Vaccine hesitancy: Pattern of side effects of the first dose of AstraZeneca COVID-19 vaccine among healthcare workers in Enugu

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Abstract

Vaccination is a basic public health intervention and its advancement in prevention of infectious diseases that plague humans has been evolving and helps to save humanity from extinction. This study aims to evaluate the common side effects of AstraZeneca COVID-19 vaccine and willingness to receive second dose among healthcare workers within Enugu metropolis. It was a cross -sectional survey carried out from March to June, 2021 using validated self-administered questionnaire among 89 participants. Data analysis were conducted using SPSS version 21.0 ($p<0.05$). The median age of the participants was 38 years and 71 (79.8%) of them constitute the frontline health-workers. Post vaccination side effects was reported by 78 (87.6%) of the participant. Among the reported side effects, pain at the injection site was the most common 55 (62%) while sore throat, chills and rigor were the least occurring in 13 (14.6%) respectively. The association between the presence of side effect of Oxford AstraZeneca vaccine and willingness to receive the second dose of the vaccine was ($p=1.00$) while the duration and number of the side effects associated with the willingness to receive the second dose of the vaccine were not statistically significant ($p>0.05$) respectively. The Oxford AstraZeneca COVID-19 vaccine has high safety profile margin, though with some side-effects which could not deter participants from getting vaccinated. Education of the masses on safety of current vaccines and future vaccines should be an integral component of public health initiatives aimed at achieving the desired herd immunity.

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Availability of data and materials: Data generated from this study cannot be shared publicly because they are based on de-identified national clinical records.

Ethics approval and consent to participate: The ethical approval was sought and obtained from research education and training committee of National Orthopaedic Hospital Enugu. The study was conducted in accordance with World Medical Declaration Of Helsinki Ethical Principle of Medical Research involving human subjects. The participants enrolled in this study signed a written informed consent form.

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Introduction

The dreaded impact of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) on health indices is quiet devastating putting a strain on the emergency health services globally with a huge public health concern. The latest global health statistics showed that healthcare workers in the frontline are getting infected and with some percentage of them dying from the COVID-19 virus.[1] The challenges in our region were particularly due to lack of personal protective equipment, ill equipped hospitals, poor knowledge on infection control measures, lack of testing kits and few molecular laboratories for prompt testing of suspected cases of COVID-19 infection.[2] The scientific community has evaluated the biology of corona virus and its mode of infectivity. At cellular level, the genome of corona virus is a single stranded positive sense RNA molecule with two arms – the 5'-terminus which contain overlapping open reading frame and 3'-terminus which encodes four structural proteins which include the Spike (S), Envelope (E), Membrane (M), and Nucleocapsid (N) protein.[3-5]

Nigeria commenced their COVID-19 vaccination program on 5th March, 2021 with Oxford/AstraZeneca vaccine. It was the third African country to get the vaccine through COVID-19 Vaccines Global Access,[6] the national COVID-19 deployment and vaccination plan aim to fully vaccinate 40% of its citizens against COVID-19 before the end of 2021, and 70% by the end of 2022. Currently Nigeria has been able to vaccinate 9.5% of the target population at the first dose which constitute about 5% of the target.[7]

The Oxford-AstraZeneca vaccine was one of the first two vaccines that was rolled out in UK since December 8th, 2020.[8] Its safety and efficacy has been established from meta analytical studies reported a pooled result of the Oxford-AstraZeneca chimpanzee adenovirus vectored vaccine in adult aged 18 years and older.[9] It is a modified adenovirus expressing the Spike protein (S) of SARS-CoV-2 which allow the development of cellular and humoral immunity against the virus.[10]

Vaccine hesitancy has been a complex setback towards achieving vaccination coverage that is broad enough to result in herd immunity and slow community transmission. To buttress this fact, World Health Organization has cited vaccine hesitancy as one of the top 10 global health drawbacks in 2019.[11] The contributing factors could vary across time, place and type of vaccine. The determinants include misinformation, sociocultural factors, increasing individual empowerment and decreasing trust in government institution.[12] The accelerated nature of development of COVID-19 vaccines was largely attributed to perceptions that corners are being cut with regard to safety assessment and misinformation about SARS-CoV-2 infection.[13]

The local and systemic adverse effect of COVID-19 vaccines are common which are of mild or moderate severity and limited to the first two days after vaccination which include redness, swelling, and pain at the injection site.[14-16] However available data on COVID-19 vaccine side effect are solely dependent on manufacturers directives which are in compliance with drug regulatory agencies guidelines. Consequently this has led to paucity of independent studies on COVID-19 vaccine safety margins coming among the end users. Hence this study aims to assess the possible side effects of Oxford/AstraZeneca COVID-19 vaccine and willingness to receive the second dose of the vaccine among the frontline health workers in Enugu, Nigeria.

