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Original Article

Evaluation of the Frequency and Severity of Complications of COVID-19 Vaccines in the Medical Staff

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Abstract

Background: There are few reports related to the possible side effects of injected vaccines, and evaluating the frequency and severity of the complications of COVID-19 vaccines can increase the knowledge, safety and importance of vaccines and reduce mistrust towards them. Therefore, we assessed the frequency and severity of the complications of COVID-19 vaccines in the medical staff of Khatam Al-Anbia and Ali Ibn Abi Talib hospitals in Zahedan.

Methods: In this cross-sectional study, 200 medical staff working in two hospitals, Khatam Al Anbia and Ali Bin Abitalib Zahedan were studied. The frequency of side effects after COVID-19 vaccination was recorded in the questionnaire.

Results: The distribution of the frequency of the type of vaccine received in the studied treatment group is equal to 83 people (41.5%) AstraZeneca vaccine, 82 people (41%) Sinopharm vaccine, 22 people (11%) Sputnik vaccine and 13 people (6.5 %) had received Barekat vaccine. The frequency distribution of side effects in the first dose and the second dose after receiving the COVID-19 vaccine was equal to 135 people (67.5%) and 96 people (48%), respectively. Distribution of the percentage of the type of side effect that occurred after receiving the first dose of COVID-19, according to fever (80.7%), headache (46.7%), weakness (40%), disorder Sleep (33.3%), myalgia (n19.2%), sweating (10.3%), dizziness (9.6%), tachycardia (18.8%), sore throat (6.7%), chest pain (5.2%), arthralgia (5.2%), rhinorrhea (3.7%), diarrhea (2.9%) and loss of appetite (2.9%).

Conclusion: It can be stated that the COVID-19 vaccine did not show severe side effects and with timely management and supportive treatment and control of side effects, patients were encouraged to get vaccinated and as a result, the collective immunity level of the society improved.

Keywords: COVID-19 ; Vaccination; Complications; Severity

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Introduction

Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) emerged in China in late December 2019 and caused the COVID-19 (1, 2). The majority of patients with COVID-19 present common symptoms that include fever, shortness of breath, cough (either with or without sputum), sore throat, nasal congestion, dizziness, chills, muscle ache, arthralgia, weakness, fatigue or myalgia, chest tightness, excessive mucus production with expectoration, hemoptysis, and dyspnea (3-5). The process of administering a vaccine to stimulate the immune system to provide protection against infection is known as vaccination. Vaccines help prevent disease in difficult to treat conditions by stimulating the body's acquired immunity (6). The rapid development of COVID-19 vaccines, due to the urgency of the pandemic, in addition to technological advances and existing vaccine candidates, has contributed to the emergence of many rumors (7). As different vaccines are used in national vaccination campaigns, there is a need to assess adverse events after vaccination to counter vaccine skepticism and rumors(8).

The Sputnik vaccine is based on recombinant adenovirus vectors (rAd26-S and rAd5-S)(9). The manufacturer of the vaccine states that the vaccine is safe and stimulates humoral immunity as well as cellular immune responses in 100% of healthy individuals (10, 11). All adverse events were reported to be mostly moderate. The most common systemic and local reactions were pain at the injection site, a slight increase in body temperature from 37°C to 38°C, as well as headache, weakness, and muscle and joint pain (12, 13). In general, these symptoms are usually associated with recombinant vector-based vaccines. According to the manufacturer, no serious adverse events were reported during the study. The profile of adverse events does not differ from those reported in published work for other vector-based vaccines(14). The aim of the current study was to assess the frequency and severity of complications of COVID-19 vaccines in the medical staff of Khatam Al-Anbia and Ali Ibn Abi Talib hospitals in Zahedan.

