BENHA MEDICAL JOURNAL bmj
Print ISSN 1110-208X.
Online ISSN 2357-0016

Original article

Covid Vaccine in Egypt "What to Expect Before You Get?"

Hossam Eldin M. Abd ElAzim, Huda A. Salman, Hamada F.Hashem

Abstract:

Background: The CoVID-19 pandemic necessitated the rapid development and deployment of multiple vaccines globally, including Egypt. Understanding the side effects associated with these vaccines is crucial for informed decision-making and public health policy. This study aimed to compare the side effects of the different type of corona vaccines in the Arab Republic of Egypt. **Methods:** This retrospective comparative study was carried out on a sample of 1050 individuals who had received CoVID-19 vaccines between 2021 and 2022 in Egypt. Informed written consent was obtained from all participants, and ethical approval was granted by the Research Ethics Committee, Faculty of Medicine, Benha University. Participants were categorized into groups based on the vaccine received. Side effects were documented, and CoVID -19 anti-spike antibodies were measured 21 days and 6 months post-vaccination. **Results:** Significant differences were observed in symptoms such as cough, pharyngitis, nasal congestion, runny nose, epistaxis, anosmia, dizziness, and drowsiness. However, there were no significant differences in antibody levels among the vaccine types at 6 months post-vaccination. **Conclusion:** In Egypt, the most frequent CoVID-19 vaccine side effects were headache, fever, fatigue, muscle pain, and joint pain. AstraZeneca and Moderna vaccines had higher rates of these side effects. AstraZeneca also exhibited more common side effects such as cough, pharyngitis, nasal congestion, epistaxis, anosmia, dizziness, drowsiness, appetite loss, nausea, vomiting, abdominal pain, diarrhea, and constipation. Allergic reactions, including skin rash, eyelid swelling, and eye redness, were more prevalent with the AstraZeneca vaccine.

Keywords: CoVID-19; Vaccine; Side Effects of vaccines; Anti-Spike Antibodies.

Otolaryngology Department, Faculty of Medicine Benha University, Egypt.

Corresponding to:
Dr. Huda A. Salman.
Otolaryngology Department, Faculty of Medicine Benha University, Egypt.
Email: hudajomedososo@gmail.com

Received:
Accepted:

Introduction

Coronaviruses constitute a widespread family of viruses known to cause a spectrum of illnesses, ranging from common colds to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). This classification was provided by the World Health Organization (WHO) in October 2020 [1].

CoVID-19, on the other hand, is the specific disease caused by a novel coronavirus known as SARS-CoV-2. The WHO first detected this novel virus on December 31, 2019, following the emergence of a cluster of viral pneumonia cases in Wuhan, People's Republic of China, making it distinct from other known coronaviruses. This discovery marked the beginning of a global health crisis [2].

To combat the pandemic, Egypt implemented various types of vaccines, including the Oxford Vaccine (AstraZeneca), Biotech Vaccine (Pfizer), Johnson and Johnson vaccine, Sputnik Vaccine, Sinopharm Vaccine, and Sinovac Vaccine, Moderna vaccine. These vaccines were made available in limited quantities and administered to specific population groups, as of October 2021 [3, 4].

Regarding the side effects of CoVID-19 vaccines, reported instances have generally been mild to moderate and typically resolve within a few days. Common side effects include pain at the injection site, fever, fatigue, headache, muscle pain, chills, and diarrhea. The likelihood of experiencing these side effects can vary depending on the specific type of vaccine administered [5, 6].

The purpose of this study was to compare the side effects of the different types of corona vaccines in the Arab Republic of Egypt.

Subjects and methods

This Retrospective Comparative Study was conducted on a sample of 1,050 individuals, both male and female, who had received the new coronavirus vaccines in Egypt. This study was carried out at the Corona Vaccines Unit in Kafr Shukr Hospital during the period between 2021 and 2022.

An informed written consent was obtained from the study subjects. Every subject received an explanation of the purpose of the study and had a secret code number. The study was done after being approved by the Research Ethics Committee, Faculty of Medicine, Benha University.

Inclusion criteria for the study encompassed individuals 18 years old and more (Age > 18) who had received different types of coronavirus vaccines in Egypt. Exclusion criteria included individuals aged below 18, those with allergies, individuals infected with HIV, those who had recently received or were planning to receive another vaccination shortly, pregnant women, breastfeeding women, and individuals with compromised immune systems.

