



BMH Med. J. 2021;8(3):103-109. **Research Article**

Adverse Drug Reactions in ChAdOx1 nCoV-19 vaccine among Health Care Workers

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Abstract

Background: Severe acute respiratory syndrome by Coronavirus 2 (SARS-CoV-2) infection and the resulting Corona virus disease 2019 has afflicted millions of people. The safety profile and effectiveness of the vaccines available are of great concern as vaccination is the main stay of control of the disease, other than the usual Covid appropriate behaviour measures.

Objective: To study the incidence and extent of adverse reactions based on age and sex after ChAdOx1 nCoV-19 vaccine (AstraZeneca Oxford Covid Vaccine) in Health Care Workers.

Study Design: An online questionnaire through a cloud-based survey software by Google Forms was sent; and the adverse events experienced were collected 7 days after the first and second doses of the vaccine.

Participants: Health Care Workers in an urban multispecialty hospital.

Results and Conclusion: Adverse reactions were seen as reported with all vaccines. In our study with the ChAdOx1 nCoV-19 vaccine, reactogenicity was mild or moderate. The reactions were less common and milder in older adults than in younger adults. Both systemic and local reactogenicity were more common after the first dose than the second. The incidence of adverse events was more in females. No serious adverse event was noted. Short term adverse events were mild in severity and short lived. Those who got the Covid 19 disease after vaccination were very few in spite of being HCWs; and they had only mild disease without any complication. Hence the vaccine is safe and effective and its use should be propagated.

Key words: Covid vaccine, Adverse events, Health care workers.

Introduction

Severe acute respiratory syndrome by Coronavirus 2 (SARS-CoV-2) infection and the

resulting Corona virus disease 2019 has afflicted millions of people during the current world-wide pandemic. It has imposed challenges on medical services, researchers, and epidemiologists about the nature of the virus posing challenges for a successful vaccine outcome [1]. The safety profile and the effectiveness of the various vaccines available are topics of discussion and debate. Two vaccines, Covishield and Covaxin were approved for use in India by January 2021; but there were a lot of apprehensions among the public on the safety aspects. Highlighting the safety and reassuring the public is of utmost importance for successful vaccination and control of the disease.

A cross-sectional study was done to investigate the adverse reactions of the vaccine Covishield (ChAdOx1 nCoV-19 - AstraZeneca Oxford vaccine), using an online questionnaire gathering responses from health care workers (HCW) who received the vaccine from a multispecialty hospital. This study mainly focused to detail the adverse reactions after the administration of the vaccine as that was the vaccine provided at the time of study.

Materials and Methods

An online questionnaire through a cloud-based survey software by Google Forms was sent to all the recipients of the Covid vaccine individually after 7 days of administration of each dose of vaccine. All the recipients were health care workers in a multispecialty hospital and hence the replies were deemed reliable. The recommended dose interval between two doses was 4 weeks at that time. The responses of those who participated in the surveys were analysed and a comparison of adverse events based on age and sex were studied in detail amongst those who participated in both the surveys. Responses were obtained from 7 days onwards after first dose of vaccination which was started on 25th January 2021 and spread over a period of 3 weeks, and the response after the second dose of vaccination was obtained a week after the administration of the second dose which was 4 weeks after the first dose.

Results

1581 staff members (77.38%) out of 2043 working in a multi-specialty hospital in South India had been vaccinated. 1084 vaccine recipients responded to the survey after the first dose and 302 responded after the second dose. Age and sex wise analysis along with adverse reactions in the respondents were done.

Among the respondents after the first dose, males constituted 44% (476) and females 56% (608). In the respondents after second dose 46.3% (140) were males and 53.6% (162) were females (Table 1).

Age	First dose			Second dose		
	No. / %	Male	Female	No. / %	Male	Female
21 – 40 yrs.	681 (62.8%)	260 (38%)	421 (62%)	181 (60%)	82 (45%)	99 (54.6%)
41 – 60 yrs.	357 (32.9%)	177 (49.5%)	180 (50.5%)	104 (34%)	43 (41.3%)	61 (58.6%)
>60 yrs.	46 (4.2%)	39 (85%)	7 (15%)	17 (6%)	15 (88.2%)	2 (11.7%)
TOTAL	1084	476 (44%)	608 (56%)	302	140 (46%)	162 (54%)

Table 1: Age and sex distribution of recipients of Covid Vaccine

Analysis of respondents who participated in both the surveys were also done. This

constituted 271 respondents. Males constituted 45.3% (123) and females 54.6% (148).

