

Investigation of The Factors Affecting the Vaccine Preferences of Pre-Hospital Emergency Healthcare Professionals

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Abstract

Background: The aim of this study was to examine the factors affecting the vaccine preferences of prehospital emergency health workers and the status of vaccine opposition.

Materials and Methods: This study was planned as a descriptive study to examine the factors affecting the vaccine preferences of prehospital emergency health care workers working in 112 emergency health services stations and command and control centers affiliated to the Ministry of Health in Aydın province between April 2022 and January 2023, their anti-vaccine status and their attitudes towards Covid-19 vaccine. The population of the study consisted of physicians, emergency medical technicians/technicians (ATT/Paramedics) and ambulance drivers (drivers) working in 112 emergency health services stations and command control centers affiliated to the Ministry of Health in Aydın province (N: 577).

Results: The population of the study was 577 people. 89.7% (n:427) people participated in our study. 51.5% (n:220) of the participants were female. 48.9% (n:209) were found to have Covid-19 infection. 95.8% (n:427) of the participants were vaccinated. Among the vaccinated participants, 70.4% (n:288) received Biontech, 70.4% (n:288) received Sinovac and 5.1% (n:21) received Turkovac vaccine types. When the scores of the attitudes towards Covid-19 vaccine scale and its dimensions were compared according to the descriptive characteristics of the participants, it was found that the positive attitude dimension scores of male participants (3.81) were higher than those of female participants (3.51). It was determined that the positive attitude dimension scores of the participants with chronic diseases and the participants who were vaccinated, and the positive attitude dimension scores of the participants whose vaccine type was Biontech, Sinovac and Turkovac were higher than those of the participants who were not vaccinated. It was determined that the positive attitude dimension and attitudes towards Covid-19 vaccine scale scores of the participants whose vaccine dose was three doses and more were higher than the participants whose vaccine dose was one dose and two doses, and the positive attitude dimension and attitudes towards Covid-19 vaccine scale scores of the participants who had a death due to Covid-19 infection in the family or close environment were higher than those of the participants who did not. According to the findings of our study, the view that there is no vaccine protection in those with chronic diseases has a higher score. Participants who did not have Covid-19 infection, who were not vaccinated, and who had no death loss in their close environment had higher scores on the anti-vaccination scale.

Conclusion: In this study, which examined the hesitancy of prehospital emergency healthcare workers about Covid-19 vaccination, it was found that Covid-19 vaccines were administered at a very high rate. However, it was also found that 4.2% of the employees had high hesitation about vaccines and were not vaccinated. Pre-hospital emergency healthcare workers have an important role and responsibility in the acceptance of Covid-19 vaccine by the public and other healthcare professionals, as in other disaster situations. In a pandemic, vaccination of all members of the society is necessary for the control of the pandemic. For this reason, scientific studies should be conducted for emergency healthcare workers who are not vaccinated and who are hesitant about vaccines, including basic concerns about vaccines and examining potential side effects of vaccines. Training programs should be organized to ensure that healthcare workers are vaccinated with existing Covid-19 vaccines.

Introduction

Emergency health systems are a system that includes health services that respond quickly and effectively to unexpected health situations. In this system, emergency medical interventions are carried out according to the urgency of the patient's health condition. The main characteristics of emergency health systems include speed, accessibility, coordination and quality. Speed emphasizes that time is of critical importance in the system, and it is aimed to reach the scene and the patient as soon as the emergency

call is received. Accessibility means that emergency health services should be easily accessible to everyone, emergency health services should be readily available, appropriate vehicles and equipment should be available and all segments of society should be served equally. Coordination states that emergency health services should be coordinated between various health services and emergency responders, which means that appropriate structures should be established and utilized for the planning, management, evaluation and improvement of emergency medical interventions. Finally, quality means that emergency health services are effective, safe and meet the satisfaction of the parties at a high level