Monitoring Vaccine Recipients: After administering the vaccine, recipients were observed for 15 minutes to ensure there were no immediate adverse reactions. Additionally, communication with vaccine recipients occurred two days after vaccination since some individuals might experience mild to moderate side effects that typically resolve within a few days.

Furthermore, CoVID-19 Anti-Spike Antibodies Titration was conducted on El-mokhtabar laboratory. Antibody titers are performed by serially diluting the patient's plasma and testing with the appropriate RBCs to determine the highest titer where reaction occurs. This testing was done 21 days after receiving the vaccines, with a subsequent reanalysis six months post-vaccination, aiming to assess the presence and levels of anti-spike antibodies.

Statistical analysis

Data management and statistical analysis were conducted using SPSS version 25 (IBM, Armonk, New York, United States). Numerical data were presented as medians and ranges, while categorical data were

expressed as numbers and percentages. To compare both groups, the Wilcoxon test was employed for numerical data, while the Chi-square test or Fisher's exact test was used for categorical data when appropriate. All P-values were calculated as two-sided, with values less than 0.05 considered statistically significant.
Approval Code: MS.41-12-2021

Results

Based on the types of vaccines, the 1,050 subjects were divided into 7 groups, with each group comprising 150 patients (14.3%). This division was made for the purpose of comparing them based on their constitutional manifestations.

As regards anti spike titer assessment we selected 105 patients distributed into 7 groups, with each group consisting of 15 patients (14.3%). This grouping was done to facilitate a comparison of their anti-spike antibody titers, both 21 days after vaccination and 6 months post-vaccination.

Headache was notably prevalent in the Astra and Moderna vaccines, with rates of 100% and 83.3%, respectively, in that order. Conversely, it was less frequently reported with the Johnson and Sinopharm vaccines, at 10% each. Fever was observed in all vaccines except for Sinopharm and Sinofac, but it was notably more common in the Astra and Moderna vaccines, at 83.3% for both.

Fatigue was prominently reported with the Johnson and Moderna vaccines, with rates of 100% and 83.3%, respectively, in that order. Fatigue was not reported in the case of Sinofac. Muscle pain (MS pain) was predominantly reported with the Pfizer vaccine, at 50.7%, with minimal cases observed with the Astra and Sputnik vaccines.

Joint pain was highly prevalent with the Pfizer vaccine, at 33.3%, while minimal cases were reported with the Astra vaccine, at 2.7%. Significant differences were observed among the various types of vaccines in terms of constitutional manifestations, including Headache, Fever, Fatigue, Muscle pain (MS pain), and Joint Pain. (Figure 1)

Cough, pharyngitis, and nasal congestion were notably prevalent with the Pfizer vaccine, with rates of 34%, 7.3%, and 33.3%, respectively, in that order. Conversely, they were reported in minimal cases for the Astra vaccine. Runny nose and epistaxis were observed in minimal cases with the Astra vaccine, at 3.3%. This table highlights significant differences among various vaccine types concerning symptoms such as cough, pharyngitis, nasal congestion, runny nose, and epistaxis. Anosmia and drowsiness were observed in minimal cases with the Astra vaccine, each at 3.3%. Dizziness was notably more common with the Pfizer vaccine, at 33.3%, while it was reported in minimal cases with the Astra vaccine, at 10%. Significant differences were noted among various vaccine types with respect to symptoms like anosmia, dizziness, and drowsiness. (Table 1)

Table 1: Comparison between different vaccines according to cough, Pharyngitis, Nasal congestion, Runny nose, Epistaxis, Anosmia, Dizziness and Drowsiness.

	Astra		Jhonson		Moderna		Pfizer		Sinofac		Sinofarm		Sputnik		Statistical test	P value
	no	%	no	%	no	%	no	%	no	%	no	%	no	%		
Cough	5	3.3	0	0.0	0	0.0	51	34.0	0	0.0	0	0.0	0	0.0	287.6	<0.001**
Pharyngitis	15	10.0	0	0.0	0	0.0	71	7.3	0	0.0	0	0.0	0	0.0	373.2	<0.001**
Nasal congestion	15	10.0	0	0.0	0	0.0	50	33.3	0	0.0	0	0.0	0	0.0	243.54	<0.001**
Runny nose	5	3.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	12.54	<0.001**
Epistaxis	5	3.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	12.54	<0.001**
Anosmia	5	3.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	12.54	<0.001**
Dizziness	15	10.0	0	0.0	0	0.0	50	33.3	0	0.0	0	0.0	0	0.0	243.54	<0.001**
Drowsiness	5	3.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	12.54	<0.001**