Out of the 44% males who responded after first dose, 54.6% (260) were in the age group 20-40 years, 37.1% (177) were between 41 and 60 years and 8.1% (39) were above 60 years. Of the 56% females, 69.2% (421) were between 20 and 40 years, 29.6% (180) were between 41 and 60 years and 1.1% (7) were above 60 years.

Among the 58.5% males who responded after the second dose of vaccine, 58.5% (82) were between 20 and 40 years, 30.7% (43) were between 41 and 60 years, and 10.7% (15) were above 60 years. Among the females, 61.1% (99) were between 20 and 40 years, 37.6% (61) between 41 and 60 years, and 1.2% (2) were above 60 years (**Table 1**).

Of the total 1084 survey respondents after the first dose, adverse events were seen in 70.3% (763). Whereas, of the 302 respondents following the second dose of vaccination, adverse events were seen only in 40.3% (122). So, when compared with the first dose adverse events were less after the second dose.

The most commonly reported local reactogenicity were injection site pain, local redness, rashes and swelling over injection site. Common systemic events reported were fever, headache, fatiguability, arthralgia, myalgia and chills.

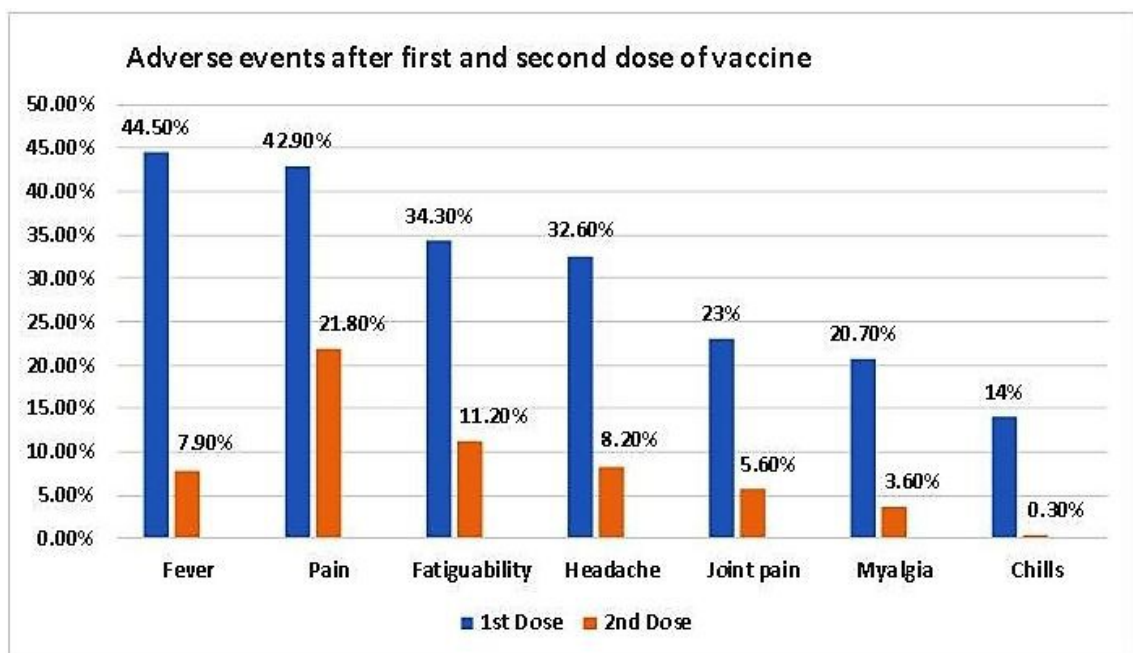


Figure 1: Overall incidence of adverse events after first and second doses of vaccine

The adverse events noted after the first and second doses of vaccines are noted in **Figure 1**. After the first dose 44.5% (483) had fever, 42.9% (466) had pain over the injection site, 34.3% (372) had fatiguability, 32.6% (354) had headache, 23% (250) had joint pain, 20.7% (225) had myalgia and chills were noted in 14% (152).