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(1). Pre-hospital emergency health systems in our country first started to provide services in 1995 and have been serving throughout the country since then. 112 Emergency Healthcare services have shown significant developments in recent years and are now provided by well-equipped and trained healthcare teams serving full-time (2). Compared to other sectors, healthcare workers are exposed to many risks due to their work. Among the occupational groups in the health sector, pre-hospital emergency health workers are in the most dangerous risk group. These professionals face many biological, ergonomic, physical and environmental risks. When prehospital healthcare workers do not take precautions against the problems that may be caused by biological agents, the risk that may arise is the danger of infection and the most effective method against these dangers is vaccines (3). Vaccines are an important tool used to protect the human body against infections (4). In 2009, many emergency workers encountered the Covid-19 infective agent, which was declared as a pandemic all over the world. The declaration of Covid-19 disease as a pandemic reemphasized the importance of vaccines (5). Having information about the benefits and side effects of vaccines before deciding to be vaccinated increases confidence in the vaccine. Vaccine hesitancy may occur due to misinformation, beliefs, rumors or anti-vaccine propaganda about the safety and efficacy of vaccines. This can pose a serious risk to public health. Because of vaccine hesitancy, these people may refuse to vaccinate themselves and their children, which can lead to the re-emergence of serious infectious diseases. Vaccine hesitancy can affect the success of vaccination programs and make it difficult to control infectious diseases (6). Another concept that causes disruption in vaccination programs is anti-vaccination. Vaccine opposition is a term that refers to people's resistance to vaccines. Opponents are concerned about the potential side effects of vaccines and have doubts about the necessity and effectiveness of vaccines. Some believe that vaccination can adversely affect children's development, while others are generally skeptical about the benefits of vaccines. Anti-vaccination sentiment has become a major public health issue in certain communities and localities, and when vaccination rates are low, it can lead to outbreaks of infectious diseases in the community. Anti-vaccination movements have been strengthened by factors such as information pollution and social media and have become widespread in many countries around the world (7). Vaccine ambivalence and opposition among Emergency Health Services workers in Turkey has gained importance with the pandemic process. Pre-hospital healthcare workers are in direct contact with patients during emergency interventions and the risk of infection transmission in this area is quite high. Therefore, in the prevention and control of the risk of infection transmission, the acceptance of vaccines by employees is also an important issue in terms of public health (8). It has been published that some healthcare workers have

the idea of anti-vaccination (9). This situation is worrying for healthcare workers to fulfill their professional obligations and may have an effect that may lead to anti-vaccination in the society (10). It has also been reported that the anti-vaccine attitudes of healthcare professionals may occur when they do not have accurate information about the safety and efficacy of vaccines, may be concerned about fulfilling their professional obligations, and have concerns about the long-term effects of vaccines (11). It has been reported that the anti-vaccine attitudes of healthcare workers make it difficult for vaccines to be accepted in the society and cause the spread of epidemics in the society (12). Therefore, it is extremely important to raise awareness and provide accurate information about anti-vaccination attitudes among healthcare workers. Prehospital emergency healthcare workers are responsible for providing fast and effective healthcare services in emergencies, and their health status is important for both themselves and the community. Taking the necessary precautions to protect workers from infection is a vital issue. Although "vaccination" seems to be the most important key in infection prevention, it is also very important to conduct research examining the attitudes and thoughts of employees towards vaccination, vaccine ambivalence and opposition (13). Based on this idea, this study was conducted to examine the factors affecting the vaccine preferences of pre-hospital emergency health workers and the status of vaccine opposition.

Materials and Methods

1. Type of Research: Our research was planned in descriptive design.
2. Place and Time of the Study: This study was conducted between April 2022 and January 2023 among pre-hospital emergency health personnel working at emergency health services stations and command and control centers within the borders of Aydın province within the Ministry of Health.
3. Population and Sample of the Study: Our study consisted of physicians, emergency medical technicians (paramedics), emergency medical technicians (EMTs), and ambulance drivers (drivers) working in 112 A.S.H.İ. and K.K.M. affiliated to the Ministry of Health in Aydın region (n:577). The sample size of the known population was found to be 231. No sample selection method was used and it was aimed to reach the whole population.

