding herbal medicine indicated positive potentials of herbal medicine for managing AEs of vaccination[18-20]. However, as with conventional Western medicine treatment, the clinical evidence on whether the complementary and alternative medicine treatments effectively prevent and manage vaccine AEs needs to be scrutinized. Due to the AEs of COVID-19 vaccine, there have been a higher number of vaccine rejections worldwide[21]. Thus, it is vital from a public health perspective to have adequate tools to manage the AEs effectively. There have been no official guidelines for KM treatment for management of vaccine AEs in Korea yet. In Japan, several cases treated with Kampo

medicine have been reported[12]. One clinical trial was registered in the Korean Clinical Trial database (CRIS; Clinical Research Information Service, KCT0006252) and started subject enrollment[22].

As a vast number of Korean medicine doctors (KMDs) will be in favor of taking herbal medicine rather than conventional medication before or immediately after vaccination in order to manage the AEs of COVID-19 vaccination, a nationwide online survey was conducted on public health doctors of Korean medicine (PHDKMs) to collect the usage status of herbal medicine and any changes in symptoms. The study results will be used as a basis for KMDs to understand how the AEs of vaccines could be managed; in addition, the results of the PHDKMs' attitudes could be utilized as fundamental data for managing AEs of future vaccines in complementary and alternative medicine. Hence, the aim of this online survey study was to investigate the attitude of PHDKMs towards prevention and management of AEs of COVID-19 vaccination, and their perception about management of AEs using East Asian traditional medicine (EATM) intervention after COVID-19 vaccination. The study results obtained will help to develop a strategy to increase the vaccination rate through the appropriate use of EATM intervention when new infectious diseases are pandemic in the future.

MATERIALS AND METHODS

Study design

An online questionnaire was created using the online survey tool SurveyMonkey™ (www.surveymonkey.com, LLC; Palo Alto, CA, United States). The survey web-link was emailed to the association of public health doctors of Korean medicine (APKOM). Then, the association distributed the web-link to all PHDKMs. The research period was from April 19 to April 30, 2021.

Ethical considerations

This study was approved by the Institutional Review Board of College of KM of Wonkwang University for the online survey protocol (WKIRB-202104-SB-022). Participants were recruited by the association and encouraged to read the questionnaire carefully. An electrical informed consent form, intended to protect personal information, was uploaded for the participants to review and continue the survey. Researchers collected only age, gender, other symptoms, AEs, medication after vaccination, and satisfaction to personal information protection. In addition, the recruited KMDs volunteered to participate in this survey and had an option not to participate without any penalties or harm. All data were used for research purposes only.

Participants

As of April 1, 2021, there were 1047 PHDKMs in Korea, and the text message containing a link to participate in the survey was sent to all registered KMDs by the association. Newly appointed PHDKMs were excluded since the vaccination was not administered. After February 2021, the PHDKMs of Infectious Diseases Specialized Hospital started administering Pfizer's vaccine, and the rest of the KMDs had the AstraZeneca vaccine. The reason for recruiting the PHKMDs was that, unlike ordinary KMDs, PHKMDs were often assigned to various tasks related to COVID-19 response, such as epidemiological investigators. Hence, the purpose of this study was to seek perceptions and attitudes of PHKMDs who were currently engaged in actual quarantine and public health tasks, considering real-world practice and the value of public health and traditional medicine in a balanced way.

Questionnaire development

Since there is no validated questionnaire for investigating AEs after COVID-19 vaccination and managing AEs using an herbal medication, we decided to develop a questionnaire based on various consultations from KM professors, KMDs, and medical doctors. Additionally, the questionnaire included a few meaningful questions from the previous cross-sectional survey about post-vaccination side-effects conducted in the United Kingdom[23]. By agreement with the research team, the questionnaire was developed in four categories: Participants' characteristics, AEs from the COVID-19 vaccination, managing COVID-19 AEs, and recommendation of using KM for potential COVID-19 AEs. For face validity, a pilot test was performed before the questionnaire was conducted, and the questions were modified according to the feedback ([Supplementary material](#)).

General characteristics of the participants: The participants' characteristics included the following: Age, gender, years in career, general health status, underlying diseases, potential exposure to COVID-19, and COVID-19 vaccination status.