Material and Methods

In this descriptive-cross-sectional study, 200 medical staff vaccinated with the COVID-19 vaccine was at Khatam Al-Anbia and Ali Ibn Abi Taleb hospitals in Zahedan, Iran. Inclusion criteria were consent to participate in the study and COVID-19 vaccination. Exclusion criteria were the vaccinated individual's unwillingness to continue participating in the study and a history of underlying diseases such as cardiovascular disease or similar symptoms such as influenza. Data collection was done through interviews and questionnaires. Short-term vaccine complications, i.e. symptoms that occurred in the individual after the vaccine injection, such as pain at the site of vaccination, mild fever, headache, fatigue, muscle pain, joint pain, diarrhea, and body tremors, along with the severity of these complications, were recorded in the questionnaire. The study was approved by the Medical Ethical Committee of Zahedan University of Medical Sciences (Ethics code: IR.ZAUMS.REC.1401.053).

Statistical analysis

Statistical analysis was performed by SPSS software Version 22. Mean±SD and number (percentage) indicate quantitative and qualitative variables, respectively.

Results

The mean age of the medical staff was 35.67±11.64years. Also, the gender distribution of the study subjects was 138 females (69%) and 62 males (31%).The mean weight, height, and body mass index were 67.67 ± 16.64 kg, 167.0 ± 9.5 cm, and 23.93 ± 4.4 kg/m2, respectively. 54% and 23% of participants were nurses and physician, respectively **(Table 1)**.

Table 1. Characteristics of study participants

Variable		Result
Age, mean±SD, Year		35.67±11.64
Sex, n (%)	Female	138 (69)
	Male	62 (31)
Weight, Kg		67.67±14.67
Height, cm		167.0±9.5
Body mass index, Kg/m²		23.93 ± 4.4
Medical Staff, n (%)	Nurse	108 (54)
	Physician	46 (23)
	Other	46 (23)

The frequency distribution of the type of COVID-19 vaccine received in the medical staff studied was as follows: 83 subjects (41.5%) received the AstraZeneca vaccine, 82 people (41%) received the Sinopharm vaccine, 22 people (11%)

received the Sputnik vaccine, and 13 people (6.5%) received the BIV1-CovIran vaccine **(Table 2)**.

Table 2. Frequency distribution of the type of COVID-19 vaccine received in the study subjects

Variable	Result
AstraZeneca, n (%)	83 (41.5)
Sinopharm, n (%)	82 (41)
Sputnik, n (%)	22 (11)
BIV1-CovIran, n (%)	13 (6.5)

The frequency distribution of adverse events in the first and second doses after receiving the COVID-19 vaccine was 135 subjects (67.5%) and 96 subjects (48%), respectively. More details are provided in **Table 3**.

Distribution of the frequency of the type of side effect that occurred after receiving the first dose of COVID-19, according to fever (n=109, 80.7%), headache (n=63, 46.7%), weakness (n=54, 40%), disorder sleep (n=45, 33.3%), myalgia (n=26, 19.2%), sweating (n=14, 10.3%), dizziness (n=13, 9.6%), tachycardia (n=11, 18.8%), sore throat (n=9, 6.7%), chest pain (n=7, 5.2%), arthralgia (n=7, 5.2%), rhinorrhea (n=5, 3.7%), diarrhea (n=4, 2.9%) and loss of appetite (n=4, 2.9%) **(Table 4)**.

Table 3. Frequency distribution of adverse events after the first and second doses of the COVID-19 vaccine

Variable		Sputnik	Sinopharm	AstraZeneca	BIV1-CovIran	Total
Side effects of the first dose, n (%)	Yes	14 (63.4)	37(45.1)	77 (92.7)	7 (53.8)	135 (67.5)
	No	8 (36.4)	45 (54.9)	6 (7.3)	6 (46.2)	65 (32.5)
Side effects of the second dose, n (%)	Yes	11 (50)	23 (28)	59 (71.1)	3 (23.1)	96 (48)
	No	11 (50)	59 (72)	24 (28.9)	10 (76.9)	104 (52)

Discussion

There are few reports on the possible side effects of administered vaccines, and assessing the frequency and severity of side effects of COVID-19 vaccines can increase knowledge, safety, and the importance of vaccines and reduce distrust of them (15, 16).