Selection and Inclusion Criteria of the Health Workers Participating in the Study. In this study, the employees working in 112 A.S.H.İ. and K.K.M. (command and control center) affiliated to the Ministry of Health in Aydın province were evaluated and the participants who accepted the research were included in the study on a voluntary basis. Exclusion Criteria for the Health Workers Participating in the Study. Employees who did not want to participate in

the study, or who were on maternity leave or unpaid annual leave were not included in the evaluation. Criteria for the Exclusion or Disqualification of the Healthcare Workers Participating in the Study. The purpose of the study was explained to those who participated in the study, and the Informed Consent Form was presented to them, stating that participation in the study was voluntary and that they could decide to withdraw at any part of the study. The e-mail address and telephone number of the principal investigator were given and it was stated that they could call to withdraw from the study at any time. The reason for this was written on the diagnostic form and stated in the study. Participants who encountered problems in a certain part of the study such as the questionnaire were excluded from our study

7. Data Collection Methods and Materials Used: Sociodemographic Data Form, Opposition to Vaccination Scale, Attitudes Towards Covid-19 Vaccine Scale were used to collect the data. The sample selection method was not used and it was aimed to reach the whole population. Data were collected by transmitting online survey forms to social media groups. The questionnaire form was sent to the employees via google survey form and they were asked to fill out the form. The information obtained was recorded electronically.
 - 7.1. Sociodemographic Data Form: The form, which was prepared as a result of literature research, consists of 12 (twelve) questions including socio-demographic characteristics such as age, gender, and educational status.
 - 7.2. Vaccine Opposition Scale: Kılınçarslan et al. developed this scale in 2020. Reliability and validity studies were conducted. This scale has a short and long form. This scale has 4 subscales. These are; Solutions for not getting vaccinated dimension, Vaccine opposition dimension, Vaccine benefit and protective value dimension and Legitimization of vaccine hesitancy dimension. The long form of the scale was used in our study. The long form of the scale has 4 sub-dimensions. It consists of 21 items and a 5-point Likert-type scoring system (1. Strongly disagree and Strongly agree). The items of the vaccine benefit and protective value subscale are reverse scored. The scale has no calculated cut-off value. The higher the score, the more vaccine opposition-anxiety increases (Kılınçarslan et al. 2020). Permission to use the scale: 09.04.2022
 - 7.3. Attitudes Towards Covid-19 Vaccine Scale: The 5-point Likert scale was developed by Geniş et al. in 2020 in Turkey. The scale has two sub-dimensions. The scale, which has positive attitude and negative attitude dimensions, consists of 9 questions. High scores from the positive attitude sub-dimension indicate that the attitude towards Covid-19 vaccine is positive. In negative attitude, the items are reversed and then calculated. A high score indicates that negative attitudes towards Covid-19 vaccine are lower (Geniş et al. 2020). Permission to use the scale. 08.04.2022

Data Collection Process: Data were collected by sharing online questionnaire forms on social media groups. The questionnaire form sent to the participants included a voluntary consent form that provided information about the purpose and scope of the data collection tool. The employees who agreed to complete the questionnaire answered the questionnaire questions after selecting the option "I agree to participate in the study" before answering the questionnaire questions. As a result, consent was obtained from the participants online. Doctors, emergency medical technicians and emergency medical technicians who participated in the study participated in the study by answering the questions in the digital environment. The data collection form was entered only once and the application was provided by taking the necessary precautions to be answered. The study was determined as 8-10 minutes maximum for the participants.