Adverse events from COVID-19 vaccination: The AEs from the COVID-19 vaccination part of the survey asked seven questions to the participants. The first question was about the type of COVID-19 vaccination when administered. The second question was related to the experiences of any AEs from the vaccination. If the participants had experienced AEs, multiple answers were allowed among the given choices. If the participants did not experience AEs, they were allowed to jump to the recommendation

category. The next question asked the severity of the AEs; the severity was measured using the numerical rating scale. The next two questions were focused on the time of the appearance of the AEs and the time that it took for AEs to disappear. The last question asked the participants if the AE disrupted working.

Managing COVID-19 adverse events: This part of the survey investigated the management of COVID-19 AEs. The first question was asked if the participants had taken any medication to prevent AEs before vaccination. The next two questions were regarding taking medication after vaccination for treating AEs, and the number of days was sought. The last two questions were related to using any KM modalities to treat AEs after vaccination other than taking herbal medicine. If the participants responded positively, they were asked to choose the KM modalities.

Recommendation of using KM for potential adverse events from COVID-19 vaccination: The last part of the survey dealt with the recommendation of using KM for AEs from the COVID-19 vaccination. The first question of this part asked the recommendation of taking herbal medicine in advance to prevent any AEs from the vaccination. For those who have answered the first question, they were also asked to recommend specific herbal medicine. Then, the next question asked the opinion of recommendation of KM modalities for potential AEs from the vaccination. If participants answered that the KM modalities were effective, they could choose any modalities that might show positive effects. The final question asked if KM treatment is helpful for people who might have AEs from the COVID-19 vaccination.

Statistical analysis

This is a survey study without a control group, and descriptive analysis was performed. For categorical variables, frequency and ratio are presented. For continuous variables, the mean and standard deviation are presented. Statistical analyses were done by using Microsoft Excel and R software (version 4.0.3, <http://r-project.org/>). We did not use a specific cutoff time-point for the exclusion of responses.

RESULTS

General characteristics of participants

A total of 143 participants were recruited for this study. The 25-29 age group had the highest number of total participants ($n = 107$, 74.8%). Among the participants, 45.5% ($n = 65$) had careers between 1 and 2 years, and 35% ($n = 50$) had careers between 3 and 4 years. Approximately 49% participants indicated that their health status was fair ($n = 70$). Only five participants had underlying diseases; the mentioned diseases were hypertension, rhinitis, gout, fatty liver disease, and cholinergic urticaria. No participants were exposed to COVID-19, and 65% participants were vaccinated during the survey ($n = 93$). The details of the general characteristics are shown in [Table 1](#).

Adverse events from COVID-19 vaccination

Except for one participant who had Pfizer vaccine ($n = 1$, 1.08%), all others had AstraZeneca vaccine ($n = 92$, 98.92%; [Table 2](#)). Among the vaccinated participants, 90 had AEs from the vaccination. As multiple answers were allowed to choose the kind of AEs experienced, muscle pain was chosen most commonly ($n = 75$, 83.33%), and fever was chosen second most commonly ($n = 67$, 74.44%). In addition, the majority of the participants indicated that the severity of the AEs was moderate ($n = 40$, 44.44%). Seventy (77.78%) participants stated that the AEs occurred within 12 h from the injection, and 48 participants (53.33%) mentioned that the AEs disappeared within 48 h. More importantly, 50% of the participants ($n = 45$) said that the AEs were mild without having any deterioration for daily activities.

Managing adverse events from COVID-19 vaccination

Although most participants did not take any medication for prevention of the AEs prior to vaccination ($n = 58$, 62.37%), 52 (57.78%) of the participants had taken herbal medicine to treat the AEs after vaccination ([Table 3](#)). Regardless of the type of medication, the majority of the participants took 1 to 2 d of medication ($n = 57$, 63.33%). It was surprising that only three (3.33%) participants only used acupuncture among the KM modalities to treat the AEs other than taking herbal medication. The 38 participants (42.22%) mentioned herbal prescriptions that they took are Gumiganghwal-tang ($n = 15$, 16.77%, Jiuweiqianghuo-tang, Kumikyokatsu-to), Galgeun-tang ($n = 9$, 10%, Gegen-tang, Kakkon-to), Ssanghwa-tang ($n = 5$, 5.56%, Shuanghe-tang, Souwa-to), *etc.* In this study, herbal medicine was used to control vaccine AEs. Side effects due to herbal medicine were not reported.