Materials and Methods

Study design

This cross -sectional survey-based study was carried out from March to June 2021 to estimate the prevalence of side effects of Oxford/AstraZeneca COVID-19 vaccine among frontline health workers in Enugu metropolis. A convenient sampling method was used and consent obtained from the willing respondents. A total of 92questionnaires were distributed within government approved designated centers for inoculation of the vaccine and 89 was completely filled and returned for analysis.

Ethical Approval

The ethical approval was sought and obtained from research education and training committee of National Orthopaedic Hospital Enugu. The study was conducted in accordance with World Medical Declaration Of Helsinki Ethical Principle Of Medical Research involving human subjects.

Study Participants

The inclusion criteria for this study were healthcare workers and hospital non-clinical staff who were vaccinated with the Oxford/AstraZeneca vaccine during the early phases of vaccination phase in Enugu. The eligible participants should have received the latest dose of the vaccine no more than thirty days before filling this questionnaire. Non-healthcare workers who were vaccinated or healthcare workers who had another brand of the vaccine were excluded from the study. Participation in this study was voluntary and no form of financial compensation or other incentives given.

Instrument

The questionnaire for this study was made of structured multiple choice questions. The reliability of the questionnaire was validated from a closed data derived from healthcare workers that were recently vaccinated within the region and response consistently the same. The questionnaire was divided into three main categories: i) demographic data, including gender, age and profession; ii) vaccine side effects, which include most common side effects; iii) rarely reported side effects.

Statistical Analysis

Analysis were conducted using Statistical Package for the Social Sciences (SPSS) software version 21. Primary descriptive statistics were carried out for the variables listed above which were represented by frequencies, percentages, median while inferential statistics was used to evaluate the associations of the leading variables. The level of statistical significance was set at $p<0.05$.

Table 1. Socio-demographic characteristics of the study participants

Variables	Median (Range) / Frequency (%)
Age (years)	38.00 (26.00-62.00)
Gender	
Male	57(64.0)
Female	32(36.0)
Total	89(100.0)
Marital status	
Married	63(70.8)
Single	23(25.8)
Widowed	3(3.4)
Separated/Divorced	0(0.0)
Total	89(100.0)
Occupation	
Hospital Administration Staff	18(20.2)
Frontline Healthcare Workers	71(79.8)
Total	89(100.0)

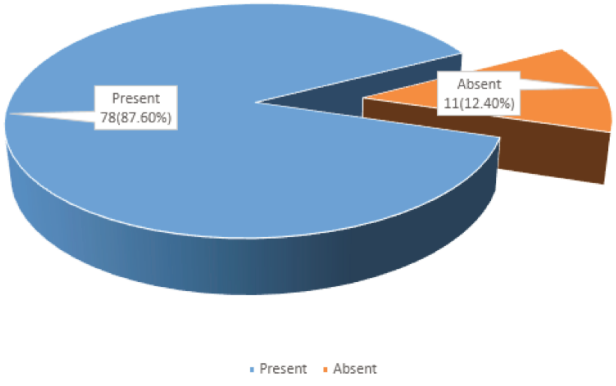

Figure 1. Prevalence of any side effect after the first dose of AstraZeneca COVID-19 vaccine.

Results

The result from this study revealed that the median age of the participants was 38 years, 71 (79.8%) of the participants were frontline health workers, of which 57 (64.0%) were males, and 63 (70.8%) of all the respondents were married, as shown in Table 1. The post vaccination side effects after receiving the first dose of prevalence of AstraZeneca COVID-19 vaccine showed that in this study 78 (87.6%) of the respondent had varying degrees of side effects as illustrated in Figure 1. Among the reported side effects of AstraZeneca COVID-19 vaccine, in this study pain at the injection site was on the lead as reported by 62% of the participants, while the least reported side effects were sore throat, chills and rigor, which constitute 14.6% respectively as shown in Figure 2. However for the less common side effects of AstraZeneca COVID-19 vaccine dizziness (13.5%) was commonly reported side effect followed by swelling at the injection site (12.4%), while anosmia (3.4%) is the least reported among the less common side effects as shown in Figure 3. The findings from this study as shown in Table 2, there was no association between the presence of side effects of AstraZeneca COVID-19 vaccine and willingness to receive the second dose of the vaccine (p=1.00). Similarly, the duration and number of the side effects were and association with the willingness to receive the second dose of the vaccine (χ^2=4.46, p=0.22) and (U=308.50, p=0.48), among the healthcare workers.

