Pharmacovigilance of COVID-19 Vaccine among Health Care Workers in Chittagong Medical College Hospital

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Abstract

Background: Successive waves of COVID-19, the pandemic of 2020 is still sweeping throughout the world in terms of morbidity and mortality. The speed of development of the vaccines, preclinical trials, clinical trials, all are unprecedented. So there remained a concern about the short- and long-term health effects (Wanted and unwanted) of these vaccines. Bangladesh is fortunate enough to get supply of vaccine (Oxford-AstraZeneca) early in the course. As expected, the vaccination program was phased and the population was stratified according to health risk. Health care workers were among the first groups receiving that vaccine in Bangladesh. A study was conducted with the objectives of assessing and describing the adverse events following vaccination against SARS-CoV-2 and also of establishment of a post vaccination support clinic in Chittagong Medical College Hospital (CMCH) Bangladesh from February 2021 to June 2021.

Materials and methods: Prospective surveillance was done among the vaccine recipients healthcare workers of CMCH and their family members. Participants were enrolled after the start of first dose vaccination from February in CMCH and also after the second dose vaccination from April 2021. A number of 1334 participants were signed-up after first dose of vaccination and were followed up through second dose. The initiative was taken to address the complications arising from vaccination among the vaccine recipients both over telephone and also in ward 16 of CMCH for those whose complaints warranted a physical examination.

Results: A total of 1334 Oxford-AstraZeneca COVID-19 vaccine (AZD1222) (Covishield) vaccinated health care workers and their family members participated in the study, with age range from 18 to 89 years. More than 78% of them were within their 2nd to 6th decade of age. 19.2% of respondents were above 60 years old. Males were predominant in numbers than females (61.3% Vs 38.7%). Among the respondents, the majority were physicians by profession (51.4%). Among the recipients, about 30% had previous comorbid diseases; hypertension and diabetes mellitus being more common (18.6% & 14.4%). An elaborate distribution of 'Adverse Events Following Immunization' (AEFI) was furnished. 37.3% participants were identified as suffering from symptoms after receiving the first dose of COVID–19 vaccinations, while only 11.4% were affected after taking the second dose. Common symptoms experienced by the respondents after first and second doses of the vaccination were as follows: mild fever (Temp< 38° C), muscle pain, pain at immunization site, tenderness and soreness at injection site, headache, tiredness, fatigue, chills, dizziness etc. Recipients aged more than 50 years suffered significantly more symptoms. Gender and comorbidities did not influence in developing symptoms. There was no serious or fatal event.

Conclusion: According to the findings of this study the used vaccine Oxford-AstraZeneca AZ AZD1222 (Covishield) appear to be reasonably safe in adult population with few physical discomforts which are neither life threatening nor serious.

Key words: AEFI; COVID-19 vaccination; Pharmacovigilance.

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Introduction

In January 2020, an outbreak of severe pneumonia occurred in China which was named as SARS-CoV-2 infection.[1] After that it swept through continents rapidly creating a pandemic and is still continuing as successive waves. Bangladesh confirmed the 1st COVID-19 case at 8th March 2020.[2]

11th March 2020 World Health Organization (WHO) declared COVID-19 as a pandemic.[3] WHO confirms 509531232 cases globally with 6230357 deaths and 1324805837 doses of vaccine administered (As of 28th April 2022).[4]

As this was a newly discovered disease, there was no recommended treatment at the beginning of the epidemic. Through the course of time, several drugs and approaches were tried, many of which were later discarded. Even now there are only a few treatment options and each one is still debated. No prophylaxis is still recommended though some of them are on trial.[5] Since the beginning of the epidemic, an unprecedented, consorted, global effort had taken place to develop a vaccine. Several (More than 50) vaccines were developed initially which were put to preclinical and clinical trials.[6] Vaccine trials were expedited than normal and few vaccines became commercially available faster than any other vaccine in history. As these trials were expedited, there were concerns about the short- and long-term effects of these vaccines on human health.[7] Lots of vaccines were in race to get approval for commercial marketing and courtiers were trying to get vaccines from multiple sources.

There are several reporting systems for ongoing vaccination programs worldwide. WHO also enlisted COVID-19 vaccines in their vaccine related adverse events reporting software. In Bangladesh, there is a strong Adverse Event Following Immunization (AEFI) system running under EPI program.