Recommendation of using KM for potential adverse events of COVID-19 vaccination

Fifty-seven (61.29%) participants said that they would recommend taking herbal medicine to prevent any AEs from the COVID-19 vaccination ([Table 4](#)). Nineteen (33.33%) participants mentioned that they would recommend specific herbal medicine for the prevention of AEs from the COVID-19 vaccination.

Table 1 Characteristics of participants

Variable	Frequency (n = 143)	Percent (%)
Age		
25-29 yr	107	74.8
30-35 yr	36	25.2
Gender		
Male	143	100
Year(s) in career		
1-2	65	45.5
3-4	50	35.0
5-6	20	14.0
7-8	8	5.6
General health status		
Very healthy	7	4.9
Healthy	60	42.0
Fair	70	49.0
Poor	6	4.2
Very poor	0	0.0
Underlying diseases		
None	138	96.5
Diseases reported (multiple answers allowed)	5	3.5
Hypertension (3), Rhinitis (1), Gout (1), Fatty liver disease (1), and Cholinergic urticaria (1)		
Exposure to COVID-19		
Yes	0	0.0
No	143	100.0
COVID-19 vaccination status		
Vaccinated	93	65.0
Unvaccinated	50	35.0

COVID-19: Coronavirus disease 2019.

The names of herbal prescriptions are Kyungok-go ($n = 15$, 26.32%, Qiongyu-gao) Gongjin-dan ($n = 19$, 33.33%, Gongchen-dan), Gumiganghwal-tang ($n = 11$, 19.3%), Ssanghwa-tang ($n = 7$, 12.28%), Galgeun-tang ($n = 7$, 12.28%), *etc.* Moreover, 55 (60.61%) participants expressed that they would recommend KM treatments for AEs. From various KM interventions, the participants strongly recommended taking an herbal medicine ($n = 69$, 74.19%) to treat AEs, and the second-highest was acupuncture treatment ($n = 19$, 20.43%). Most importantly, the participants agreed that the KM modalities are helpful for those who may have AEs after the vaccination ($n = 70$, 75.27%).

DISCUSSION

This study was the first to conduct a survey of traditional medicine doctors engaged in public health works regarding the prevention and management of AEs utilizing traditional medicine modalities before and after the COVID-19 vaccination. Ninety-seven percent of KMDs who received the vaccine complained of AEs such as muscle pain, fever, pain at the injection site, and fatigue. Moderate AEs were common, and AEs lasted more than 1 d in many cases. Fifteen percent of the participants took herbal medicines before vaccination to prevent AEs, and 57.78% took herbal medicines for post-vaccination management. More than 60% of the PHDKMs stated that they would recommend taking herbal medicines to manage AEs before vaccination and considered that KM treatments for vaccine AEs were

Table 2 Adverse events from coronavirus disease 2019 vaccination

No.	Question	Frequency (n = 93)	Percent (%)
1	What type of COVID-19 vaccine have you been vaccinated?		
	AstraZeneca	92	98.92
	Pfizer	1	1.08
	Moderna	0	0
	Janssen	0	0
	Novavax	0	0
	Others	0	0
2	Have you experienced any side effects?		
	Yes	90	96.77
	No	3	3.23
3	If yes in 2 above, what kind of side effect have you experienced since vaccination? (multiple answers allowed)	Frequency (n = 90)	
	Fatigue	61	67.78
	Muscle pain	75	83.33
	Fever	67	74.44
	Headache	45	50.00
	Pain at the injection site	65	72.22
	Joint pain	27	30.00
	Nausea	12	13.33
	Diarrhea	8	8.89
	Others	18	20.00
4	What was the severity of the side effects experienced after vaccination? (use of numerical rating scale)	Frequency (n = 90)	
	None (0)	0	0.00
	Mild (1 to 3)	21	23.33
	Moderate (4 to 6)	40	44.44
	Severe (7 to 10)	29	32.22
5	How many hours did it take for side effects to occur after vaccination?	Frequency (n = 90)	
	1 to 12	70	77.78
	13 to 24	20	22.22
6	How many hours did it take for the side effects to disappear after the vaccination?	Frequency (n = 90)	
	1 to 24	26	28.89
	25 to 48	48	53.33
	49 to 72 h	14	15.56
	More than 72 h	2	2.22
7	Has your work been disrupted after an adverse vaccine reaction?	Frequency (n = 90)	
	(Mild) treatment is not required; have no problem performing activities of daily living	45	50.00
	(Moderate) treatment may be required; have slight problems performing activities of daily living	39	43.33
	(Severe) high-level treatment is required due to severe side effects as the aftereffects remain	6	6.67

COVID-19: Coronavirus disease 2019.

helpful in public health.

