Inactive SARS-COV-2 Vaccine Adverse Effects Among Hospital Workers

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ABSTRACT

Covid-19 is a contagious viral infection with serious complications. Since a proven treatment for such a disease with high mortality has not yet been found, vaccination studies are important for preventative measures and rapid herd immunity. In a period when the whole world urgently needed vaccines, objective scientific data about the safety of the vaccine were requested by the employees of Ufuk University Faculty of Medicine, and the adverse effects they encountered in the early period were requested. 173 participants completed the survey. When systemic and local adverse events were reported within the first seven days after the first and second vaccination, most of the side effects observed were mild. One participant developed anaphylaxis. The most common local side effect was pain in the vaccinated arm (38.2%), and the most common systemic side effect was fatigue (24.7%). No grade 4 reaction or death was observed, except for one patient who developed anaphylaxis requiring urgent medical attention. Since studies evaluating the effects and side effects of vaccines, which are of great importance in the fight against the pandemic, are necessary for public health, we share the early post-vaccine side effects of the hospital staff who first started the vaccination.

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INTRODUCTION

SARS-CoV-2, the causative agent of COVID-19, has become the third coronavirus to infect humans in the current century. The Middle East Respiratory Syndrome Coronavirus (MERS-CoV), which was diagnosed in 2012, and the Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV), which emerged in 2003, caused hundreds of life-threatening epidemics (Sağlık Bakanlığı Covid Rehberi, 2020).

Sars-Cov-2, which has spread rapidly all over the world since December 2019 and has become a serious public health problem, Covid-19 is a highly contagious viral infection with potentially serious complications. In a study involving more than 44,000 people in China; 81% were mild-moderate, 14% severe (shortness of breath, hypoxia or more than 50% lung involvement in imaging), 5% critical (respiratory failure, shock or multi-organ system dysfunction). For all cases, the mortality rate was 2.3% (Wu & McGoogan, 2020). Since a proven treatment for such a disease with high mortality has not yet been found, vaccination studies have gained importance in order to ensure rapid prevention and herd immunity. Studies on the side effects and efficacy of vaccines were done quickly. Side effects observed in the most frequently used vaccines; For the Pfizer-BioNTech COVID-19 vaccine, a local reaction was observed in 84.7% of all individuals in a placebo-controlled study in which individuals aged 18-55 and over 55 were evaluated 7 days after vaccination. Pain at the local injection site was the most common side effect with 83.1% in individuals aged 18-55 and 71.1% in individuals over 55 years of age. However, none of them were considered as grade 4 side effects. Fatigue was the most common side effect observed with a rate of 47.4% in individuals aged 18-55 years and 34.1% in individuals over 55 years of age. These side effects were not evaluated as grade 4 (CDC,2021).

In the phase 1-2 study of 320 people evaluating the inactivated COVID-19 vaccine, the most common adverse reaction was injection site pain, followed by mild and self-limiting fever, although the side effects varied depending on the dose and time between vaccination; no serious adverse reactions were reported (Shengli et al., 2020).

No serious adverse effects were encountered in clinical studies conducted to date. Adverse effects seen after vaccination were often mild (Wu, et al., 2021, Zhang, et al., 2021).

In our country, the vaccination program started with the inactivated vaccine CoronaVac, produced by a Chinese biopharmaceutical company, on January 14, 2021, with the vaccination of healthcare workers.

We aimed to evaluate the adverse effects that were reported in the early period, after seven days following the first and second dose of CoronaVac.

MATERIALS AND METHODS

After the first dose Sars-Cov-2 vaccine (CoronaVac) was administered to the staff of Ufuk University Faculty of Medicine, the adverse effects they encountered in the first seven days were questioned by face-to-face questionnaire method. After the second dose administered 28 days after the first vaccine, the same questionnaire was applied to the patients again.

The questionnaires were prepared by scanning the evidence-based literature. The questionnaire was administered by the researchers in the form of face-to-face interviews. Participation in the survey was on a voluntary basis, and the surveys were applied after the participants were informed and verbal consent was obtained.

One hundred and seventy-three personnel people over the age of 18 who agreed to participate in the survey were included in the study. PCR positive for SARS-CoV-2, pregnancy, breastfeeding, alcohol or drug use; and those with any confirmed or suspected autoimmune or immunodeficiency disease were excluded from the study. Seven days after the second dose of vaccine, the questionnaire was administered to the same staff again. One person was excluded from the study because of an anaphylactic reaction, one person was diagnosed with Covid-19 after the first dose of vaccine, and one person did not want to have the second dose of vaccine. Data from 170 people were used for comparison between the two vaccine doses.

Ethical approval was obtained from the Ufuk University Clinical Research Ethics Committee (2021-02-01).

The research data were evaluated using the SPSS 27.0 program. The descriptive statistics were presented as mean ± standard deviation, frequency distribution and percentage. McNemar test was used to compare the first and second dose The results were evaluated $p<0.05$ was accepted as significant.