Not much was known about adverse effects for SARS-Co-V2 vaccination, its immediate adverse events and long-term side effects before 2020, but few studies showed some nonfatal side effects.[8] In general, there were concerns about possible events following this immunization which was hampering the acceptance of this vaccine worldwide. So, setting up a specific clinic for following up the vaccine recipients was an absolute necessity where support and management for any health issue arising after vaccination would be provided. At the same time the consent for documenting the data for using those in future for scientific research could be acquired. Thus, an ambience of confidence among the recipients regarding vaccination would be created.

As these vaccines against SARS-CoV-2 were not studied extensively as other prior vaccines, its safety was not well documented. It was given permission for emergency use due to pandemic but in phase four trial, there is a chance of pharmacovigilance.[9] WHO was working in collaboration with scientists, business, and global health organizations through the Access to COVID-19 (ACT) Accelerator to speed up the pandemic response. When a safe and effective vaccine would be found, COVAX (Led by WHO, GAVI and CEPI) would facilitate the equitable access and distribution of these vaccines to protect people in all countries. Simultaneously, the group of people most at risk would be prioritized as well. Clinical events might occur when the vaccine was applied in populations with different ethnicity, co-morbidity or different community practices. For this reason, before mass immunization among a large population, any clinical event following vaccination should be documented and further assessed.

Materials and methods

This was a prospective type of observational study conducted in Chattogram Medical College Hospital, Bangladesh. The vaccine provided in this center was the Oxford-AstraZeneca COVID-19 vaccine (AZD1222) manufactured by the Serum Institute of India. The ethical clearance of this study was taken from Chittagong Medical College Ethical Review Committee. All the participants gave consent to participate.

Physicians and other healthcare workers and their family members who had taken vaccines from CMCH were invited to participate in the study, those consented were included. A post vaccine support center was established in a ward of CMCH which provided treatment for post vaccine complications. A system was established and provided beforehand to the vaccine recipients to communicate with the post vaccine support center and research physician to report any adverse clinical events following vaccination. Other participants were interviewed over telephone 7 days afterfirst and second dose of vaccination regarding any adverse events. Participants were also interviewed at the time of their dose of vaccination (2 months after first dose) regarding any health issues arising during this time. During clinic visits and telephonic interview their

information were documented in a pretested case record form. Notifiable adverse events were notified according to the national AEFI reporting format and to proper authority. If any participant required any treatment that was provided according to national protocol. All the participants' data were entered in an electronic database and analyzed accordingly with IBM-SPSS Statistics v.20.0 for Windows.

Results

A total of 1334 COVID –19 vaccinated health care workers and their family members participated in the study, with ages ranging from 18 to 89 years (mean 44.4 SD ± 17).Majority of the respondents (60.6%) were above 40 years of age, 19.2% of respondents were above 60. Male female ratio was 1.6 (61.3% vs 38.7%).Among the respondents, the majority were physicians (51.4%), followed by family members of HCW (37.6%), nurses (5.6%) and office and support staffs(5.4%) [Table I]. Only 44 recipients attended the support clinic.

Table I Baseline socio-demographic characteristics of the participants (n = 1334)

Age in groups	Number (%)
≤20 Years	28 (2.1)
21 - 30 Years	224 (16.8)
31 - 40 Years	274 (20.5)
41 - 50 Years	264 (19.8)
51 - 60 Years	288 (21.6)
61 - 70 Years	194 (14.5)
>70 Years	62 (4.7)
Gender	
Male	818 (61.3)
Female	516 (38.7)
Occupation	
Physician	685 (51.4)
Nurse	75 (5.6)
Office and support staffs	72 (5.4)
Family Members of HCW	502 (37.6)

Among the respondents, about 30% had comorbid diseases, hypertension and diabetes mellitus being the most common (18.6% & 14.4%). [Table II]

Table II Co-morbid diseases of the participants (n = 1334)

Co-morbid diseases	Number(%)
Present	396 (29.7)
Absent	938 (70.3)
Specific comorbidity	
Hypertension	248 (18.6)
Diabetes mellitus	192 (14.4)
Bronchial Asthma	64 (4.8)
Others	20 (1.5)

An elaborate distribution of 'Adverse Events Following Immunization' (AEFI) is furnished below. [Table IIIA, IIIB] 37.3% of participants were identified as suffering from symptoms after receiving the first dose of COVID –19 vaccinations, while only 11.4% were symptomatic after taking the second dose.99 (7.4%) recipients developed symptoms after both doses and 783(58.7%) did not develop any symptom after any dose.

Common symptoms experienced by the respondents after the first and second doses of the vaccination were as follows: mild fever (Temperature <38° C), muscle pain, tenderness at the injection site, headache, tiredness, fatigue, chills, dizziness, etc. Mild fever was the highest reported adverse effect; 15% after first dose and 2.6% after second dose. 9.6% of therespondents experienced muscle pain following the initial dose.