Data Evaluation and Statistical Analysis: In our study, SPSS (Statistical Package for Social Sciences) for Windows 25.0 program was used for statistical analysis. Descriptive statistical methods (number, percentage, min-max values, mean, standard deviation) were used to evaluate the data. The data used in the questionnaire were tested for conformity to normal distribution. Compliance with the normal distribution can be examined with Q-Q plot drawing (Chan, 2003:280-285). In order for the data used in this method to show normal distribution, skewness and kurtosis values should be between ± 3 . When comparing normally distributed quantitative data, t-test was used to find the difference between two independent groups, and one-way analysis of variance was used for comparisons of more than two groups. In cases where a difference was detected, Bonferroni was used to identify the group that made a difference. Pearson correlation was used to determine the relationship between numerical variables. Multiple regression analysis was used to determine the effect of independent variables on the dependent variable. **Ethical Disclosures:** Our study was conducted in accordance with the principles of the Declaration of Helsinki. Before starting the study, an application was made to Ege University Medical Research Ethics Committee and permission was obtained (decision dated 10.06.2022). Then, permission was obtained from the Ethics Committee of Aydın Provincial Health Directorate (decision dated 06.07.2022). For the scales to be used in our study (permission to use the anti-vaccine scale: 09.04.2022, permission to use the attitudes towards Covid-19 vaccine scale: 08.04.2022), permission was obtained from the scale owners. Informed consent was obtained from all participants before data collection. The study was initiated in line with the permissions obtained.

Results

The population of the study was 577 people. 89.7% (n:427) people participated in our study. 51.5% (n:220) of the participants were female. 48.9% (n:209) were found to

have Covid-19 infection. 95.8% (n:427) of the participants were vaccinated. Among the vaccinated participants, 70.4% (n:288) received Biontech, 70.4% (n:288) received Sinovac and 5.1% (n:21) received Turkovac vaccine types. When the scores of the attitudes towards Covid-19 vaccine scale and its dimensions were compared according to the descriptive characteristics of the participants, it was found that the positive attitude dimension scores of male participants (3.81) were higher than those of female participants (3.51). It was determined that the positive attitude dimension scores of the participants with chronic diseases and the participants who were vaccinated, and the positive attitude dimension scores of the participants whose vaccine type was Biontech, Sinovac and Turkovac were higher than those of the participants who were not vaccinated. It was determined that the positive attitude dimension and attitudes towards Covid-19 vaccine scale scores of the participants whose vaccine dose was three doses and more were higher than the participants whose vaccine dose was one dose and two doses, and the positive attitude dimension and attitudes towards Covid-19 vaccine scale scores of the participants who had a death due to Covid-19 infection in the family or close environment were higher than those of the participants who did not. According to the findings of our study, the view that there is no vaccine protection in those with chronic diseases has a higher score. Participants who did not have Covid-19 infection, who were not vaccinated, and who had no death loss in their close environment had higher scores on the anti-vaccination scale.

Discussion

According to the data obtained from the participants, the dimension of positive and negative attitude towards Covid-19 vaccine, anti-vaccination and vaccine ambivalence were questioned. The reasons for this and the behaviors chosen by the participants as a result are discussed in the findings section of this study. In our study, it was observed that female participants experienced more ambivalence about vaccination than male participants. In the study conducted by Yıldız and Gencer, it was determined that women had insecure feelings towards the Covid-19 vaccines developed and therefore did not exhibit positive attitudes towards the vaccine (14). In the study conducted by Salmon et al. in 2021, it was determined that the rate of men who never thought of getting the vaccine was lower than the rate of women. In the study by Salali and Uysal (2020) in Turkey, it was determined that the likelihood of accepting the Covid-19 vaccine was higher in men than in women. Covid-19 pandemic poses a great risk for those with chronic diseases such as diabetes, obesity, hypertension, etc. Strizova et al. 2021 reported that in the study conducted by Bish et al. in Italy, it was stated that more than half of the healthcare workers have a chronic disease that is important in their family or close environment

and this situation positively affects their willingness to be vaccinated. Since existing chronic diseases may contribute to comorbidity, there are studies showing that attitudes towards vaccines produced against the Covid-19 outbreak are affected