The adverse events after the second dose were pain over the injection site 21.8% (66), fatiguability 11.2% (34), headache 8.2% (25), fever 7.9% (24), joint pain 5.6% (17), and myalgia 3.6% (11).

Less commonly reported side effects after the first dose of vaccination were dizziness 3.5% (38), breathing difficulty 2% (22), Palpitation 1.8% (20), chest tightness 1.4% (16), swelling

over the injection site 1.2% (14), redness 0.64% (7), rashes 0.30% (4) and swelling of throat 0.30% (4). Other mild adverse reactions like nausea, vomiting, insomnia, hypertension, discoloration of urine and dryness of mouth were seen in a total of 3.8% (41) vaccine recipients. None of the above side effects were seen after the second dose except palpitation in one individual (0.3%).

Adverse events were more common in female recipients compared to their male counterparts in all age groups both after the first and second doses. Exceptions were for fever, pain and fatigue in female recipients above 60 years, who had less incidence compared to males after the first dose. Headache, joint pain, myalgia and chills were not reported in both sexes after the second dose. Adverse events were in general less common and milder in older adults. Age-wise details of the adverse events are noted in **Tables 2, 3** and **4**.

Table 2: Adverse events in age group more than 60 years

Adverse events (Age > 60)	First dose		Second dose		Both doses	
	Males (n=39)	Females (n=7)	Males (n=15)	Females (n=2)	Males (n=10)	Females (n=3)
Fever	6(15.3%)	2(28.5%)	2(13.3%)	0	1(10%)	0
Pain	13(33.3%)	4(57.1%)	4(26.6%)	0	2(20%)	0
Fatigue	7(17.9%)	2(28.5%)	3(20%)	0	1(10%)	0
Headache	2(5.1%)	1(14.2%)	0	0	1(10%)	0
Joint pain	1(2.5%)	0	0	0	0	0
Myalgia	6(15.3%)	1(14.2%)	0	0	0	0
Chills	1(2.5%)	0	0	0	0	0

Table 3: Adverse events in age group 41-60 years

Adverse events (Age 41-60)	First dose		Second dose		Both doses	
	Males (n=177)	Females (n=180)	Males (n=43)	Females (n=61)	Males (n=40)	Females (n=56)
Fever	48(27.1%)	85(47.2%)	2(4.6%)	5(8.1%)	2(5%)	4(7.1%)
Pain	42(23.7%)	67(37.2%)	5(11.6%)	10(16.3%)	4(10%)	7(12.5%)
Fatigue	26(14.6%)	77(42.7%)	4(9.3%)	7(11.4%)	2(5%)	5(8.9%)
Headache	26(14.6%)	61(33.8%)	3(6.9%)	8(13.1%)	0	1(1.7%)
Joint pain	22(12.4%)	53(29.4%)	0	5(8.1%)	0	0
Myalgia	15(8.4%)	45(25%)	0	2(3.2%)	0	0
Chills	11(6.2%)	15(8.3%)	0	0	0	0

Table 4: Adverse events in age group 20-40 years

Adverse events (Age 20-40)	First dose		Second dose		Both doses	
	Males (n=260)	Females (n=421)	Males (n=82)	Females (n=99)	Males (n=73)	Females (n=89)
Fever	110(42.3%)	232(55.1)	4(4.8%)	11(11.1%)	3(4%)	8(8.9%)
Pain	109(41.9%)	231(54.8%)	13(15.8%)	34(34.3%)	5(6.8%)	18(20.2%)
Fatigue	65(25%)	195(46.3%)	4(4.8%)	16(16.1%)	2(2.7%)	12(13.4%)
Headache	74(28.4%)	190(45.1%)	7(8.5%)	6(6%)	1(1.3%)	6(6.7%)
Joint pain	61(23.4%)	113(26.8%)	3(3.6%)	9(9%)	1(1.3%)	6(6.7%)
Myalgia	44(16.9%)	114(27%)	1(1.2%)	8(8%)	1(1.3%)	3(3.3%)
Chills	25(9.6%)	100(23.7%)	0	1(1%)	0	1(1.1%)

