Original Research Article

Post vaccination side Effects of Different available vaccines among People of Karachi, Pakistan: A cross sectional Study

Abstract

As vaccination one of the best remedies to eliminate the harm of Corona virus. **Objectives:** The aim of the study was to highlight the side effects of covid 19 vaccines among people in Karachi Pakistan. **Methodology:** A cross sectional study was conducted between May - October 2021. Demographic Data of all Participants, Health status, COVID-19 related anamnesis of vaccinated individuals and Prevalence of side effects after vaccination among individuals were reported. **Results:** Side effects such as pain at the site of injection were found in males (64.2%),in females (54.6%) and in trans genders were (66.6%), fatigue in male were (33.3%), in females were (28%), Nausea and vomiting in males were (28.5%), in females were(17.3%) and in transgenders (33.3%), Abdominal Pain in males were (11.9%),in females were (8%) and Diarrhea occurred in males (35.7%) & in females (16%) after vaccination which subsided after few days or hours and no Hospitalization reported **Conclusion:** side effects after vaccination were predictable and mild this data help in reducing vaccine hesitancy as well as clear conspiracy theories regarding COVID vaccines.

Key words: Post-Vaccination, COVID-19, Vaccines, Pandemics, Side effcets

1. Introduction

Severe Acute Respiratory Syndrome Corona virus-2 (SARS-COV 2) was emerged from city Wuhan Hubei Province China. The beginning of SARS COV 2 appearance was linked to Animal Market in Wuhan where it is possibly come to the fore from Bat(Ahmed et al., 2020). THE Virus is acknowledge as Novel because the evolution characters is completely different from the previous known viruses strain(Gorbalenya et al., 2020). National Health commission and China CDC after the disclosure and scanning of complete viral genome of the virus. On 3rd January, 2020 the virus first named as 2019-ncov (2019 Novel corona virus) and the disease called as (NCIP) Novel coronavirus infected Pneumonia(Tan et al., 2020). On 31st January, 2019 WHO reveals (SARS-COV 2) as Pandemic (WHO d), as the virus spread globally(Hatmal et al., 2021) and it is up to the present time(Saeed et al., 2021)covid . It is disseminate from person to person at a very fastest rate through wheeze, saliva, urine, fecal matter and contact with infected person(Tahir et al., 2021). The main combat area for this virus are lungs as the lungs Alveoli are rich in ACE 2 Receptors(Wadman et al., 2020). Virus strike the epithelial cells of the lungs and resulting in Diffuse Alveolar damage (DAD) resulting in Respiratory failure in patients(Gu et al., 2020). After virus attack WBC, Dead cells, Mucus and pus or fluid all together in the Alveoli causes Acute Respiratory Distress syndrome with side by side symptoms of Pneumonia like fever, cough and difficulty in breathing resulting in Hypoxia(Xu et al., 2020). People having older age, lung disease, CVD, diabetics and Hypertension are at high risk for severe covid-19. To fight against covid 19 many