(15). In our study, it was determined that healthcare workers with chronic diseases had positive attitudes towards Covid-19 vaccines. In our study, it was found that the positive attitude dimension and attitudes towards Covid-19 vaccine of the participants who were vaccinated were higher than the employees who were not vaccinated. A similar result was found in a study conducted by Başkaya and Kaya (16). The level of positive attitude towards the vaccine was found to be higher in those who had Covid-19 vaccine and were willing to get Covid-19 vaccine. This result of our study is similar to the results of other studies in the literature (17); Durduran et al. 2022). It is seen that the negative attitude dimension scores of the participants who were vaccinated were lower than the participants who were not vaccinated. Among the participants who received the Biontech, Sinovac and Turkovac vaccines, positive attitude scales were higher than those who did not receive the vaccine. However, their confidence in the protection of the vaccine is also evident, especially in the Biontech vaccine. In the study conducted by Civelek et al. (2021), it was determined that offering options for vaccines to people in Covid-19 vaccination studies positively affected the thoughts about vaccination. Therefore, providing vaccine diversity can be shown as one of the positive methods to get better results in vaccination studies. In Çakal's study conducted with the critical discourse analysis method, more positive expressions and attitudes towards the Biontech vaccine were found against the Türkovac vaccine. People clearly expressed their opinions on vaccines with clear statements such as "I do not want to be vaccinated with Türkovac" and "I prefer the German vaccine". This study shows that social media networks, which are widely used, can have great effects among individuals (18). Among the health workers who participated in the study, the positive attitude dimension scores of those who experienced death due to Covid-19 in the family and close environment are seen at higher levels. This finding seems to be related to the survival orientation of people when they encounter or witness a disaster, instinctively showing the behavior of turning towards disaster-preventive measures (19). A similar protective reflex regarding the protection of the vaccine shows that it developed for the participants who saw the Covid-19 destruction closely. The increase in the positive perspective on the Covid-19 vaccine at this point with the literature of this study is consistent with the similarity of the reaction of the participants who saw the disaster closely (seeing the disease through relatives or witnessing the death) (20). This harmony shows that the approach to vaccination can be shaped by psychological conditions. According to

the findings of our study, the view that there is no vaccine protection in patients with chronic diseases has a higher score. In the study conducted by Durduran et al., vaccine hesitancy and refusal of people who did not have a chronic disease were found to be statistically significantly higher than those with a chronic disease (21). Many studies show that having a chronic disease increases vaccine acceptance (22). It is seen that participants who did not have Covid-19 disease were hesitant about getting vaccinated and looked for solutions not to get vaccinated. Anti-vaccination effects are seen in almost all infectious diseases. In the study conducted by Düzel and Doğan (2022), mothers with children stated that they had their childhood vaccinations without interruption and that some of them also received the flu vaccine, and explained that they did not have an attitude that rejected vaccines other than Covid-19 vaccines. In their publication, Erkekoğlu et al. (2020) wrote that misinformation sources cause vaccine hesitation. Untrue news about the Covid-19 virus is spread through social media tools. In order for people to distinguish inaccurate information from false information, they need to have information on the subject, even at the maximum level. While updating their information status, individuals may consume news that is likely to be false, and this news may cause people to experience anxiety and fear (23). This may lead people to seek alternative solutions instead of vaccination. In our study, it was found that participants who were not vaccinated had higher scores on the vaccine benefit and protective value dimension and the anti-vaccination scale than those who were vaccinated. Among the participants, those who had positive attitudes towards vaccination were more likely to be anti-vaccine, vaccine hesitant and in search of solutions to avoid vaccination. Among the participants with negative attitudes, it is seen that they have more negative thoughts than the participants who are anti-vaccine and vaccine hesitant. Thoughts that vaccines are not safe and side effects are the most common reasons for refusal and hesitation about Covid-19 vaccines (24). In our study, it was observed that participants who did not receive Biontech, Sinovac and Türkovac vaccines had higher scores in the dimension of solutions for not being vaccinated, the dimension of legitimization of vaccine hesitancy and the scale of anti-vaccination than the participants who received Biontech, Sinovac and Türkovac vaccines. Therefore, it is very important to build trust in vaccines. Due to the high mortality and infection rate, individuals have naturally experienced anxiety and fear about Covid-19 disease (25). In our study, it was determined that participants who did not have Covid-19 disease in their family or circle of friends and who did not have any loss due to Covid-19 infection in their family or friends were in search of solutions not to be vaccinated. As in all infective epidemics, healthcare workers worked selflessly in the Covid-19 pandemic and were the most affected professional group. In the study conducted by Karaman et al. (26,27), it was reported that 85.4% of