Adverse events in those who responded after both the doses

This constituted 271 respondents. Among the 45.3% (123) males, 59.3% (73) were between 20 and 40 years, 32.5% (40) were between 41 and 60 years and 8.1% (10) were above 60 years. Among the 54.6% (148) females, 60.1% (89) were between 21 and 40 years, 37.8% (56) were between 41 and 60 years and 2.0% (3) were above 60 years.

The most commonly reported local reactogenicity were injection site pain, local redness, rashes and swelling over the injection site. 13.3% (36) reported pain over the injection site after each dose whereas 42.4% (115) reported pain after the first dose, and only 20.7%(56) reported after the second dose. Pain was reported less frequently among participants older than 40 years of age. Among those above 40 years, 11.9% (13) had pain after each dose, 40.3% (44) after the first dose and 14.6% (16) after the second dose. Among the younger participants (<40 years) 14.1% (23) were affected after each dose, 43.8% (71) after first dose and 24.6% (40) after second dose. A noticeably lower percentage of participants reported injection site redness or swelling following either dose. In general, local reactions were mild to moderate in severity.

Systemic events were also reported more in younger vaccine recipients (<40 years) than in older vaccine recipients (>40 years) and within each age group the frequency and severity of systemic adverse events were higher after the first dose. The most commonly reported systemic events were fever, headache, fatiguability, arthralgia and myalgia. Other systemic side effects were dizziness, chest tightness, and palpitation.

Fever was reported in 6.6% (18) after each dose, whereas 45.8% (124) had fever after the first dose and only 8.5% (23) after second dose. 48.1% (78) of the recipients who had fever after the first dose were in the age group less than 40 years and 42.2% (46) were in those more than 40 years.

3.3%(9) had headache after both doses; whereas 34.7% (94) had fever only after first dose and 8.1% (22) only after second dose. Fatiguability was noted in 8.1% (22) after both the doses, 34.6% (94) after first dose, 10.7% (29) after second dose. Chills were seen in 12.9%(35) recipients after the first dose and in 0.3% (1) after the second dose. 1.4% (4) and 2.5% (7) had

myalgia and arthralgia respectively after both the doses, 18.4%(50) and 27.6% (75) after first dose and 4% (11) and 5.9% (16) after second dose. Other systemic side effects like chest tightness, dizziness, and palpitation were also reported but were comparatively less (**Table 2,3,4**). No serious adverse event was reported.

Discussion

Two vaccines were available in India when the vaccination drive was started at the beginning of the year 2021. Of the two only the ChAdOx1 nCoV-19 vaccine (AstraZeneca Oxford vaccine) was available in Kerala initially. The ChAdOx1 nCoV-19 vaccine is a human adenovirus vector- based vaccine that targets the spike protein of the SARS-CoV2 virus.

This study aimed to analyze the safety and detailed adverse events of ChAdOx1 nCoV-19 vaccine among health care workers in a tertiary care center in Kerala.

In the ChAdOx1 nCoV-19 vaccine recipients, we have noted that the systemic events reported were fever, headache, myalgia, fatiguability, joint pain and chills and were more commonly seen in younger age vaccine recipients (<40 years). The higher incidence of systemic events may represent a more robust immune response in younger individuals compared to the older population [2,3]. It was also more common after the first dose. Immunogenicity of vaccines is often worse in older adults as a result of immune-senescence. In a study conducted on BNT162b2 (Pfizer vaccine) vaccine recipients, systemic events were also reported more in younger vaccine recipients (16 to 55 years) than the older vaccine recipients (>55 years) and that too more after the second dose than the first dose [2]. In our vaccine recipients, fever and fatigue were the commonly reported systemic events, whereas fatigue and headache were the most commonly reported systemic events after BNT162b2 vaccination. We had a high incidence of fever, but in the BNT162b2 recipients the incidence was less. [2] In another study done in UK, self-reported systemic and local side effects were analyzed, in those who received one or two doses of the BNT62b2 or one dose of the ChadOx1 nCov-19 vaccine. This was done within 8 days of vaccination by individuals using the COVID symptom study app. They found out that the incidence of systemic side effects was more after first dose of ChadOx1 nCov-19 vaccine when compared with BNT62b2. The incidence of local reactogenicity was more with BNT62b2 than with ChadOx1 nCov-19 vaccine [4]. It was similar to our study where systemic events were more after the first dose. Pain over the injection site was the local reaction most commonly seen after both doses, but the incidence was less after 2nd dose. Others like redness, rashes and swelling were less commonly seen.