After first and second dose, 61.6%and 18% people of more than 50-years-age were symptomatic, while 20.6% and 6.8% were symptomatic in younger (<50 years) group(p value <0.001) [Table IV].

Persons with any of the comorbidities were symptomatic in 35.6% cases after first dose and 13.1% after second dose while people without co-morbidity were symptomatic in 38.1% and 10.7% cases respectively (p value >0.05).

Table IIIA Frequent clinical features after vaccination

Symptoms		Sex			
		Male (n)	Female (n)	Totalp (n)	value*
Fever	After First Dose	194	132	326	0.440
	After Second Dose	26	22	48	0.300
Muscle pain	After First Dose	78	50	128	0.926
	After Second Dose	6	7	13	0.259
Pain & tenderness at injection site	After First Dose	91	74	165	0.082
	After Second Dose	53	48	101	0.058
Headache	After First Dose	35	27	62	0.420
	After Second Dose	10	2	12	0.116

Table IIIB Less frequent clinical features

Symptoms	After First Dose No. (%)	After Second Dose No. (%)
Abscess	1 (0.1)	0 (0.0)
Arthritis	1 (0.1)	1 (0.1)
Chills	16 (1.2)	0 (0.0)
Cough	9 (0.7)	0 (0.0)
Diarrhoea	7 (0.5)	2 (0.2)
Dizziness	15 (1.1)	2 (0.2)
Drowsiness	7 (0.5)	0 (0.0)
Eczema vaccinatum	2 (0.2)	0 (0.0)

Table IV Frequency of symptoms after 1st and 2nd dose in recipients according to age group

Symptoms	Age ≤50 Years No. (%)	Age > 50 Years No. (%)	Total
After 1st dose	163 (20.6)	335 (61.6)	498
After 2nd dose	54 (6.8)	98 (18.0)	152

Discussion

A total of 1334 adult vaccine recipients were included in our study. All of them received two doses of Oxford-AstraZeneca AZD1222 (Covishield) vaccine two months apart. About one third recipients developed symptoms after first dose, whereas only around 11% developed symptoms after second dose. Reverse scenario was found in other studies.[10,11] Ours is a different population from those studies includes health care workers and their family members. This may be the reason for less reporting of symptoms after the second dose which was months later. We assume that much of the fear of unwanted effect of vaccine had been ameliorated by then and they might have ignored the minor symptoms. In this study, common reported symptoms were mild fever, muscle pain, tenderness at the injection site, headache, tiredness, fatigue etc. There was no reporting of anaphylaxis, aseptic meningitis, encephalitis, bleeding at injection site or cellulitis. Similar findings were found in studies conducted in neighboring countries and worldwide.[5,12,13,14,15]

In this study the incidence of symptoms after first and second dose of vaccination were significantly more in recipients aged more than 50 years. This finding contradicts with other studies who reported more symptoms in younger recipients.[10,11] This difference should be studied further.We did not find any significant gender related difference in the occurrence of symptoms;presence of co morbidity did not influence the incidence either.

Most of the respondents were health care workers so that they might have treated the symptoms on their own rather than coming to the post-COVID vaccination support clinic.Among those who attended the clinic there was no significant clinical finding unlike the study who reported rise of blood pressure after vaccination.[5] The symptoms frequently experienced by our participants are those commonly encountered at a routine vaccination program like EPI. This study was designed to describe the adverse events following immunization. We report occurrence of symptoms not unfamiliar with common vaccination program.

Limitation

It is a small study and within a selected population. So, the result of this study may not be representative of the general population. Ongoing national pharmacovigilance, though that is a passive surveillance process, may give us larger data and better understanding.

Conclusion

According to the findings of this study the used vaccine Oxford-Astra Zeneca AZ AZD1222 (Covishield) appear to be reasonably safe in adult population with few physical discomforts which are neither life threatening nor serious.

Recommendation

Further study with large samples and wide population to be recommended.

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Contribution of authors

RAMEU-Design, conception, manuscript drafting & final approval.

AAS-Data collection, critical revision & final approval.

AKG-Conception, data analysis, critical revision & final approval.

HN-Conception, critical revision & final approval.

SSA-Interpretation of data, critical revision & final approval.

MMR-Data collection, data analysis, critical analysis & final approval.

SDP-Data collection, data analysis, critical analysis & final approval.

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SMHK-Interpretation of data, drafting & final approval.

AG-Design, critical revision & final approval.

Disclosure

All the authors declared no conflict of interest.

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