Annals of Clinical and Analytical Medicine
Original Research

Post-vaccination COVID-19 positivity and clinical situation analysis in healthcare professionals

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Abstract
Aim: Healthcare workers are an occupational group that is at the forefront of a pandemic process, where morbidity and mortality are intense. Deaths due to COVID-19 among workers in our country and in the world are reported mostly in healthcare workers. In this study, we aimed to analyze the rate of contracting COVID-19 among healthcare workers after vaccination and the clinical features of the disease.
Material and Methods: Between January 14, 2021 and June 29, 2021, the diagnosis of COVID-19 in healthcare workers who had clinical complaints after a single dose and two doses of vaccination was made as a result of the evaluation of the patients' throat and nose swab samples by reverse transcriptase-polymerase chain reaction (RT-PCR). The disease table of the positive patients was grouped as home treatment and hospital treatment by accessing clinical and laboratory records from electronic medical records.
Results: At least one dose of vaccine was given to 11,540 (79.62%) of a total of 14,461 healthcare workers. COVID-19 positivity was detected in the PCR test performed on 51 single-dose vaccinated healthcare workers and 177 double-dose vaccinated healthcare workers with clinical complaints. While all patients vaccinated with a single dose were treated at home, 176 of the patients vaccinated with two doses were treated at home and 1 was treated in the hospital.
Discussion: It has been seen that if countermeasures against COVID-19 are not taken, it could be a great disaster for the whole world, that the most important defense against this pandemic is vaccination, and that those who have COVID-19 after vaccination have a mild illness even if they have the disease.

Keywords
COVID-19, Healthcare Workers, Vaccine

DOI: 10.4328/ACAM.21139 Received: 2022-03-11 Accepted: 2022-04-13 Published Online: 2022-08-03
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Introduction

Vaccines aim to prevent deaths and sequelae caused by infectious diseases. Throughout human history, it is known that deadly infectious diseases are the most frightening disasters that threaten social life. While wars and natural disasters were limited only to certain geographical regions, infectious diseases affected the whole of humanity and showed their effect to a great extent wherever people were [1,2]. The COVID-19 virus is a type of virus in the betacoronavirus (beta-coronavirus) family, which includes SARS-CoV and MERS-CoV, emerged in 2019 and quickly affected the whole world in a short time, and this became a global epidemic, that is, it has been accepted as a "pandemic" [3]. While the first measures taken against this epidemic all over the world were masks, distance, cleaning, vaccination studies against COVID-19 started due to the inadequacy of precautions and treatments to prevent the spread. As priority targets in the COVID-19 vaccination, health workers, adults over 60 years of age, with underlying diabetes or hypertension; and the vaccine produced should not cause undesirable effects on the immune system and should be suitable for stocking [4]. Due to the wide spectrum of COVID-19 infection, while the disease progresses with mild symptoms in many cases among healthcare workers, serious consequences, including deaths, have been reported [5]

Material and Methods

XXX and in the region, between January 14, 2021 and June 29, 2021, one or two doses of vaccine were administered to healthcare workers with clinical complaints (fever, headache, myalgia, malaise, sore throat, cough, shortness of breath, nausea, vomiting, diarrhea), and those who were diagnosed by taking a throat swab and studying on the RT-PCR BIORAD (Qiagen, Germany) device were included. Patients were separated from electronic medical records according to demographics (gender, age) and symptoms (home treatment and hospital treatment).

The number of samples in the data is shown as "n" and calculated as a percentage. In the statistical analysis of the data, IBM Inc; SPSS (Statistics for Windows Version 21.0, Armonk, NY, USA) package program was used.

The study was approved by the Ethics Committee of XXX University Medical Faculty, Turkey (March 18, 2021) before the study period. The research was conducted in accordance with the Declaration of Helsinki. Written informed consent was obtained from all participants, consistent with the Turkish National Research Ethics Committee resolution for research conducted during the COVID-19 pandemic.