intern nurses experienced fear during the pandemic and 83.3% did not want to have Covid-19 vaccines. Considering that the impact of Covid-19 is striking all over the world; we think that pre-hospital emergency healthcare workers are positively affected by the experience of an increase in the number of cases, hospitalizations and deaths, seeing this disease as more important and severe, and their vaccine preferences are positively affected. According to the findings of our study, the rate of healthcare workers willing to vaccinate is higher than the rate of healthcare workers who are against vaccination. The findings show that the participants in our study have a higher perception of Covid-19 risk, concerns about Covid-19 vaccine safety, and preference for Covid-19 vaccine alternatives. It also showed that participants scored lower on the perceived benefits of the Covid-19 vaccine, suggesting that social factors such as family and friends also have an impact on the intention to receive the Covid-19 vaccine. Pre-hospital workers are the groups closest to contracting and transmitting diseases. Therefore, they have to know pre-transmission protection methods. However, given that there is still no certainty about the benefits and side effects of Covid-19 vaccine over time, other Covid-19 prevention methods may have been preferred instead of vaccination.

The low intention of prehospital healthcare workers to receive Covid-19 vaccine over time shows the need for education and provision of valid scientific information about Covid-19 disease, the effects and possible side effects of the vaccine, such as “concerns about Covid-19 vaccine safety and hesitation” and “preference for Covid-19 vaccine alternatives” in our study. Vaccines are one of the most effective inventions in the fight against infectious diseases in the world. In addition to direct immunity and disease prevention in vaccinated individuals, it has been shown to protect unvaccinated individuals with herd immunity when the majority of the population is immune. The Emergency Health Services team has a special importance before the hospital. They are the medical units that first intervene in life-threatening cases at the scene, apply basic and advanced life support, and ensure the safe transportation of patients. In addition to the first intervention, Emergency Health Services also includes the people who are the first contact for the emergency service needs of the society. In Turkey, the vaccine preferences and attitudes of employees on the road from 112 Emergency Call Center employees to the hospital are considered important. According to the results of our study, emergency healthcare workers have a positive attitude towards vaccines. Personal perception of influenza risk, misconceptions about the contagiousness and severity of the disease, and concerns about safety and efficacy are often the reasons for not getting vaccinated. In the study on influenza vaccination and the need for vaccination, the most common reasons for refusing vaccination were the belief that vaccination was not necessary and the search for alternative

Table 1: Distribution of employees according to their descriptive characteristics

Variables		n	%
Age (±SS, 33.59±7.98) 18.0	24 years and younger	47	11.0
	25-29	100	23.5
	30-34	77	18.0
	35-39	114	26.7
	40 years and over	89	20.8
Gender	Female	220	51.5
	Male	207	48.5
Marital status	Married	235	55.0
	Single	192	45.0
Education Status	High school and below	48	11.2
	University	350	82.0
	Graduate	29	6.8
Occupation	Doctor	13	3.0
	Paramedic/A.T.T.	373	87.4
	Driver	41	9.6
Presence of chronic disease	Yes	76	17.8
	No	351	82.2
Covid-19 infection status	Yes	209	48.9
	No	218	51.1
Vaccination status	Yes	409	95.8
	No	18	4.2
Total		427	100.0
Type of vaccine received	Biontech		
		Yes	288
	No	121	29.6
	Sinovac		
	Yes	288	70.4
	No	121	29.6
	Turkovac		
	Yes	21	5.1
	No	388	94.9
Completeness of vaccination	One dose	12	2.9
	Two doses	129	31.6
	Three or more	268	65.5
Total		409	100.0
Family history of Covid-19 infection	Yes	320	74.9
	No	107	25.1
Death due to Covid-19 infection in the family and close environment	Yes	163	38.2
	No	264	61.8
Total		427	100.0