RESULTS

The average age of participants was found to be 40.12 ± 12.23. 94 people (54.06%) were female, 79 people (54.06%) were male. The number of people with mild adverse effects in previous vaccination applications was 7 (4.10%) and there was no history of severe adverse effects. Among the participants, 22.7% (n:39) were physicians, 23.2% (n:40) nurses, 22.1% (n:38) caregivers ,32% (n:55) were administrative staff.

When systemic and local adverse effects seen in the first seven days after vaccination are questioned; the most common local side effect was pain in the arm in which the vaccine was administered (38.2%), the most common systemic side effect was fatigue (24.7%). While a general decrease was observed in side effects seen after the second dose of the vaccine, a significant decrease was observed in local pain, fatigue, heat and headache (p: 0.004, p <0.001, p: 0.021, p <0.001, respectively) (Table 1).

Most of the adverse effects observed after vaccination were mild. Anaphylaxis with dyspnea and syncope developed in only one person after vaccination.

Table 1. Adverse Effects After First and Second Dose Inactive Sars-Cov-2 Vaccine.

Local adverse effects	First Dose		Second Dose		p
	n	%	n	%	
Pain at the vaccination site	65	38.2	41	24.1	**0.004**
Numbness at the vaccination site	11	6.5	14	8.2	0.678
Redness at the vaccination site	3	1.8	6	3.5	0.508
Systemic adverse effects					
Fatigue	42	24.7	16	9.4	**<0.001**
Nausea or Vomiting	11	6.5	5	3.0	0.210
Throat ache	6	3.5	6	3.5	1.000
Heat	13	7.6	3	1.8	**0.021**
Tremor	5	2.9	5	2.9	1.000
Headache	35	20.6	12	7.1	**<0.001**
Dizziness	7	4.1	5	2.9	0.727
Loss of smell	0	0.0	0	0.0	NA
Loss of taste	0	0.0	0	0.0	NA
Muscle pain	21	12.4	13	7.7	0.200
Joint pain	14	8.2	7	4.1	0.143
Diarrhea	4	2.4	1	0.6	0.375
Abdominal pain	5	2.9	2	1.2	0.375
Itching	9	5.3	6	3.5	0.549
Swelling of the lips and throat	3	1.8	0	0.0	NA
Dyspnea	4	2.4	1	0.6	0.375
Tachycardia	4	2.4	2	1.2	0.625

*McNemar test was used to compare the first and second dose. Values were calculated over 170 individuals. p <0.05 means there is a significant change. NA is used to mean could not be calculated.

DISCUSSION

Main results of this study; we evaluated early adverse effects with a limited number of participants, we found local and systemic mild, transient symptoms after injection in healthcare workers. Anaphylaxis with dyspnea and syncope developed within the first half hour after vaccination was observed in only one case.

It is known that vaccines are the most effective and economical way to prevent and control infectious diseases instead of treating people (Remy et al., 2015). For this reason, preclinical and clinical studies of many Covid-19 vaccine studies are ongoing. In addition to the old known methods, many new vaccine trials are carried out with technological developments (Callaway, 2020).

According to the results of the randomized, double-blind, placebo-controlled, Phase I-II clinical study of CoronaVac in healthy adults aged 60 and over conducted in China, no serious adverse effects were observed in either phase. The most common adverse reaction was pain at the injection site followed by mild and self-limiting fever (Wu, et al., 2021). In another randomized, double-blind, placebo-controlled, phase I- II study conducted in China, including cases 18-59 years, reported that the most common symptom was pain at the injection site; four (17%) in the 3 µg group, five (21%) in the 6 µg group, and one in

placebo arm (4%). Most adverse reactions were mild and the participants resolved within 48 hours. Only one case of acute hypersensitivity was observed in the 6 µg group 48 hours after the first dose of the study drug, in which urticaria developed (Zhang, et al., 2021)

When the results of the placebo-controlled phase 3 study, which used 3 µg of inactivated SARS-CoV-2 virion in Turkey, in which 10214 individuals were evaluated, the frequency of any side effects was 1259 (18.9%) in the vaccine group and 603 (16.9%) in the placebo group (p=0.0108). No deaths or Grade 4 adverse events were observed. Pain at the injection site was the most common local adverse event, 157 (2.4%) subjects in the vaccine group and 40 (1.1%) subjects in the placebo group, (p<0.0001). The most common systemic adverse event was fatigue 546 (8.2%) subjects in the vaccine group and 248 (7.0%) subjects in the placebo group, (p=0.0228).

In a study conducted with hospital staff in Turkey in which 2277 people were evaluated, the three most common systemic adverse reactions were observed as headache, fatigue, nausea and vomiting, respectively, when evaluated in terms of side effects three days after vaccination (Kaya et al., 2021).

In our study, when individuals were evaluated seven days after the first dose of vaccine administered at the standard dose and the second dose administered on the 28th day; the most common local side effect was pain in the arm in which the vaccine was administered (38.2%), the most common systemic side effect was fatigue (24.7%). No grade 4 reaction or death was observed, except for one patient who developed anaphylaxis requiring urgent medical attention.

The study has some limitations; first it was a unicentric study including limiting number of cases, the second late side effects were not evaluated.

As a result, it is clear that safety studies on vaccines, our strongest weapon in the fight against the pandemic, should continue for a longer time and with more participants.

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