Results

Of a total of 14,461 healthcare workers, 11,514 (79.62%) were vaccinated with at least one dose. PCR tests of 51 people who had clinical complaints 14 days after a dose of vaccine were positive. Twenty-one (41.18%) of 51 PCR-positive patients were female and 30 (58.82%) were male. Fifty-one (100%) of 51 positive patients were treated at home and regained their health. PCR tests were found to be positive in 177 of the 10,666 (73.76%) healthcare workers who completed two doses of vaccine and 14 days later had clinical complaints. One hundred (56.50%) of the 177 PCR-positive patients were female and 77 (43.50%) were male. While 176 (99.44%) of the 177 positive patients regained their health while being treated at home, 1 (0.56%) was treated in the hospital. It was determined that the patient who was treated at the hospital was treated in the COVID-19 wards and recovered without the need for intensive care. Between March 11, 2020 and June 29, 2021, a total of 3,435 (23.67%) healthcare workers were diagnosed with COVID-19. Between March 14, 2020 and January 28, 2021, 3,207 (93.36%) were found to be positive for COVID-19 before vaccination and 228 (6.63%) between January 28, 2021 and June 29, 2021 after vaccination. It is seen that positivity decreases with vaccination and there is no worsening in the clinical. In Tables 1 and 2, the vaccination status of male and female healthcare workers by age is given in detail.

Discussion

The most basic method of protection in viral epidemics is vaccination or prophylactic support of healthy individuals. Social distance and mask rules, general cleaning and hygiene rules, which are physical protection methods, should be strictly followed. However, although these practices seem to be the main practices in preventing the spread of the disease, they are the last link of the prevention control program [6]. The first ring is to determine the origin of the disease and to eliminate the factor.

Parameters such as the age of the vaccinated person, her/his previous immunity level, and the state of the immune

Table 1. Distribution of vaccinated male healthcare workers.

Age grou30	Number of people	Vaccinated	Positiveness after the 1st dose of vaccination	Positiveness after the 2nd dose of vaccination
20-24	737	556 (%75,44)	5	4
25-29	1.378	1.038 (%75,44)	7	13
30-34	1.174	895 (%76,24)	2	15
35-39	1.061	838(%78,98)	3	10
40-44	1.142	993(%86,95)	6	8
45-49	879	767 (%87,26)	1	9
50-54	646	601(%93,03)	5	6
55-59	428	401 (%93,69)	-	7
60>	301	289(%96)	1	5
Total	7.746	6378(%82,34)	30	77

Table 2. Distribution of vaccinated female health workers.

Age group	Number of people	Vaccinated	Positiveness after the 1st dose of vaccination	Positiveness after the 2nd dose of vaccination
20-24	1.077	805(%74,74)	3	10
25-29	1.659	1.144(%68,96)	4	20
30-34	1.071	769(%71,8)	6	19
35-39	924	696(%75,32)	2	20
40-44	972	828(%85,19)	2	21
45-49	544	469(%86,21)	2	5
50-54	294	261(%88,78)	1	5
55-59	127	119(%93,7)	1	-
60>	47	45 (%95,74)	-	-
Total	6.715	5.136(%76,49)	21	100