supportive options has been suggested(Hatmal et al., 2021) which includes NSAIDS, Antipyretic for fever and pain reduction(Wu et al., 2020), oxygen therapy to maintain oxygen saturation(Røsjø et al., 2011). As an Empiric therapy Antibiotics were suggested(Rhodes et al., 2017). IV resuscitation or vasopressin for resulting persistent shock(Schultz et al., 2019). For the management of cardiac shock or failure Beta Agonist Dobutamine and systemic steroid against COPD exacerbation are suggested as supportive therapy(Alhazzani et al., 2021) and for immunity booster some vitamins and Chinese medicine also reported to manage covid 19 disease. This pandemic has imposed a heavy impact Disease and socio economic burden all over the world(Tuite et al., 2020). In Karachi the first case of covid 19 was reached through Iran on 26th February, 2020(Ahmed et al., 2020). The non-Pharmaceutical intervention between the covid Pandemic like wearing mask, using Hand sanitizer , washing hand and maintaining social distance was less perceive this behavior from the public was thought to associated with different religious beliefs that covid not exist. According to the covid government website of Pakistan in October 202 confirmed covid cases in Pakistan were 462,859 whereas deaths were reported to be 28,134 in Karachi. Despite of Health challenges covid 19 creates other directly or indirectly such as Anxiety and Depression(inyat, 2020) (Meo et al., 2020). The process by which immune system after administrating a vaccine to create protection against an infection is called vaccination it prevent illness by the stimulation of Body Adaptive immunity process(Swetha et al., 2020). In reducing the disability, death as well as the burden of disease vaccination can play an important role(Andre et al., 2008). The National command and control center (NCOC) in Pakistan manages the covid 19 vaccination where front line health care workers involving inpatient care with suspected and confirmed cases of covid 19 was on top priority for vaccination followed by other Health workers ,teachers and general public(Naeem et al., 2020). Acceptance of vaccination by the general public is the most important thing for the complete success of immunization program(DeRoo et al., 2020). Although many Narrative conspiracies in Pakistan against covid 19 such as the installation of 5G chips in Human and associated infertility affects the people decision in taking covid 19 vaccine after its availability(Uscinski et al., 2020). In 2019 WHO Considered vaccine hesitancy in the top ten threats to the world. It has been previously reported that social media was the main source of spreading such conspiracies(Suarez-Lledo and Alvarez-Galvez, 2021). Currently available vaccine in Pakistan against SAR COV-2 are prepared by the following methods a) mRNA based vaccine Pfizer Biontech and Moderna b) viral vector based Sino pharm and sinovac c) Protein subunit vaccine Vaxzervia d) whole virus sputnik(Klugar et al., 2021). Pfizer Vaccine Biontech and Moderna vaccine use Lipid Nanoparticle delivery system or modified RNA System (Dolgin, 2020), the vaxzevria replicated deficient chimpanzee Adenovirus inoculating the SARS-COV-2 protein in the body to initiate immune response(Voysey et al., 2021). sputinik V uses the two adenovirus vector Ad5 and Ad26 which helps in the spike protein gene expression(Logunov et al., 2020). Sino pharm is the inactivated whole virus made from vero cell. Multiple copies of SARS-COV-2 Virus which are treated with Beta propionalactone deactivating the virus by binding to the gene(Siddique et al., 2021). Cansino Bio contain modified common cold virus and as vector for inoculation of corona virus genetic material in the Human Body It helps in the boost of T cells Response which Helps in the combaction of disease(Ramasamy et al., 2020). According to NCOC latest update till 13th October 2021 64,947,702 of people got their first vaccine while 34,809,848 peoples are fully vaccinated while the total Dose of the covid vaccine administered are 93,551,193. According to CDC (Center of Disease control and prevention) the common ADR after Post vaccine includes pain at the site of injection , fever ,chills , fatigue ,myalgia ,Headache and Nausea Vomiting(Abu-Hammad et al., 2021). The primary objectives of this study is to evaluate the short time side effects of all available vaccine in Pakistan Post vaccination side effects in the people of Karachi the secondary objectives were evaluation of medical risk and demographic factor of covid -19 Vaccine side effects and to compare between side effects frequency and intensity.

2. METHODOLOGY

A cross sectional study was conducted for the period of 6 months starting from May - October 2021. A self-administered online survey Questionnaire created on Google form. Link of which had been delivered using Whatsapp. Authors declared no conflict of interest, informed consent were given to all Participants, No incentives or compensation was given to participants. Individuals $\geq$ 18 years were included Individuals less than 18 years were not allowed to participate in survey Questions of the survey were multiple choice questions and closed ended questions language of questions were in English. The survey was in three sections first were demographic factors, second were about Chronic diseases and Participants are vaccinated or not, type of vaccines they are vaccinated. The main focus of this study is to identify the side effects associated with vaccine. Data were analyzed by using SPSS Version 20.0