DOI: 10.21608/bmfj.2024.252023.1963

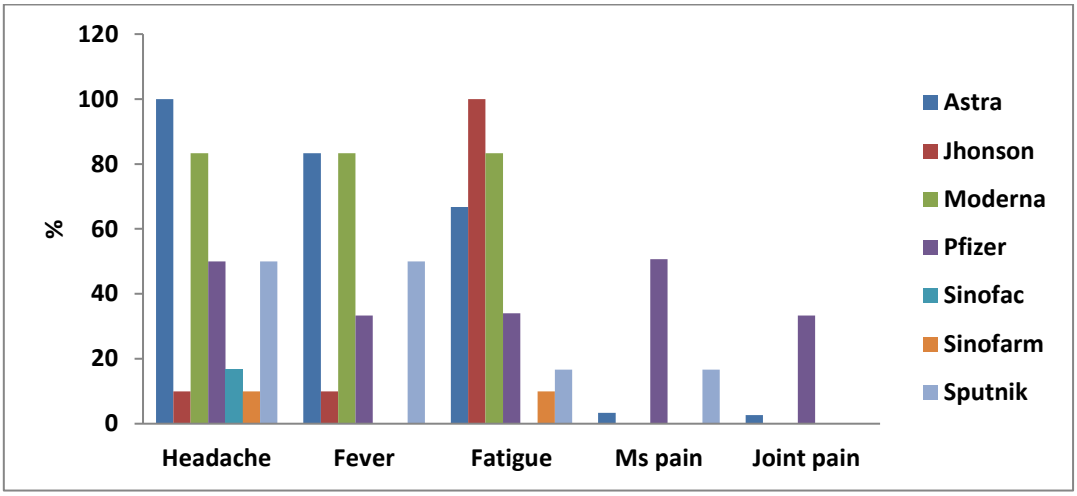

Figure 1: Comparisons between different vaccines according to Headache, Fever, Fatigue, Ms pain and Joint pain

Loss of appetite, nausea, vomiting, abdominal pain, and constipation were observed in minimal cases with the Astra vaccine, each at a rate of 3.3%. Diarrhea was reported in minimal cases with the Astra vaccine, at 10%. Significant differences were evident among various vaccine types in terms of symptoms such as loss of appetite, nausea, vomiting, abdominal pain, diarrhea, and constipation. (Figure 2 A)

Skin rash, eyelid swelling, and red eye were observed in minimal cases with the Astra vaccine, each at a rate of 3.3%. Significant differences were found among various vaccine types in terms of symptoms such as skin rash, eyelid swelling, and red eye. (Figure 2 B)

We observed that all cases from all types of vaccines had antibodies after 21 days of vaccination but did not have antibodies after 6 months of vaccination. Therefore, there were no significant differences in antibody levels among the different types of vaccines. (Table 2)

Table 2: Comparison between different vaccines according to Anti-bodies after 21 days of vaccination and after 6 Months of Vaccination.

	Astra		Jhonson		Moderna		Pfizer		Sinofac		Sinofarm		Sputnik		Statistical test	P value
	no	%	no	%	no	%	no	%	no	%	no	%	no	%		
Anti-bodies After 21 days of Vaccination	15	100	15	100	15	100	15	100	15	100	15	100	15	100		
Anti-bodies After 6 Months of Vaccination	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	FET= 2.1	1.0

