



Original Article

Association of Post Vaccination Shoulder Pain with Sinovac and Astrazeneca COVID-19 Vaccines: A Cross-Sectional Study

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ABSTRACT

The world is facing severe pandemic due to COVID-19. AstraZeneca and Sinovac both vaccines are being used in many countries to fight against this Fatal Virus. Both AstraZeneca and Sinovac vaccines have some side effects, shoulder pain is one of the most common post vaccination side effect after receiving these vaccines. **Objectives:** Purpose of this study was to determine the association of post-vaccination shoulder pain among individuals who had been administered with AstraZeneca & Sinovac COVID-19 Vaccines. **Methods:** A descriptive study design was chosen to conduct this research. Study duration was six months. Sample selection was based on inclusion and exclusion criteria. Sample size was 143 with 71% response ratio. Snowball sampling (non-probability sampling) technique was adopted. Data were collected from various areas of Lahore using self-administered questionnaire. Responses were collected using questionnaire and data was analyzed by using SPSS version 22.0. Chi-square test and cross tabulations were executed to determine association of the variables. **Results:** 143 individuals were reviewed for this study. Among total respondents, 65% reported shoulder pain after first dose and 50.3% respondents reported shoulder pain after second dose. P-value after chi-square test was <0.001 after both doses and level of significance was adjusted to 0.05. **Conclusion:** This study concluded that there is significant association of post vaccination shoulder pain among those individuals having received Sinovac nad Astrazeneca inoculation for COVID-19.

INTRODUCTION

COVID-19 was first reported on 31st December, 2019 by World Health Organization (WHO) which entered the global landscape, altering the daily lives of everyone in its path. A fatality rate of coronavirus is approximated from 2-3%. AstraZeneca and Sinovac both vaccines are being used in many countries to fight against this Fatal Virus [1]. Vaccine prepares the body's natural protection which is known as an immune system to fight against the virus [2]. Both AstraZeneca and Sinovac vaccines have some side effects too, shoulder pain is one of the most common post

vaccination side effect after receiving these vaccines. Possible side effects of vaccines related to shoulder are joint pain which limit the range of motion (ROM), injections site pain, myalgia, tenderness, swelling and SIRVA [3]. Shoulder Pain after COVID-19 vaccination can also be a referred pain of some serious disease [4]. Injection site pain and soreness have been noticed as most common side effect reported by 17 to 21 percent of people who received various doses of vaccines [5]. CoronaVac was exhibited to be well tolerated and didn't cause dose-related safety

concerns in Phase 1 and 2 clinical studies involving healthy persons among the age of 18-59 years and those aged 60 years and older. Most common side effect was injection site pain and hypersensitivity reactions were the least common symptoms reported [6]. The European Medicine Agency's (EMA) Pharmacovigilance Risk Assessment Committee (PRAC) discussed about thrombo-embolic disorders associated with COVID-19 vaccine. Aside from Deep Venous Thrombosis (DVT), there have been 8 cases of disseminated intravascular coagulation (DIC) and 18 cases of central vein thrombosis (CVT) reported and record of 9 deaths also found [4]. Most of the candidates were women and their average age reported was <55, which is alarming. Most worrying fact is that these effects are life- threatening [7]. Myalgia and arthralgia are common musculoskeletal problems after vaccination. Shoulder injury related to vaccine administration (SIRVA), explained as shoulder pain and restricted range of motion (ROM) that usually occurs after intramuscular injection in the upper arm, is well known medical problem in medical literature [8]. Millions of COVID-19 vaccine doses have been administered in the whole world and after that, many cases of post-vaccination subacromial-subdeltoid bursitis has been reported due to unintended vaccine administration into bursa [9]. Aims and objectives of this study are to find any association of shoulder pain after receiving AstraZeneca and Sinovac covid-19 vaccines and to find the association of shoulder pain or discomfort and other similar effects after first and second dose of both vaccines. There was no association of shoulder pain in individuals receiving AstraZeneca & Sinovac COVID-19 Vaccines. There was association of shoulder pain in individuals receiving AstraZeneca & Sinovac COVID-19 Vaccines.

METHODS

A descriptive cross sectional study design was chosen to investigate the research query. A non-probability sampling technique, snowball sampling was used to collect responses. Study setting was various areas of Lahore where the target population was approached on site and online both (web-based questionnaire) to record their responses. The sample size was estimated around 200 individuals. As per snowball sampling method, the following mathematical operations were performed to calculate the sample size and response ratio [10]. Respondents in researcher contact = 40, Expected person in contact with respondents = 5, Targeted population = 40*5 = 200, Response collected = 143, Response ratio = 143/200 = 71 %. People with age group between 30-60 years. Both male and female participants. Individuals reported shoulder pain after COVID-19 vaccination [11]. Individuals who received COVID-19 vaccination with post-

covid condition [9]. Individuals received vaccination without having COVID-19 disease [12]. Individuals who have been vaccinated with both doses. Exclusion Criteria: People experiencing shoulder pain prior to AstraZeneca or Sinovac COVID-19 vaccination. Individuals vaccinated with only first dose. A self-administered questionnaire was used to collect data. Participants recorded their responses after informed consent via direct on-site and web based online survey. SPSS version 22.o software was used for data analysis. Results of data were determined according to the Chi-Square test and cross-tabulation for finding association of shoulder pain in individuals receiving AstraZeneca and Sinovac COVID-19 vaccines

RESULTS

Results obtained from data shows that out 143 candidates almost 70% were from age

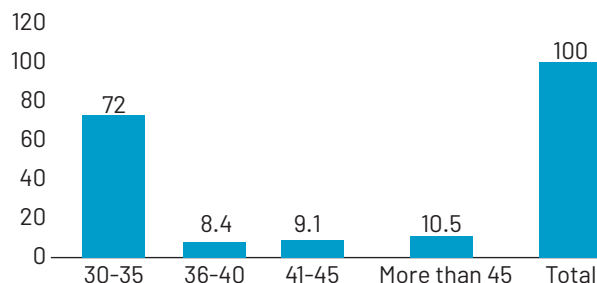


Figure 1: Age of respondents group 30-35 years while others fell in age group 36-40,41-45 and more than 45 (upto ≥60) with percentages 13%, 14.5%, and 15% respectively. The distribution of frequencies and percentages of population vaccinated with AstraZeneca and Sinovac. Among total 143 respondents 22.4% (f =32) were vaccinated with AstraZeneca and 77.6% (f=111).