Table 3 Managing coronavirus disease 2019 adverse events

No.	Question	Frequency (n = 93)	Percent (%)
1	Was medication taken to prevent adverse reactions prior to vaccination?		
	None taken	58	62.37
	Herbal medicine	14	15.05
	Western medicine	13	13.98
	Both	8	8.60
2	How did you treat side effects after vaccination? (multiple choices are available)	Frequency (n = 90)	
	No response	23	25.56
	Herbal medicine	52	57.78
	Western medicine	38	42.22
3	If you have taken medication after vaccination, how long have you been taking the medication? (regardless of the type)	Frequency (n = 90)	
	None taken	24	26.67
	1 to 2 d	57	63.33
	More than 2 d	9	10.00
4	Did you use any Korean medicine modalities other than herbal medicine to treat side effects after vaccination?	Frequency (n = 90)	
	Yes	3	3.33
	No	87	96.67
5	If yes in 5 above, which treatment other than herbal medicine did you receive for the COVID-19 side effects? (multiple answers allowed)	Frequency (n = 3)	
	Acupuncture treatment	3	100.00
	Moxibustion treatment	0	0.00
	Cupping therapy	0	0.00
	Pharmacopuncture	0	0.00
	Chuna manual therapy	0	0.00
	Others	0	0.00

COVID-19: Coronavirus disease 2019.

COVID-19 and traditional medicine

As the pandemic lasted nearly 3 years, COVID-19 has had a tremendous impact on each country's economy and medical status and travel, trade, and restrictions on daily activities. For this reason, policy-makers are seeking to return to pre-pandemic status *via* vaccination; however, a worldwide vaccine shortage has been the issue for all. Up to date, 24.3% of the world population have received at least one dose of a COVID-19 vaccine, and 3.22 billion doses have been administered globally. With regard to the Republic of Korea, 15 million people received their first vaccination, and 5.3 million were finished until June[24]. So far, six vaccines have been approved by the World Health Organization, and four vaccines are being used in Korea. Nucleic acid vaccine of COVID-19, mRNA-1273, was developed by Moderna and the National Institute of Allergy and Infectious Diseases and entered human trial on March 16, 2020. mRNA-1273 received emergency use approval from the United States Food and Drug Administration[25,26]. Another nucleic acid vaccine, BNT162b2, was developed by Pfizer and BioNTech and a phase III trial has been completed[27]. Non-replicating viral vector vaccines also get approval[26]. The Oxford Jenner Institute and AstraZeneca developed ChAdOx1 nCoV-19 Vaccine (AZD1222) using non-replicating chimpanzee adenovirus containing severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) surface spike[28]. Janssen Pharmaceutical's vaccine, Ad26, is a single-dose vaccine that shows a safety profile in phase I study and a phase III trial is being conducted[29].

Common AEs of COVID-19 vaccines include fever, fatigue, headache, coldness, nausea, diarrhea, and muscle pain. Severe and rare AEs include anaphylaxis, thrombosis with thrombocytopenia syndrome, myocarditis, and pericarditis[8,10]. Anxiety-related symptoms, including syncope, were also reported after vaccination[30]. According to an online survey conducted in Poland, 78% (1253) of vaccinated

Table 4 Recommendation of using Korean medicine for potential coronavirus disease 2019 adverse events