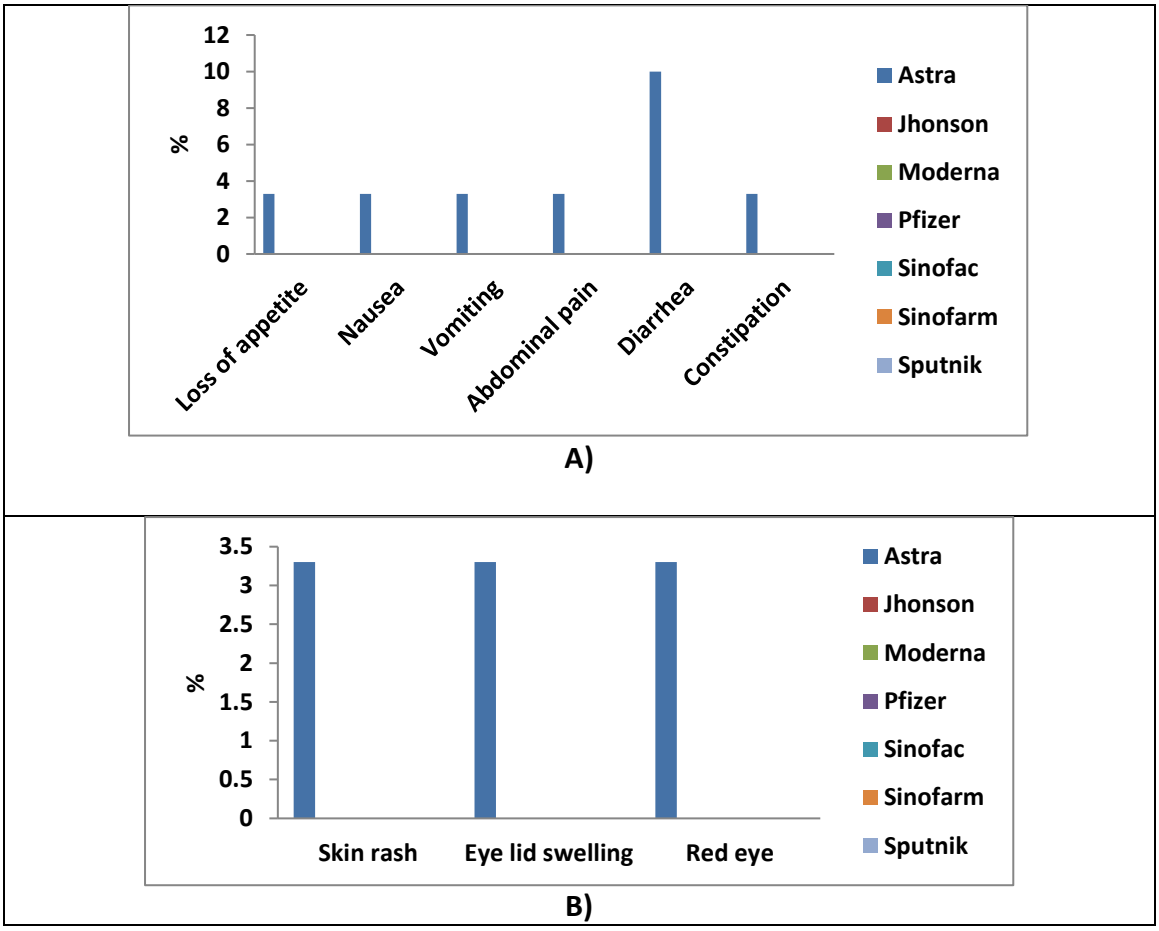

Figure 2: A) Comparison between different vaccines according to Loss of appetite, Nausea, Vomiting, Abdominal pain, Diarrhea and B) Constipation and Loss of Skin rash, Eye lid swelling, Red eye

Discussion

In the current study, the highest prevalence of post-vaccination headache occurred after Astra vaccines (100%), while the lowest occurred after Sinopharm and Johnson vaccines (10%) ($p < 0.001$). Other studies also support these findings, with AstraZeneca consistently associated with a higher risk of post-vaccination headache compared to other vaccines [7, 8].

Our study found a significant difference in post-vaccination fever among the seven vaccinated groups ($p < 0.001$). The highest incidence occurred with Astra and Moderna vaccines (83.3% for both), while Sinovac and Sinopharm had no reported cases (0%). This aligns with a previous review reporting no fever with Sinovac (0%) and low incidence with Sinopharm (2%), while Moderna ranged from 40 to 57% [9]. However, an Afghani study reported a 66.3% incidence with Astra, considering it common, and another study contradicted our findings, reporting 9% for Astra, even lower than Moderna and Pfizer (16%) [10].

In our study, we noted a significant increase in the incidence of fatigue after Johnson vaccines (100%), followed by Moderna vaccines (83.3%), whereas no individuals reported that adverse event after Sinovac vaccine.

Frontera and his associates agreed with our findings regarding the increased risk of that complication after Janssen vaccine, as the most commonly reported adverse neurological events were fatigue, dizziness, and syncope, all of which were more often reported following Janssen vaccination. Even, the rates of these complications exceed the y-axis scale

DOI: 10.21608/bmfj.2024.252023.1963

compared to other CovVid vaccines [11]. A study reported that fatigue is among the most common adverse events occurring after Moderna vaccination [12].

A previous Turkish study confirmed our findings regarding the low incidence of fatigue after Sinovac vaccine (8.2%) [13]. Another review handling the adverse effects of CoVid vaccines did not report fatigue as an adverse event after Sinovac [9].