	Shoulder Pain	Frequency	Percent
(1st dose)	No	50	35.0
	Yes	93	65.0
	Total	143	100.0
(2nd dose)	No	71	49.7
	Yes	72	50.3
	Total	143	100.0

Table 1: Percentage ratio of respondents reported discomfort or shoulder pain after first & second dose

Table:1 shows frequency of subjects receiving second shot of the both the vaccines. 65% reported pain after first dose of both vaccines. While on second dose shows that 50.3% respondents among them shows symptoms of discomfort and pain while 49.7% didn't experience any discomfort or pain in shoulder.

Symptoms	After 1st Dose		After 2nd Dose	
	Frequency	Percent	Frequency	Percent
Little to no swelling	70	49.0	83	58.0
Swelling with pain and difficulty in movement	27	18.9	21	14.7
Swelling with pain but no restriction in movement	34	23.8	27	18.9
Others	12	0.12	12	8.4

Table 2: Percentage ratio of symptoms experienced at injection site after first & second dose

Table 2 shows population of individuals who have experienced post vaccination swelling on injection site after first dose. After first dose 49% out of total population experience little to no swelling. Swelling with pain and difficulty in movement was experienced by 18.9% and swelling without reaction was seen in 23.8%. 0.12 % were other symptoms after first dose. While after second dose little to no swelling, swelling with restricted movement and swelling without restricted movement was reported by 58%, 14.7% and 8.4% respectively. 8.2 % were others symptoms after second dose.

Duration	After 1st Dose		After 2nd Dose	
	Frequency	Percent	Frequency	Percent
12-24 hours	56	40	28.0	28.0
3-4 days	40	31	21.7	21.7
6-7 days	10	12	8.4	8.4
No Pain	37	60	4.0	4.0
Total	143	143	100.0	100.0
p-value	<.001		<.001	

Table 3 Association between duration of pain after first & second dose of both vaccines

Level of significance was adjusted to 0.05 ($\alpha=0.05$). Results from the Chi-Square test (Table 3) were <0.001 , which express that there was statistically significant association between shoulder pain and the administration of vaccines under concern.

DISCUSSION

This study was conducted to find any association of shoulder pain in individuals receiving Sinovac and AstraZeneca COVID-19 vaccines. 30-35 years while others fell in age group 36-40, 41-45 and more than 45 (upto ≥ 60) with percentages 13%, 14.5%, and 15% respectively. These results are similar to study of Theodorou et al., and Abbas et al., [12,13]. Among total 143 respondents 22.4% ($f=32$) were vaccinated with AstraZeneca and 77.6% ($f=111$). These results are similar to study of Smerilli et al., 2021 who stated that less people were vaccinated with AstraZeneca vaccine due to vaccine hesitancy [14,15]. 65% reported pain after first dose of both vaccines. While on second dose shows that 50.3% respondents among them shows symptoms of discomfort and pain while 49.7% didn't experience any discomfort or pain in shoulder similar to Andrezejczak-Grazadko et al., [16]. Level of significance was adjusted to

0.05 ($\alpha=0.05$). Results from the Chi-Square test were <0.001 that means alternative hypothesis is accepted, which express that there was statistically significant association between shoulder pain and the administration of vaccines under concern, and null hypothesis is rejected [17]. Results obtained from data shows that there were very few respondents vaccinated with AstraZeneca vaccine as described in the study of Smerilli et al., 202 [14]. 65% reported pain or discomfort in shoulder after first and 50.3% after second dose of both vaccines [18]. According to the current study, that showed similar results to study of Andrezejczak-Grazadko et al., in which 60.3 % Individuals reported these symptoms [16,19]. According to the study of Sah et al., mostly pain was reported after 30 minutes of vaccine administration. Whereas in this study After first dose, in 39.2% participant, pain had been lasted for 12-24 hours post vaccination. 28% and 7% participants reported their pain ended in 3-4 days and 6-7 days, respectively. 25.9% reported no pain, while after second dose, duration of pain in 28% respondents was 12-24 hours while the pain duration in 21.7% and 8.4% respondents was 3-4 days and 6-7 days, respectively and 42% respondents reported no pain, rendering the findings comparable to a study conducted by Singhal et al in 2020 [20,21]. Whereas, in this study 32.2% and 32.9% reported pain after 30 min of first and second dose respectively. Limitations of the study were small sample size due to COVID-19 and due to large number of population. This study included only two vaccines, other vaccines can also be included in further future studies.

CONCLUSION

From this study, it was concluded that there is an association of shoulder pain in individuals receiving both doses of Sinovac and AstraZeneca COVID-19 vaccines. Immune system response to vaccine, shoulder injury related to inappropriate vaccine administration, tenderness, soreness over the injected area and injection site pain are some common causes of post-vaccination shoulder pain after the administration of these vaccines.

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