No.	Question	Frequency (n = 93)	Percent (%)
1	Do you recommend taking herbal medicine in advance to prevent side effects from the COVID-19 vaccination?		
	Highly recommend	24	25.81
	Recommend	33	35.48
	Neutral	29	31.18
	Not recommend	7	7.53
	Not recommend at all	0	0
2	If you are recommending for the prevention of side effects from the COVID-19 vaccination, which herbal medicine do you recommend? (multiple answers allowed)		
	Not recommend	15	26.32
	Recommend with specific herbal medicine	19	33.33
	No response	35	61.40
3	Would you recommend Korean medicine treatment for potential side effects from the COVID-19 vaccination?		
	Highly recommend	20	22.22
	Recommend	35	38.89
	Neutral	31	34.44
	Not recommend	3	3.33
	Not recommend at all	1	1.11
	No response	3	3.33
4	If it is helpful, which treatment do you recommend among Korean medicine treatments? (multiple answers allowed)		
	Herbal medicine treatment	69	74.19
	Acupuncture treatment	19	20.43
	Moxibustion treatment	7	7.53
	Cupping therapy	4	4.30
	Pharmacopuncture	2	2.15
	Chuna manual therapy	4	4.30
5	Do you think Korean medicine treatment is helpful for the people in the case of adverse reactions to the COVID-19 vaccine?		
	Strongly Agree	27	29.03
	Agree	43	46.24
	Neutral	20	21.51
	Disagree	3	3.23
	Strongly Disagree	0	0.00

COVID-19: Coronavirus disease 2019.

respondents reported soreness at injection sites, 46.6% (746) limb pain, 30% (490) fatigue, and 24.5% (392) injection site swelling[31]. Vaccine refusal due to AEs is a long-known threat to infectious disease management in the field of public health. In the United States, myocarditis has been reported after vaccination of COVID-19 mRNA vaccine to healthy soldiers, and anaphylaxis has also been observed after Pfizer-BioNTech COVID-19 vaccine inoculation[32]. However, the number of 11.1 cases per million doses is small[30]. It is well known that the misinformation and fear of AEs negatively affect the rate of accepting vaccination[33]. Recently, countries such as Romania have also struggled to increase coverage because of COVID-19 vaccine rejection due to an outdated trend of vaccine rejection[34]. Thus, developing public health strategies to prevent and manage vaccine AEs effectively is essential to increase COVID-19 vaccination rates and return to the pre-COVID era. Through this study, it was

possible to explore the awareness and attitude of KMDs working in public health in managing AEs of vaccination utilizing KM. Most of the participants in this study reported the AEs of COVID-19 vaccination. It is vital to note that the response rate of recommending herbal medicine treatment for effective management of vaccine AEs was high.

Sanghanron (Shang Han Lun, Treatise on Cold Damage and Miscellaneous Diseases), the oldest traditional Chinese medicine book, is a book to treat infectious diseases (refer to Sanghanron), and until recently, traditional medicine has been used to treat various infectious diseases in East Asia[35]. Various experimental studies and clinical studies have been conducted to elucidate the mechanism of herbal medicines in the treatment of COVID-19, and the results of the studies are being actively used in the treatment of COVID-19 in China[20]. Studies on herbal medicines to prevent AEs of vaccines or enhance vaccines' effectiveness are also being reported in East Asia. In this study, no side effects were reported after taking herbal medicine. One of herbal medicine's most known side effects is drug-induced liver damage. However, the risk of drug-induced liver damage from herbal medicines prescribed by professionals like KM doctors is around 1%, and most recover when they stop taking them[36-40]. From this point of view, this study is meaningful in that it confirmed the consensus on the AEs experienced during the vaccination process and management experience with herbal medicines through an online survey among the PHDKMs. The participants were highly inclined to recommend KM treatments to the general public. In addition to the existing experimental and clinical evidence of the effects of herbal medicines on vaccine AEs, it was confirmed through the experiences and opinions of experts that herbal medicines can be used to manage AEs of vaccines. Hence, these data can be used as fundamental research data on the role of KM in establishing a strategy to increase the vaccination rate by reducing vaccine rejection. However, there is no consensus on the types of recommended herbal medicines; therefore, additional research is much needed. Further research is also needed to explore how many clinical effects herbal medications have been used in the management of AEs and how they affect immune formation when combined with vaccines.