3. RESULTS

Table 1: represent the Demographic data of participant's n= (42) (35.8%) were males, n= (75) (62.5%) were females and n= (3) (2.5%) were transgenders. Age of Participants were 18-30 years males n= (37) (88%), females n= (59) (78.6%) and Transgenders n= (2) (66.6%).Participants with age 31-40 were males n= (4)(9.52%), Females n=(11)(14.6%) and Transgenders n=(1)(33.3%).Participants age between 41-50 includes males n=(1)(2.38%), Females n=(05)(6.66%) and no transgenders were found to be in this age limit. The marital status of all participants were found to be that n=(9)(21.4%) males and n=(10)(13.3%) females were married however n=(33)(78.5%) males, n=(63)(84%) females and n=(3)(100%) transgenders were unmarried. Participants that were widow includes n= (2)(2.66%) females were widow. The education level of all participants includes males n=(2)(4.76%), females n=(2)(2.66%) and transgenders 1(33.3%) were matric whereas Males n=(8)(19%),females n=(24)(32%) and transgenders n=(1)(33.3%) were found to be intermediate. Males n= (18) (42.8%), females n= (23) (30.6%) were master/graduated. Participants that were medical students includes males n=(14)(33.3%), Females n=(26) (34.6%) and transgenders n=(1)(33.3%).The Employment status of participants were found to be males n=(10)(23.8%),females n=(16)(21.3%) and transgenders n=(2)(66.6%) were found to be employed, Participants that were unemployed includes males n=(8)(19.04%), females n=(6)(8%) were unemployed Participants that were students includes males n=(22)(52.38%),females n=(51)(68%) and transgenders n=(1)(33.3%).Nationality of our all Participants were found to be Pakistani n=(120)(100%).**Table 2:** represent the Health status and chronic Diseases that participants suffered. R In our study we found that n=()(%) were healthy and had no chronic disease while Participants males n=(1)(2.38%),Females n=(3)(4%) and n=(1)(33.3%) transgenders were Diabetic, n=(39)(92.8%) males, n=(70)(93.3%) females and n=(2)(66.6%) transgenders were not Diabetic. However Participants n= (2) (4.76%) males, n= (2)(2.66%)were not sure. Participants n=(2)(4.76%) males, n=(3)(4%) females were suffered from Hypertension where as Participants n=(36)(85.7%) males, n=(68)(90.6%) females and n=(3)(100%) transgenders were not Hypertensive however n=(4)(9.52%) males, n=(4)(5.33%) females were not sure about Hypertension n= (2) (2.66%) females were found to have Heart Disease however n= (41) (97.6%) males, n= (68) (90.6%) males and n= (3) (100%) transgenders had no complain of Heart Disease however n= (1) (2.38%) males, n= (5) (6.66%) females were not sure. Participants suffered from liver Disease incudes n= (2) (4.76%) male, n= (2) (2.66%) female and n= (1) (33.3%) transgenders had liver Disease however n= (40) (95.2%) male, n= (70) (93.3%) female and n= (2) (66.6%) transgenders had no liver disease however n= (2) (4%) female not sure. Participants of this study suffered from Renal insufficiency includes n= (1) (2.58%) male, n= (3) (4%) female however participants n= (41) (97.6%) male, n= (72) (96%) female and n=

(3) (100%) transgenders had no renal insufficiency **Table 3** Compares how many participants are vaccinated and received which brand of vaccines. Participants that were vaccinated includes n= (41) (97.6%) males, n= (72) (96%) females and n= (3) (100%) transgenders however n= (1) (2.38%) males, n= (3) (4%) females were not vaccinated. Those Participants that were vaccinated with Pfizer includes n= (3) (7.14%) males, n= (11) (14.6%) females, n= (1) (33.3%) transgenders whereas n= (39) (92.8%) males, n= (64) (85.3%) females and n= (3) (100%) transgenders were not vaccinated with Pfizer vaccine. Participants vaccinated with AstraZeneca includes n= (2) (2.66%) males and n= (1) (33.3%) transgenders while n= (42) (100%) males, n= (73) (97.3%) females and n= (2) (66.6%) transgenders were not vaccinated by AstraZeneca. Vaccination of Participants by vaccine sputnik includes n= (2) (2.66%) females however n= (42) (100%) males, n= (73) (97.3%) females and n= (3) (100%) transgenders were not vaccinated by sputnik. Participants that were vaccinated with Sino pharm includes n= (13) (30.95%) males, n= (29) (38.6%) females and n= (1) (33.3%) transgenders. Participants that were not vaccinated by Sino pharm includes n= (29) (69%) males, n= (46) (61.3%) female and n= (2) (66.6%) transgenders were not vaccinated by Sino pharm vaccine. Participants of this study that were vaccinated by sinovac includes n= (17) (40.4%) male, n= (28) (37.3%) female and n= (1) (33.3%) transgenders. However, n= (25) (59.5%) male, n= (47) (62.6%) female and n= (2) (66.6%) transgenders were not vaccinated by sinovac vaccine. Another vaccine of sever acute respiratory syndrome (SARS) Covid 19 vaccine is Cansino Bio participants vaccinated by it include n= (9) (21.4%) males, n= (3) (4%) females however n= (33) (78.5%) males, n= (72) (96.1%) females and n= (2) (66.6%) transgenders were not vaccinated by Cansino Bio. **Table 4** Present the prevalence of general Adverse Reaction among males and females n= (27) (64.2%) males, n= (41) (54.6%) females and n= (2) (66.6%) transgenders had pain at site of injection however n= (15) (35.7%) males, n= (34) (45.3%) females and n= (1) (33.3%) transgenders had no pain at the site of injection. According to Participants that pain at site of injection last at one day includes n= (26) (61.9%) males, n= (60) (80%) females and n= (1) (33.3%) transgenders However Participants whose pain last in one week includes n= (12) (28.5%) males, n= (11) (14.6%) females and n= (2) (66.6%) transgenders. Participants suffered from fever after COVID vaccination includes n= (14) (33.3%) males, n= (23) (30.6%) females however n= (28) (66.6%) males, n= (52) (69.3%) females and n= (3) (100%) transgenders had no fever after vaccination. Participants that suffered from fatigue includes n= (14) (33.3%) males, n= (21) (28%) females whereas participants n= (28) (66.6%) males, n= (54) (72%) females and n= (3) (100%) transgenders were not complain about fatigue after vaccination. Participants that faced Nausea and vomiting condition includes n= (12) (28.5%) males, n= (13) (17.3%) females and n= (1) (33.3%) transgenders However n= (30) (71.4%) males, n= (62) (28.5%) females and n= (2) (66.6%) transgenders had no Nausea and vomiting. Participants that were suffered with abdominal pain includes n= (5) (11.9%) males, n= (6) (8%) females. n= (37) (88%) males, n= (69) (92%) females and n= (3) (100%) Transgenders had no abdominal pain after vaccination. n= (7) (16.6%) males, n= (12) (16%) females suffered Diarrhea however n= (35) (83.3%) males, n= (63) (84%) females and n= (3) (100%) transgenders had no compliant of Diarrhea. In our study n= (15) (35.7%) males, n= (28) (37.7%) females had no side effects such as pain at the site of injection, fever, fatigue, Diarrhea and Abdominal pain