In the current study, the incidence of muscle pain was significantly higher after Pfizer vaccine administration (50.7%). No patients who received Sinopharm, Sinovac, Moderna, or Johnson vaccines reported that adverse event ($p < 0.001$).

Although some studies reported no incidence of muscle pain after Pfizer vaccine administration [14-16], other studies reported high incidence of the same side effect that reached up to 70% [17, 18].

In the previous review published by Kaur and his associates, the authors did not reported the incidence of myalgia with either of the Sinopharm, Sinovac, Moderna vaccines [9], which agree with our results.

In our study, we observed a significant increase in fatigue incidence following Johnson vaccines (100%), followed by Moderna vaccines (83.3%), with no reports of fatigue after Sinovac vaccination. These findings align with a study noted an increased risk of fatigue after Janssen vaccine, where fatigue, dizziness, and syncope were the most commonly reported adverse neurological events, surpassing other CoVid vaccines [11]. Additionally, a previous Turkish study supported our results, reporting a low incidence of fatigue after Sinovac vaccination (8.2%) [13].

In our study, the incidence of muscle pain was significantly higher following Pfizer vaccine administration (50.7%), with no reported cases among those who received Sinopharm, Sinovac, Moderna, or Johnson vaccines ($p < 0.001$). While some studies reported no muscle pain incidence after Pfizer vaccination, others documented a high incidence, reaching up to 70% [18, 19]. Notably, a previous review did not report the incidence of myalgia for Sinopharm, Sinovac, or Moderna vaccines, consistent with our findings [9].

Our findings indicated an increased incidence of joint pain associated with the Pfizer vaccine (33.3%), with no reports of this adverse event in individuals receiving Johnson, Moderna, Sinovac, Sinopharm, or Sputnik vaccines. A study reported a 3.06% incidence of joint pain after Pfizer vaccination, closely aligned with our findings [20]. Our results were consistent with another study in demonstrating a weak association between Sinovac, Sinopharm, and Johnson vaccines and joint pain [9]. However, another study reported a 24% incidence of joint pain after Sputnik vaccine [21].

In our study, Pfizer vaccination was associated with a significant increase in cough incidence (34%), while only 3.3% of Astra vaccine recipients experienced this adverse event, and it was absent in recipients of the other five vaccines. Other studies reported lower cough rates after Pfizer vaccination, ranging from 3.3% to 4.3%, with one study focusing on persistent cough [22]. An Iraqi study noted a 4.5% cough incidence after Astra vaccine [19], and cough was found to be uncommon after CoVid vaccination, not occurring with Astra or Sinopharm vaccines [23].

Additionally, Astra vaccine was linked to a 10% incidence of pharyngitis, compared to 7.3% with Pfizer, and this adverse event was absent in recipients of the other five vaccines. Another American study reported a 5% incidence of similar adverse events after Pfizer or Moderna vaccination [24], and a 30% incidence was reported in patients developing post-vaccination thyroiditis following various COVID vaccines [25].

In our study, only five individuals developed epistaxis after Astra vaccine administration (3.3%). No individuals developed the same event after the other

vaccine types. A study reported that two patients developed the same complications after receiving Pfizer and Vaxzevria vaccines. Nonetheless, that event occurred secondary to the development of severe immune thrombocytopenia after vaccination [(26)].

In the current study, anosmia was reported in 3.3% of individual receiving Astra vaccine, with no similar complaint from individual receiving the other vaccines. A study reported the incidence of smell abnormalities in five out of six cases, four of them received Astra vaccine, while the remaining one received Pfizer vaccine [(27)].

Our findings showed that dizziness occurred in 33.3% of individuals receiving Pfizer vaccine compared to 10% of patients receiving Astra vaccine. That event was never reported by the remaining five vaccine groups. In the previous case series which included 30 patients receiving either Pfizer or Moderna vaccines, eight patients reported dizziness (26.67%) [(28)].

In the current study, drowsiness was reported by 3.3% of the Astra group, versus no individuals in the remaining six groups. In contrast to our findings, drowsiness has been also reported after covid vaccination, but it was described after Pfizer vaccine [(29, 30)].

In the current study, only 3.3% of individuals receiving Astra vaccine reported appetite loss, which was never reported with the other six vaccinations. A study reported that appetite loss occurred after Astra vaccination. Nonetheless, the authors did not report its exact incidence [(31)].