In general, in our study reactogenicity was mild or moderate, and reactions were less common and milder in older adults than in younger adults. Both systemic and local reactogenicity were more common after the first dose than the second. The incidence of adverse events was more in females. No serious adverse event was noted. Short term adverse events were mild in severity and short lived.

Based on our results vaccine recipients can expect the following symptoms during the early phase after vaccination. Local reactogenicity: localized pain, redness, rashes and swelling. Systemic reactogenicity: Fever, headache, chills, fatiguability, myalgia, joint pain, dizziness, chest tightness, palpitation, nausea, vomiting and insomnia.

Among the total vaccine recipients, followed up over a period of 3 months, 35 of them developed Corona virus disease even after completing two doses. 3 others who got the disease had taken only one dose. All of them had only mild disease.

Our data can be used to educate people on the likelihood of adverse events on the basis of their age and sex. They can be assured that the adverse events are mild with no serious event

reported. It also emphasizes the need to practice safety measures as they can still get the

Conclusions

The current data suggest that the currently approved recombinant ChAdOx1 nCoV-19 vaccine is safe and effective for the vast majority of the population. A broad-based vaccine uptake is critical for achieving herd immunity. This is an essential factor in decreasing future surges of Covid 19 infections.

Adverse reactions were common after the ChAdOx1 nCoV-19 vaccine, as with the reports of other Covid 19 vaccines. It was more severe in young adults when compared to older vaccine recipients. The adverse reactions were more commonly seen after the first dose when compared to the second dose. No major serious adverse event was noted in vaccine recipients. Those who got the Covid 19 disease after vaccination were very few in spite of being HCWs; and they had only mild disease without any complication. Hence the vaccine is safe and effective and everyone should be encouraged to take the vaccine at the earliest.

Limitations

1. This was an independent study investigating self-reporting symptoms through a cloud-based survey. Their reported symptoms were not verified by the study investigators but were taken as reliable since they were all health care workers.
2. Most of the symptoms reported occurred in the early post vaccination phase, the late effects of the vaccine were not studied.

Funding

No funding was received from any source for conducting this study.

Acknowledgements

The authors wish to thank Dr. Bijoy Johnson, Consultant in Healthcare Data Analytics, for all the support and help given in data collection.

References

1. Umakanthan S, Sahu P, Ranade AV, et al. Origin, transmission, diagnosis and management of coronavirus disease 2019 (COVID-19). *Postgrad Med J*. 2020;96(1142):753-758. doi:10.1136/postgradmedj-2020-138234
2. Polack FP, Thomas SJ, Kitchin N, et al. Safety and Efficacy of the BNT162b2 mRNA Covid-19 Vaccine. *N Engl J Med*. 2020;383(27):2603-2615. doi:10.1056/NEJMoa2034577
3. Baden LR, El Sahly HM, Essink B, et al. Efficacy and Safety of the mRNA-1273 SARS-CoV-2 Vaccine. *N Engl J Med*. 2021;384(5):403-416. doi:10.1056/NEJMoa2035389
4. Menni C, Klaser K, May A, et al. Vaccine side-effects and SARS-CoV-2 infection after vaccination in users of the COVID Symptom Study app in the UK: a prospective observational study [published online ahead of print, 2021 Apr 27]. *Lancet Infect Dis*. 2021;S1473-3099(21)00224-3. doi:10.1016/S1473-3099(21)00224-3.