Table 1: Demographic Data of Participants (n=120)

Details of Participants	**Frequency (n)**	**Percentage (%)**

Gender of Participants		Males	42	35.8%
		Females	75	62.5%
		Transgenders	3	2.5%
Age of Participants	18-30	Males	37	88%
		Females	59	78.6%
		Transgenders	2	66.6 %
	31-40	Males	4	9.52%
		Females	11	14.6%
		Transgenders	1	33.3%
	41-50	Males		1 2.38%
		Females	05	6.66%
		Transgenders	0	0%
Marital Status	Married	Males	9	21.4%
		Females	10	13.3%
		Transgenders	0	0%
	Un married	Males	33	78.5%
		Females	63	84%
		Transgenders	3	100%
	Widow	Males	0	0%
		Females	2	2.66%
		Transgenders	0	0%
Education level	Matric	Males	2	4.76%
		Females	2	2.66%
		Transgenders	1	33.3%
	intermediate	Males	8	19%
		Females	24	32 %
		Transgenders	1	33.3%
	Masters/Graduated	Males	32	76.1%
		Females	49	65.3%
		Transgenders	1	33.3%
Employment status				
	Employed	Males	10	23.8%
		Females	16	21.3%

	Transgenders	2	66.6%
UN employed	Males	08	19.04%
	Females	06	8%
	Transgenders	0	0%
Student	Males	22	52.38%
	Females	51	68%
	Transgenders	1	33.3%
Own Business	Males	2	4.76%
	Females	2	2.66%
	Transgenders	0	0%
Nationality	Pakistani	120	100%
	Non-Pakistani	None	

Table 2: Health status and chronic conditions of Participants

Conditions	**males=45, Females =75, Transgenders= 3**

		Yes	no	not sure
Diabetic	males	1 (2.38%)	39(92.8%)	2(4.76%)
	Females	3 (4%)	70(93.3%)	2(2.66%)
	Transgenders	1(33.3%)	2(66.6%)	-
Hypertensive	males	2(4.76%)	36(85.7%)	4(9.52%)
	Females	3(4%)	68(90.6%)	4(5.33%)
	Transgenders	0	3(100%)	-
Heart Disease	Males	0	41(97.6%)	1(2.38%)
	Females	2(2.66%)	68(90.6%)	5(6.66%)
	Transgenders	0	3(100%)	0
Liver Disease	males	2(47.6%)	40(95.2%)	0
	Females	2(2.66%)	70(93.3%)	3(4%)
	Transgenders	1(33.3%)	2(66.6%)	0
Renal insufficiency	males	1 (2.38%)	41(97.6%)	
	Females	3 (4%)	72(96%)	
	Transgenders	0	3(100%)	