Limitation, recommendation, and future perspective

This study has several strengths. First, to our knowledge, this study is the first to report the use of KM treatment after vaccination in Korea. Second, previous studies reported that AEs were severe in people in the 20s and 30s rather than in older people[4]. This study's data perhaps could be used in a homogeneous population with relatively severe AEs. Third, this study was conducted on KMDs working on public health; it has the advantage of obtaining fairly accurate data compared to other groups because of a high understanding of the types of AEs. There are also some limitations to this study. First, this research was based on self-reported AEs, which would have been biased and may not represent all KMDs. In addition, a bias may exist that gives more favorable answers to KM due to the fact that the participants were KMDs. Nonetheless, raw data itself is meaningful because it is the significant data that shows the public health workers' awareness of KM interventions. Since this survey was conducted after vaccination, the reported AEs could be overestimated or underestimated. Third, participants were recruited by the APKOM, further studies are needed to reflect the attitude of all KMDs. Lastly, when this survey was conducted on April 2021, there was no distinction between vaccination according to age according to national guidelines, and KMDs who were in their 20s were vaccinated with AZ vaccine. However, in May 2021, the same KMDs received the Pfizer-centered vaccinations due to a change in the guidelines. Finally, the study period was short (11 d), the number of people who responded to the questionnaire was less than 100, and the study design itself had intrinsic limitations in which no control group was established. Nevertheless, this study has the strength of being the first exploratory survey that can confirm the attitudes of using KM interventions after vaccination from KMDs.

Also, in this study, there was no statistically significant difference in the incidence of AEs between the group taking herbal medicine and the group taking Western medicine (14 herbal and 13 western medicine) before vaccination to prevent AEs. However, this study is not quantitatively or clinically confirming the difference in AEs after administration, but a questionnaire about the attitudes toward vaccines of traditional medicine practitioners in public health. Because the number of samples is small to verify the difference in the occurrence of AEs after administration, and the power is low accordingly, it is not possible to make a definitive conclusion about the occurrence of AEs after administration as a result of this study. In this regard, further studies are needed to figure out the clinical outcomes of usage of KM treatment for the post-vaccination AE management. From a clinical perspective, PHKMDs recommend herbal medicine and acupuncture for the AEs of vaccination management. In order to increase the vaccination rate when a new infectious disease is prevalent, herbal medicine or acupuncture should be actively used to manage the side effects of vaccination. In terms of clinical research, prospective, controlled, and multi-site clinical studies are needed to explore which kind of herbal prescription is effective for each side effect.

CONCLUSION

Our research demonstrates a high prevalence of herbal medicine and acupuncture treatment usage by the PHDKMs. PHDKMs are also highly intended to use herbal medicine and acupuncture to prevent and manage the side effects of vaccination. Hence, this study's results may serve as fundamental evidence for health professionals to consider using KM treatments when treating or preventing AEs from vaccinating the pandemic of new infectious diseases in the near future. We need prospective, controlled, multi-site clinical research to explore the value of herbal medicine in management of the adverse effects of vaccination.

ARTICLE HIGHLIGHTS

Research background

This study aimed to perform a questionnaire survey about the prevention and management of adverse events (AEs) of coronavirus disease 2019 (COVID-19) vaccination among public health doctors of Korean Medicine (PHDKMs).

Research motivation

The study results will be used as a basis for Korean medicine doctors (KMDs) to understand how the AEs of vaccines could be managed; in addition, the results of the PHDKMs' attitudes could be utilized as fundamental data for managing AEs of future vaccines in complementary and alternative medicine.

Research objectives

We developed an online questionnaire of AEs of vaccination and perception of using Korean medicine (KM) in managing AEs of vaccination among PHDKMs.

Research methods

The survey web-link was emailed to the association of PHDKMs. Online links were sent through Survey Monkey to all PHDKMs.

Research results

A total of 143 participants were recruited for this study.

Research conclusions

Our research demonstrates a high prevalence of herbal medicine and acupuncture treatment usage by the PHDKMs. PHDKMs are also highly intended to use herbal medicine and acupuncture to prevent and manage the side effects of vaccination. Hence, this study's results may serve as fundamental evidence for health professionals to consider using KM treatments when treating or preventing AEs from vaccination for control of the pandemic of another infectious disease in the near future.

Research perspectives

From a clinical perspective, PHDKMs recommend herbal medicine and acupuncture for management of the AEs of vaccination. In order to increase the vaccination rate when a new infectious disease is prevalent, herbal medicine or acupuncture should be actively used to manage the side effects of vaccination. In terms of clinical research, prospective, controlled, and multi-site clinical studies are needed to explore what kind of herbal prescription is effective for each side effect.

FOOTNOTES

Author contributions: Kang B and Leem J conceptualized the manuscript and contributed to data curation; Chu H and Kang B contributed to methodology and original drafting of the manuscript; Youn B reviewed the writing and contributed to manuscript drafting; all authors read and approved the final version of the manuscript.

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Conflict-of-interest statement: All the authors report no relevant conflicts of interest for this article.

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