Our findings showed the increased incidence of nausea and vomiting in association with Astra vaccine (3.3% for each complication). These two adverse events were not reported with the remaining six vaccines. A study reported an incidence of 13% for the same complication when Astra vaccine was given [(10)].

In the current study, abdominal pain was reported by 3.3% of individuals receiving Astra vaccine, while no subjects receiving the other six vaccines reported the same complication.

In line with our findings, a study reported that the most common digestive symptom was abdominal pain, whereas the most common complication was enterocolitis. Digestive symptoms mainly occurred following administration of the first vaccine dose, with symptom onset usually occurring within one day. Among the mild cases, the proportion of women was high, and the proportion of men was high among the severe cases. Astra vaccine resulted in more adverse reactions after vaccination than Pfizer one [(32)].

The proposed hypothesis is that transcribed viral spike protein binds to cells in the GI tract in a manner similar to that of the actual virus, promoting dysbiosis and inflammation. Hence, the vaccine is able to produce various GI symptoms in recipients, similar to patients infected with SARS-CoV-2. However, this hypothesis needs to be further explored in clinical trials [(33)].

Our findings showed a significant increase in the incidence of diarrhea after Astra vaccination (15%), which was nor encountered with the remaining six vaccines. Azimi and his coworkers reported an incidence of 11.8% for the same complication after Astra vaccination [(10)], which is near our findings.

A study reported a 15% incidence for the same adverse event after Sputnik vaccination [(21)].

In our study, constipation was reported by 3.3% of subjects receiving Astra vaccines, which was never reported by individuals receiving the other vaccine types. There is a paucity of clinical studies connecting Astra vaccine with the incidence of constipation.

A study reported the incidence of the same adverse event in 1% of their Sinopharm-receiving subjects [(34)]. Another study reported an incidence of 1.7% for the same event after Pfizer vaccine [(35)].

DOI: 10.21608/bmfj.2024.252023.1963

Our findings revealed the increased incidence of allergic complications like skin rash, eye lid swelling, and eye redness in association with Astra vaccination. Neither of these manifestations were reported in the remaining six vaccines.

A study reported the incidence of eye lid edema in three patients after receiving Pfizer vaccine. it is possible that the COVID-19 vaccine caused complement activation that increased complement mediators within the plasma and tear film, resulting in eyelid edema [(36)]. That was not the case in our study as none of our Pfizer receiving individuals developed that complication.

Our study is the first to compare the seven Covid vaccines applied in Egypt. However, it has some limitations. First, our observations included a limited number of participants, mainly from Benha city. Second, the observed adverse reactions were based on the patient's self-reported data, which might result in misclassification or an information bias. Also, our study did not define the incidence of these complications after the first or second doses. These drawbacks should be well handles in the upcoming studies.

Conclusion

Our study revealed that the most common side effects of corona vaccines in Egypt were headache, fever, fatigue, muscle pain, and joint pain. These side effects were more common after vaccination with the Astra vaccine, followed by the Moderna vaccine. Other side effects that were more common after the Astra vaccine included cough, pharyngitis, nasal congestion, epistaxis, anosmia, dizziness, drowsiness, appetite loss, nausea, vomiting, abdominal pain, diarrhea, and constipation. Allergic complications like skin rash, eye lid swelling, and eye redness were also more common after the Astra vaccine.

Sources of funding.

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Author contribution.

Authors contributed equally in the study.

Conflicts of interest.

No conflicts of interest.

References

1. Dhama K, Khan S, Tiwari R, Sircar S, Bhat S, Malik YS, et al. Coronavirus Disease 2019-COVID-19. Clin Microbiol Rev. 2020;33.

2. Harapan H, Itoh N, Yufika A, Winardi W, Keam S, Te H, et al. Coronavirus disease 2019 (COVID-19): A literature review. J Infect Public Health. 2020;13:667-73.

3. Boshra MS, Elgendy MO, Abdelaty LN, Tammam M, Alanazi AS, Alzarea AI, et al. Knowledge, Attitude, and Acceptance of Sinopharm and AstraZeneca's COVID-19 Vaccines among Egyptian Population: A Cross-Sectional Study. Int J Environ Res Public Health. 2022;19.

4. Orebi HA, Emara HE, Alhindi AA, Shahin MR, Hegazy AH, Kabbash IA, et al. Perceptions and experiences of COVID-19 vaccines' side effects among healthcare workers at an Egyptian University Hospital: a cross-sectional study. Trop Med Health. 2022;50:37.