Paczkowska et al. conducted a study titled safety profile of COVID-19 vaccines among healthcare workers. The findings of this study showed that the BNT162b2 vaccine (Pfizer-BioNTech) was the most commonly used COVID-19 vaccine among healthcare workers with a frequency of 61.69%, and the adverse event frequency of the Pfizer vaccine was 11.53%, mRNA-1273 vaccine (Moderna) was 72%, and AstraZeneca vaccine was 59.67% (17). The findings of the present study were consistent with our study. In our study, the incidence of adverse events in the first dose was 67.5%, and severe adverse events were more common in the AstraZeneca vaccine than in the Sputnik and Sinopharm vaccines; however, due to the lack of nucleic acid-based vaccines, it was not possible to compare the adverse events of these vaccines with common vaccines in the country in the present study.

Zare et al. investigated the prevalence of adverse events of COVID-19 vaccines (Sputnik V, AZD-1222, and Covaxin) among 503 healthcare workers. The findings of this study showed that 81.9%, 88.8%, and 92.9% of individuals vaccinated with AZD1222, Sputnik-V, and Covaxin vaccines reported at least one adverse event. Injection site pain (62.1%), fatigue (43.9%), muscle pain (42.5%), and fever (40.6%) were the most common adverse events in all three vaccines. The frequency of adverse events was higher in female (90.6%) than in men (79.5%) (18). In comparison with the findings of the present study, the frequency of complications of the Sputnik, Sinopharm, AstraZeneca, and Barakat vaccines was 63.6%, 45.1%, 92.7%, and 53.8 %, respectively.

Lee et al. conducted a cross-sectional study titled adverse events after COVID-19 Vaccination. In this study, 153,183 individuals vaccinated with the COVID-19 vaccine were studied. Most of the adverse events occurred after the first dose of the COVID-19 vaccine (80.6%) and within one day of vaccination (63.2%). 95.5% of these cases were non-severe, and most of the severe adverse events occurred in older age groups. Therefore, they concluded that different adverse events were

observed in all types of vaccines. In their study, pain was observed in all patients who had adverse events, followed by swelling, erythema, and tenderness. Also, no severe adverse events were observed in this study (19).

Table 4. Frequency distribution of the type of adverse event occurring after the first dose of the COVID-19 vaccine

Variable	Result, n (%)
Fever	109 (80.7)
Headache	63 (46.7)
Weakness	54 (40)
Sleep disorder	45 (33.3)
Myalgia	26 (19.2)
Sweating	14 (10.3)
Dizziness	13 (9.6)
Tachycardia	11 (8.1)
Sore throat	9 (6.7)
Chest pain	7 (5.2)
Arthralgia	7 (5.2)
Rhinorrhea	5 (3.7)
Diarrhea	4 (2.9)
Vomiting	4 (2.9)
Loss of appetite	4 (2.9)

In another study, Hatmal et al. investigated adverse events following COVID-19 vaccination. The frequency distribution of Pfizer-BioNTech, AstraZeneca, Sinopharm, and other vaccines was 38.2%, 31%, 27.3%, and 3.5%, respectively. Most adverse events following vaccination were common and non-life-threatening (such as fatigue, chills, dizziness, fever, headache, arthralgia, and myalgia), with only 10% of participants experiencing severe adverse events, while 39% and 21% of participants experienced moderate and mild adverse events, respectively. They concluded that the licensed COVID-19 vaccines are safe and that getting vaccinated makes people more confident. Most side effects after vaccination are mild to moderate, which is a sign of the body's immune system protecting it (20).

The anxiety of individuals after the injection in our study was significantly lower than in the Hatmal's study, which is probably because this study was conducted in a healthcare professional community, and this difference indicates the importance of individuals' awareness of the Covid-19 vaccine in reducing their anxiety.

Conclusion

Finally, it can be stated that the COVID-19 vaccine did not show severe side effects, and with timely management and supportive treatment and control of side effects, it encouraged patients to get vaccinated and consequently improved the level of collective immunity in society.

Conflict of interests

There is no conflict of interests.

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