and safe methods. Vaccination is the most successful preventive health intervention and is important for public health. Vaccines prevent the development and spread of many diseases with direct and indirect effects. Vaccines are very reliable biological products. It should be kept in mind that the likelihood of getting the flu in people who have not been vaccinated against the flu, as well as the morbidity and mortality associated with the disease, are too high to be compared with the possible side effects of the vaccine. As in the world, the number of anti-vaccinationists is increasing day by day in our country. Healthcare professionals have

an important role in ensuring that patients who refuse vaccination are vaccinated. Doctors who do not vaccinate themselves or their children do not recommend vaccination to their patients. In order to ensure the successful operation of vaccination programs throughout the country, it is important to raise awareness among healthcare professionals and to increase the number of vaccinations by raising awareness. For this purpose, it is first necessary to identify the factors that lead to opposition to vaccination and develop strategies to change them. Pre-hospital healthcare workers played an important role in the pandemic. Most of the patients affected by the outbreak first and directly encountered prehospital emergency health workers. This group personally provided emergency care and intervention to infected patients. Therefore, prehospital workers have priority in vaccination to protect them from epidemics. Although prehospital workers are expected to prefer vaccination very often, the vaccination rate is not at the desired level. Just like in the society, it has been observed that healthcare workers hesitate to make decisions due to impure information. Vaccination ambivalence persists despite global tragedies related to inadequate immunization. Parents' concerns are many, but educational efforts cannot solve these problems. Health workers and patients need to know the value of advice about vaccination, and stronger advice in hypothetical language effectively increases vaccination rates. Hypothetical language implies that one is seeking advice from the health professional and is willing to follow it. Pre-hospital health workers are a key population in the study of vaccine safety and behavior, as their recommendations influence patient acceptance. In addition, personal vaccination behavior influences the prevention and control of infectious diseases in health care settings. In our study, some of the prehospital health workers reported vaccine hesitancy. Healthcare workers are positively influenced by close friends and colleagues who believe that vaccination against Covid-19 is important, which can support communication between units and roles to improve vaccination. Therefore, certain populations, such as non-physicians or those concerned about adverse reactions, are less likely to be vaccinated against the Covid-19 virus. Work with specific units and roles should be planned to improve this population's knowledge about vaccines against Covid-19. As healthcare workers have more scientific knowledge about how vaccines are made and produced, such as their side effects and potential risks, they are naturally more concerned than other groups of people and may therefore be hesitant to use vaccines. The public mostly obtains information about Covid-19 vaccines and the disease from healthcare professionals and the internet/social media. Therefore, it is predicted that the government organizing trainings on Covid-19 vaccine such as on-line, question-and-answer sessions for healthcare professionals will be effective in getting more successful results from the public about vaccines. Most health workers have a strong belief in the benefits and safety of vaccines and trust other health professionals. However, low confidence in vaccination

among many health workers has also been observed. The results of our study showed that health workers who perceived vaccines as less beneficial and safe were less likely to accept vaccination for themselves and their children and less willing to recommend vaccination to patients who did not want to be vaccinated. Trust in health workers appears to be directly related to their own vaccination decisions or willingness to recommend vaccination. Trust in evidence-based information about vaccines was found to be associated with the level of education of health workers, so that trust increased as education increased. This is particularly true for claims that require knowledge about specific vaccines or diseases. Further research should investigate whether vaccine adherence can be increased by increasing vaccine education or training. As lay people cite health worker trust as a key factor in health worker vaccination decisions, ensuring that health workers are vaccinated may be important to maintain high vaccine use in the population. We believe that providing trainings on the effects and possible side effects of vaccines and updating the knowledge of healthcare workers with current valid scientific information will lead to more effective and efficient results in vaccination studies.

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