5. Azimi M, Dehzad WM, Atiq MA, Bahain B, Asady A. Adverse Effects of the COVID-19 Vaccine Reported by Lecturers and Staff of Kabul University of Medical Sciences, Kabul, Afghanistan. Infect Drug Resist. 2021;14:4077-83.

6. Kaur RJ, Dutta S, Bhardwaj P, Charan J, Dhingra S, Mitra P, et al. Adverse Events Reported From COVID-19 Vaccine Trials: A Systematic Review. Indian J Clin Biochem. 2021;36:427-39.

7. Mattiuzzi C, Lippi G. Headache after COVID-19 vaccination: updated report from the Italian Medicines Agency database. Neurological Sciences. 2021;42:3531-2.

8. Nasergivehchi S, Togha M, Jafari E, Sheikhvatan M, Shahamati D. Headache following vaccination against COVID-19 among healthcare workers with a history of COVID-19 infection: a cross-sectional study in Iran with a meta-analytic review of the literature. Head & Face Medicine. 2023;19:1-8.

9. Kaur RJ, Dutta S, Bhardwaj P, Charan J, Dhingra S, Mitra P, et al. Adverse events reported from COVID-19 vaccine trials: a systematic review. Indian Journal of Clinical Biochemistry. 2021;36:427-39.

10. Azimi M, Dehzad WM, Atiq MA, Bahain B, Asady A. Adverse effects of the COVID-19 vaccine reported by lecturers and staff of Kabul University of Medical Sciences, Kabul,