Discussions

The large number of healthcare workers that took part in the COVID-19 vaccination could be attributed to government driven policy to ensure that they belong to the group of highest priority for vaccination in Nigeria.[17] This could help the undecided citizens who need to have the efficacy and safety of the vaccines confirmed.[18] As shown in Table 1 in this study, 71 (79.8%) respondents are frontline health workers. The enthusiasm of the healthcare workers to consent for COVID-19 vaccination in this study also corroborates with a study from United States, which involved 3479 health workers: only 8% opted out from the study, which showed a high level of participation.[19] AstraZeneca vaccine safety and efficacy has been established from meta analytical studies reported a pooled favorable result in adult aged 18 years and older.[20] In the present study as shown in Table 2,out of all the 89 (100.0%) participants, 78 (87.6%) of them reported post-vaccination side effects. The most common side effects reported were injection site pain (62.9%), followed by myalgia (47.2%), and headache (46.1%). The skin reactions are common as it is seen in other non COVID-19 vaccines.[21] In the present study, the injection pain concurs with earlier study done in Jordanian and Polish health workers,[22,23] though slightly higher than 58.7% of the respondents as reported in an another observational study done in United Kingdom.[24] The less common side effects experienced by the par-

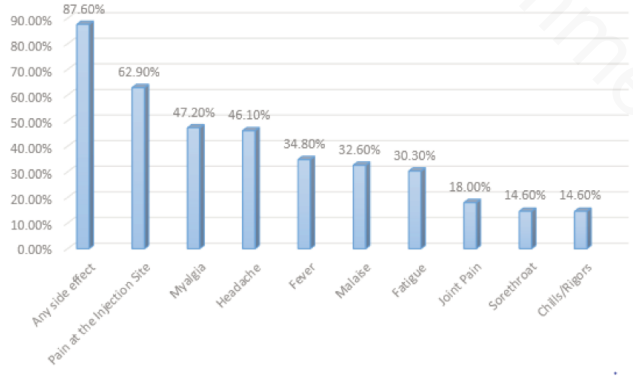

Figure 2. Frequency of commonly reported side effects.

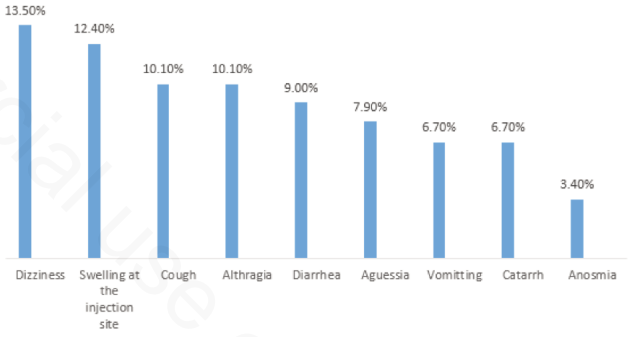

Figure 3. Distribution of less common side effects.

Table 2. Relationship between the presence, duration and number of side effects on the willingness to receive the second dose

Variables	Willingness to receive the second dose Yes	No	Test stat	p-value
Any side effect			FT	1.00
Present	70(87.5)	8(88.9)		
Absent	10(12.5)	1(11.1)		
Total	80(100.0)	9(100.0)		
Duration of side effects			χ^2 = 4.46	0.22
<24 hours	23(29.1)	4(44.4)		
24-28 hours	30(38.0)	1(11.1)		
49-72 hours	15(19.0)	1(11.1)		
>72hours	11(13.9)	3(33.3)		
Total	79(100.0)	9(100.0)		
Median number of side effects (IQR)	3.00 (4.00)	4.00(7.00)	U=308.50	0.48

IQR = Interquartile Range, U = Mann-Whitney U-Test

ticipants in this study include dizziness (13.5%), which is the most frequent, and anosmia (3.4%), the least as shown in Figure 2. This contrasts with the earlier study done by Azim *et al.*[25] which reported sore throat, nausea and diarrhea.

The findings in this study reveal that most of the participants 30 (38.0%) admitted that the duration of side effects of the vaccine received lasted between 24 to 48hours. Also most of the participants (70, 87.5%) inoculated with the vaccine Oxford AstraZeneca who experienced some side effects reported that such side effects never deterred them from taking the second dose. Thus there is no significant association between the presence of side effects of AstraZeneca COVID-19 vaccine and willingness to receive the second dose of the vaccine (p=1.00). The outcome reinforced the cross-sectional surveys across the globe which identified perception of COVID-19 vaccines as safe and effective as the core determinant of COVID-19 vaccination intentions.[26,27] The participant assumed health behavior aligned with the Health Belief Model considering the perceived risks and benefits alongside perception of disease threat.[28] Thus the widespread campaign advertisements of COVID-19 vaccine safety could be responsible for improved vaccine uptake. Jones *et al.*,[29] in their study of influenza vaccination reported that effective communication was the inevitable tool that led to its success as people believed that vaccine would prevent disease and will not have a negative impact on their health.

Conclusions

The current data suggested that currently approved Oxford AstraZeneca COVID-19 vaccine has a high safety profile margin, though with some side effects that has not deterred the participants from being fully vaccinated as recommended. Thus educating the general public about the safety of current vaccines and future vaccines should be an integral component of public health initiatives to achieved the desired herd immunity

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