system are factors that affect the response to the vaccine [7]. Although the effectiveness of the vaccine is seen at the rate of 70-90% in a healthy individual, this rate decreases to 30-40% in people over 65 years of age. However, despite this, the incidence of influenza-like disease in people over 65 years of age decreased by 33%, and the rate of serologically proven disease by 56% [8]. Although the rate of passing the disease with symptoms is 70-80% in infected individuals, the severity of these symptoms is much stronger in those with seronegative or low titer antibodies [9,10]. It is beneficial to immunize active, working members of the society, who are not from any risk group, with the flu vaccine. Upper respiratory tract infections were found to be 25% less common among vaccinated healthy individuals, and there was a 43% decrease in absenteeism and a 44% decrease in the rate of applying to workplace physicians [11]. To prevent influenza-like diseases in healthcare workers, early detection and treatment of infection with surveillance, reduction of contact, standard and droplet isolation precautions, and necessary cleaning and disinfection in the hospital should be provided. Vaccination of healthcare workers against flu-like diseases is another preventive measure [12]. As in the whole world, the number of vaccine opponents is increasing day by day in our country. Healthcare workers play a key role in increasing the vaccination of patients who refuse vaccination [13]. Unfortunately, opposition to vaccination is also very common among healthcare workers. Physicians who do not vaccinate themselves or their children do not recommend vaccines to their patients [14]. In a study conducted by Karadağ Öncel et al. [15] in 2015 with 179 healthcare workers, it was reported that 18.4% of them were vaccinated, and the most important reasons for not being vaccinated were not having the flu (53.4%) and fear of the side-effect profile of the vaccine (24.6%). In the study by Sarı T et al. [16], of those who answered the question of whether 115 healthcare workers had influenza vaccination or not, only 5 (4.3%) were vaccinated, 110 (95.7%) were not; It was learned that 59 (51.3%) of these 110 people had never been vaccinated against influenza in their lifetime. One of the most important reasons for not wanting to be vaccinated against influenza is not believing that the vaccine is necessary (64.5%); preferring other protection methods (40.9%), fear of the side effects of vaccines (39.1%), thinking that the vaccine has not been tested enough, that natural immunity is more effective, thinking that vaccines are produced for commercial interests, and thinking that the vaccine causes cancer. In a situation that has a significant impact on anti-vaccine thoughts, it is finding information about vaccines by chance. The best example of this is information obtained from the internet. In a study investigating the relationship between trust in health-related information sources, indiscriminate information, and concerns about the safety of vaccines, ethnicity was shown to be one of the reasons affecting vaccine-related concerns [17]. Healthcare workers need more training and support to manage rapidly changing vaccinations.

It has been announced that the number of 23.000 COVID-19 positive health workers, which have been notified to the WHO (World Health Organization) worldwide by the Geneva-based International Nursing Council regarding the COVID-19 pandemic, exceeded 90 thousand in a very short time. The Council reports that the actual number may be twice as high as declared [18]. In studies involving healthcare workers in China, it has been reported that the positivity of COVID-19 was between 3.46% and 28.9% [19,20]. In the United Kingdom, COVID-19 positivity in healthcare workers was 14.5% [21]; 12.9% in the US state of Massachusetts [22], 38% in Madrid, Spain [23], in studies conducted in different regions of Italy it was 12.9%. It has been reported that between 10.6%-20.0% health workers have COVID-19 positivity [6,23]. In Turkey, it has been reported that until September 2, 2020, 29,865 healthcare workers had COVID-19 positivity, constituting 10.9% of the total cases, and 52 of them died [24]. Vaccination has been found to significantly reduce morbidity and mortality in patients with flu-like symptoms. In our study, it was determined that 3,423 (23.67%) healthcare workers had COVID-19 between March 14, 2020 and June 29, 2021, and COVID-19 positivity decreased significantly after vaccination. The organization named COVAX, which was formed by the World Health Organization with the non-governmental organizations GAVI (Global Vaccine Alliance) and CEPI (Coalition for Innovations for Epidemic Preparedness) carries out studies for the fair and effective distribution of COVID-19 vaccines around the world. If these studies go well, it is estimated that 40% of the world population will be vaccinated by the end of 2021. In our study, 11,514 (79.62%) of a total of 14,456 healthcare professionals working were vaccinated, the PCR tests were positive in 51 people who had been vaccinated 14 days after the first dose of vaccine, and 177 people had clinical complaints after two doses of vaccine. PCR test positivity was detected together with the findings. It was determined that only one of the positive patients was hospitalized, and this patient recovered without worsening of the clinical picture, and all patients were healthy. Post-vaccination COVID-19 positivity has decreased considerably compared to pre-vaccination, which has clearly shown us the protection of the vaccine.

Conclusion:

There is a need for more scientific studies on the medical conditions that may occur with vaccination and non-vaccination, and the dissemination of social studies aimed at increasing confidence. Among the measures that can be taken against anti-vaccination, which is a risk for public health, that influential people of the country, and especially health workers, take a role in vaccination campaigns and enlighten the public in the light of scientific data by using social media, technology and communication tools.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

Funding: *None*

Conflict of interest

None of the authors received any type of financial support that could be considered

potential conflict of interest regarding the manuscript or its submission.

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How to cite this article:

Ilkay Bahceci, Feray Ferda Senol. *Post-vaccination COVID-19 positivity and clinical situation analysis in healthcare professionals. Ann Clin Anal Med 2022; DOI: 10.4328/ACAM.21139*