Afghanistan. Infection and drug resistance. 2021:4077-83.
11. Frontera JA, Tamborska AA, Doheim MF, Garcia-Azorin D, Gezegen H, Guekht A, et al. Neurological events reported after COVID-19 vaccines: an analysis of vaccine adverse event reporting system. Annals of Neurology. 2022;91:756-71.
12. Rabail R, Ahmed W, Ilyas M, Rajoka MSR, Hassoun A, Khalid AR, et al. The side effects and adverse clinical cases reported after COVID-19 immunization. Vaccines. 2022;10:488.
13. Tanriover MD, Doğanay HL, Akova M, Güner HR, Azap A, Akhan S, et al. Efficacy and safety of an inactivated whole-virion SARS-CoV-2 vaccine (CoronaVac): interim results of a double-blind, randomised, placebo-controlled, phase 3 trial in Turkey. The Lancet. 2021;398:213-22.
14. Ripabelli G, Tamburro M, Buccieri N, Adesso C, Caggiano V, Cannizzaro F, et al. Active surveillance of adverse events in healthcare workers recipients after vaccination with COVID-19 BNT162b2 vaccine (Pfizer-BioNTech, Comirnaty): a cross-sectional study. Journal of Community Health. 2022:1-15.
15. Alamer E, Alhazmi A, Qasir NA, Alamer R, Areeshi H, Gohal G, et al. Side effects of COVID-19 Pfizer-BioNtech mRNA vaccine in children aged 12–18 years in Saudi Arabia. Vaccines. 2021;9:1297.
16. Im JH, Kim E, Lee E, Seo Y, Lee Y, Jang Y, et al. Adverse events with the Pfizer-BioNTech COVID-19 vaccine among Korean healthcare workers. Yonsei Medical Journal. 2021;62:1162.
17. Kadali RAK, Janagama R, Peruru S, Malayala SV. Side effects of BNT162b2 mRNA COVID-19 vaccine: A randomized, cross-sectional study with detailed self-reported symptoms from healthcare workers. Int J Infect Dis. 2021;106:376-81.
18. Shailabi TI, Borwis EO, Majeed NS, Bubtina NH, Betamar N, Abdeldaim G. Side effects of Pfizer-BioNTech COVID-19 vaccine among Libyan young adults: Observational study. Journal of Biosciences and Medicines. 2022;10:33-45.
19. Krótki F, Jońca M, Mariankowska A, Bębenek A, Surówka A, Tomasik P. Side Effects After Vaccination Using the Pfizer-Biontech (Bnt162b2) Against Sars-Cov-2 in the Young Adults. 2021.
20. Lee YW, Lim SY, Lee J-H, Lim JS, Kim M, Kwon S, et al. Adverse reactions of the second dose of the BNT162b2 mRNA COVID-19 vaccine in healthcare workers in Korea. Journal of Korean medical science. 2021;36.
21. Logunov DY, Dolzhikova IV, Zubkova OV, Tukhvatulin AI, Shcheblyakov DV, Dzharullaeva AS, et al. Safety and immunogenicity of an rAd26 and rAd5 vector-based heterologous prime-boost COVID-19 vaccine in two formulations: two open, non-randomised phase 1/2 studies from Russia. The Lancet. 2020;396:887-97.
22. Abukhalil AD, Shatat SS, Abushehadeh RR, Al-Shami Nm, Naseef HA, Rabba A. Side effects of Pfizer/BioNTech (BNT162b2) COVID-19 vaccine reported by the Birzeit University community. BMC Infectious Diseases. 2023;23:5.
23. Zahid MN. Unfolding the mild to moderate short-term side effects of four COVID-19 vaccines used in Bahrain: a cross-sectional study. Vaccines. 2021;9:1369.
24. Pilishvili T, Fleming-Dutra KE, Farrar JL, Gierke R, Mohr NM, Talan DA, et al. Interim estimates of vaccine effectiveness of Pfizer-BioNTech and Moderna COVID-19 vaccines among health care personnel—33 US sites, January–March 2021. Morbidity and Mortality Weekly Report. 2021;70:753.
25. Siolos A, Gartzonika K, Tigas S. Thyroiditis following vaccination against COVID-19: report of two cases and review of the literature. Metabolism open. 2021;12:100136.
26. Gardellini A, Guidotti F, Maino E, Steffanoni S, Zancanella M, Turrini M. Severe immune thrombocytopenia after COVID-19 vaccination: Report of four cases and review of the literature. Blood Cells, Molecules & Diseases. 2021;92:102615.
27. Lechien JR, Diallo AO, Dachy B, Le Bon SD, Maniaci A, Vaira LA, et al. COVID-19: post-vaccine smell and taste disorders: report of 6 cases. Ear, Nose & Throat Journal. 2021:01455613211033125.
28. Wichova H, Miller ME, Derebery MJ. Otologic manifestations after COVID-19 vaccination: the house ear clinic experience. Otology & Neurotology. 2021;42:e1213.
29. El-Shitany NA, Harakeh S, Badr-Eldin SM, Bagher AM, Eid B, Almukadi H, et al. Minor to moderate side effects of Pfizer-BioNTech COVID-19 vaccine among Saudi residents: a retrospective cross-sectional study. International journal of general medicine. 2021:1389-401.
30. Mulligan MJ, Lyke KE, Kitchin N, Absalon J, Gurtman A, Lockhart S, et al. Phase I/II study of COVID-19 RNA vaccine BNT162b1 in adults. Nature. 2020;586:589-93.
31. Onyango J, Mukunya D, Napyo A, Nantale R, Makoko BT, Matovu JKB, et al. Side-Effects following Oxford/AstraZeneca COVID-19 Vaccine in Tororo District, Eastern Uganda: A Cross-Sectional Study. International Journal of Environmental Research and Public Health. 2022;19:15303.
32. Lee DS, Kim JW, Lee KL, Jung YJ, Kang HW. Significance of digestive symptoms after COVID-19 vaccination: A retrospective single-center study. The American Journal of Emergency Medicine. 2022;58:154-8.
33. Ajmera K, Bansal R, Wilkinson H, Goyal L. Gastrointestinal Complications of COVID-19 Vaccines. Cureus. 2022;14.

DOI: 10.21608/bmfj.2024.252023.1963

34. Xia S, Zhang Y, Wang Y, Wang H, Yang Y, Gao GF, et al. Safety and immunogenicity of an inactivated SARS-CoV-2 vaccine, BBIBP-CorV: a randomised, double-blind, placebo-controlled, phase 1/2 trial. The Lancet infectious diseases. 2021;21:39-51.
35. El-Shitany NA, Bagher AM, Binmahfouz LS, Eid BG, Almukadi H, Badr-Eldin SM, et al. The adverse reactions of Pfizer BioNTech COVID-19 vaccine booster dose are mild and similar to the second dose responses: a retrospective cross-sectional study. International Journal of General Medicine. 2022:6821-36.
36. Austria QM, Lelli GJ, Segal KL, Godfrey KJ. Transient eyelid edema following COVID-19 vaccination. Ophthalmic Plastic and Reconstructive Surgery. 2021;37:501.

To cite this article: Hossam Eldin M. Abd ElAzim, Huda A. Salman, Hamada F.Hashem. Covid Vaccine in Egypt "What to Expect Before You Get?". BMFJ XXX, DOI: 10.21608/bmfj.2024.252023.1963.