Table 3: Covid -19 related anamnesis of vaccinated individuals

Anamnesis outcomes n= (120)		
Vaccinated	yes	No
Males	41	1
Females	72	3
Transgenders	3	0
Pfizer		
Males	3	39
Females	11	64
Transgenders	1	2
AstraZeneca		
Males	0	42
Females	2	73
Transgenders	1	2
Sputnik		
Males	0	42
Females	2	73
Transgenders	0	3
Sino-Pharm		
Males	13	29
Females	29	46
Transgenders	1	2
Sinovac		
Males	17	42
Females	28	47
Transgenders	1	2
Cansino-Bio		
Males	9	36
Females	3	72
Transgenders	1	2

Table 4: Prevalence of general side effects after Covid-19 Vaccination n= (120)

Side effects **Transgenders =3**	**males =42**	**Females= 75,**
Pain at the site of injection	yes (%)	No (%)
Males	27 (64.2%)	15 (35.7%)
Females	41 (54.6%)	34 (45.3%)
Transgenders	2 (66.6%)	1(33.3%)
Pain at the site of injection last		
In one Day		
Males	26 (61.9%)	
Females	60 (80%)	
Transgenders	1(33.3%)	
It takes one week		
Males	12 (28.5%)	
Females	11 (14.6%)	
Transgenders	2 (66.6%)	
Fever		
Males	14 (33.3%)	28 (66.6%)
Females	23 (30.6%)	52 (69.3%)
Transgenders	0	3 (100%)
Fatigue		
Males	14(33.3%)	28(66.6%)
Females	21 (28%)	54 (72%)
Transgenders	0	3 (100%)

Nausea and vomiting		
Males	12 (28.5%)	30 (71.4%)
Females	13 (17.3%)	62 (82.6%)
Transgenders	1 (33.3%)	2 (66.6%)
Abdominal Pain		
Males	5 (11.9%)	37 (88%)
Females	6 (8%)	69(92%)
Transgenders	0	3(100%)
Diarrhea		
Males	7 (16.6%)	35(83.3%)
Females	12(16%)	63 (84%)
Transgenders	0	3 (100%)
No above side effects		
Males	15 (35.7%)	27 (64.2%)
Females	28 (37.3%)	47 (62.6%)
Transgenders	0	3(100%)

4. DISCUSSION

As most of the countries have taken safety measures against COVID -19 Pandemic by the use of vaccines (Alhazmi et al., 2021). All emergency approved COVID -19 vaccine are authorized, safe and effective as well as they stimulate immune system which is capable of preventing individuals against COVID -19 effects after complete vaccination doses There is no serious side effects from currently authorized vaccines has been found, however post vaccination mild symptoms such as pain at the site of injection, fever, fatigue, Nausea, Abdominal pain and Diarrhea. These symptoms subside within 2-3 Days (Ullah et al., 2021) and there is no treatment requires for these side effects (Xian et al., 2020). Similar type of studies were conducted by Menni and team the study found that tiredness and pain at the site of injection were the most common side effects that occurred on the same day after vaccination and subsided after one or few days highlight the post vaccination side effects (Menni et al., 2021). Our findings showed that there were only mild side effects of these COVID vaccines none of the side effects requires hospitalization but one of the most common systemic reaction was pain at the site of injection and fever that were self-limiting and subside after few days. As pain at the injection site was reported with majority of vaccine (Hatmal et al., 2021) pain can be reduced as patients were recommended to lower their arm so their muscles get relaxed inoder to reduce pain at the site of injection. Previous studies that were conducted among Health care workers found that pan at injection site (41.5%), fatigue (23.6%) and Headache (18.7%)(Riad et al., 2021) . In our study Minor side effects were reported as pain at the site of injection (58.3%), fever (30.83%), fatigue (29.16%), Nausea and vomiting (21.6%), abdominal pain (9.16%) and Diarrhea (15.83%). (35.3%) participants in our study had no side effects. Several studies showed that all these vaccines produced transient type side effects and tolerable (Alghamdi et al., 2021).As these side effects can also cause by

the excipients added in the formulation of vaccine such as gelatin ,Thiomersal or Neomycin which stimulates IgE Antibodies and triggers these reactions which subsided in few days or hours (Saeed et al., 2021). A follow up study needed to evaluate long term safety and the effect of covid-19 vaccines in the prevention and control of SARS-COV-2 infection(Alhazmi et al., 2021).

5. Conclusion

Currently vaccination is the only effective weapon in the fight against the covid infection. The majority of the post vaccination side effects are mild to moderate from single or both Doses of vaccine indicating body immune system are strengthening its defense. The current study concluded that all approved covid 19 vaccines in Pakistan are safe

6. COMPETING INTERESTS DISCLAIMER:

7.

8. Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

9.

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