

# Motivational Factors and Post Vaccination Symptoms among COVID-19 Vaccinated Beneficiaries at a Tertiary Care Hospital, West Bengal, India: A Cross-sectional Study

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## ABSTRACT

**Introduction:** Since, the emergence of Coronavirus Disease-2019 (COVID-19) pandemic, there has been an intense burden on the health system and economy worldwide with millions of people being affected leading to several deaths. In this scenario vaccination seems to be a hope to control the pandemic. However, fear of adverse events following immunisation sometimes makes people hesitant about vaccination.

**Aim:** To assess the spectrum of post vaccination symptoms and also to identify the motivational factors along with their determinants at a tertiary care hospital, West Bengal, India.

**Materials and Methods:** A cross-sectional study was conducted in the COVID-19 Vaccination Centre at Nil Ratan Sircar Medical College and Hospital, Kolkata West Bengal, India (tertiary care hospital), from August to November 2021. A total of 448 vaccinated beneficiaries were enrolled in the study. Data collection was done by an online questionnaire, sent to the participants in their registered mobile numbers. Descriptive statistics and Chi-square tests were used for data analysis.

**Results:** Among 448 study participants, 262 (58.5%) were in 18-44 years of age group, 248 (55.4%) female, 384 (85.7%) Hindu, 132 (29.5%) medical or paramedical students, 290 (64.7%) passed graduation and above and 306 (68.3%) belonged to nuclear family. About 228 (50.9%) beneficiaries reported post vaccination symptoms. Most common being local pain at injection site, found among 150 (65.8%) out of them. Most common motivational factors of COVID-19 vaccination were found to be fear of COVID-19 infection, reported by 274 (61.2%) participants, which showed significant difference with various age groups ( $p$ -value=0.001), religions ( $p$ -value=0.030), occupations ( $p$ -value<0.001) and educations ( $p$ -value=0.002). Statistical significant ( $p$ <0.05) differences were also found according to age, gender, co-morbidities, interval between vaccination and past COVID-19 infection and type of COVID-19 vaccine in relation to onset of post vaccination symptoms.

**Conclusion:** Following COVID-19 immunisation minor adverse events were reported. Monitoring of those adverse events will help in further responding and prompt action. Also, the knowledge about motivational factors is expected to reduce vaccine hesitancy among unvaccinated people.

**Keywords:** Adverse events, Coronavirus disease-2019, Immunisation, Pandemic

## INTRODUCTION

The current pandemic due to Severe Acute Respiratory Syndrome-Coronavirus-2 (SARS-CoV-2), known as COVID-19, has emerged as a catastrophe, putting immense pressure on the health and economic system worldwide [1,2]. In this scenario, effective vaccine seemed to offer the only hope [2-4].

In India, three vaccines, Covishield, Covaxin and Sputnik V, have got approval from the Drug Controller General of India [5]. The vaccine schedule was two doses for each vaccine. Nationwide vaccination programme started on 16<sup>th</sup> January 2021 with healthcare workers being the first group of beneficiaries to receive the vaccine. It was gradually expanded to include the frontline workers, senior citizens and eventually to all adults (18 years and above) [5].

One of the greatest challenges of this vaccination programme was the acceptance of the vaccine by the general population. Undue fear of any adverse events and confusion about the efficacy of the vaccines were identified as the main determining factors for successful vaccination programme [6-9]. Several studies based on the 'health belief model' and 'protection motivation theory' has revealed some factors affecting the vaccine acceptance viz. perception of risk due to the disease, safety, efficacy, cost of the vaccine, past history of vaccination, physician's recommendation and the attitude and socio-demographic characteristics of the population [10-14].

Though, vaccines are an important tool in public health, helping in prevention and control of several diseases, vaccination may lead to

reactions like other drugs [3]. Though, these reactions are mostly non severe, it interferes with a person's confidence in vaccines. Various factors like awareness regarding vaccines, religious and socio-political issues, fear of associated risks and socio-economic factors may alter the attitude of an individual towards vaccination [15-17].

Several studies have been conducted to find the factors affecting willingness to get vaccinated, but most of them were community based studies [17,18]. Since, this study was conducted among the beneficiaries vaccinated at a COVID-19 Vaccination Centre, it will help us to assess the motivating factors for vaccination and its determinants. This may help in raising public awareness. Fear of side effects is one of the important causes of vaccine hesitancy. Thus, knowledge regarding the post vaccination symptoms will help to educate the people regarding the adverse effects, which will help to allay the fear and increase the acceptance of COVID-19 vaccine, which may ultimately lead to increased coverage and curb the pandemic.

Hence, the following study was conducted to find out the Post Vaccination Symptoms (PVS) and to assess the motivational factors of COVID-19 vaccination among the beneficiaries attending the COVID-19 Vaccination Centre (CVC) of a tertiary care hospital in West Bengal, India.

## MATERIALS AND METHODS

A cross-sectional study was conducted in the COVID-19 Vaccination Centre at Nil Ratan Sircar Medical College and Hospital, Kolkata

West Bengal, India (tertiary care hospital), from August to November 2021. After receiving Institutional Ethics Committee approval (Vide Memo No: NRSMC/IEC/04/2021, Dated: 20.07.2021), permission was sought for obtaining informed verbal consent from the participants considering the feasibility issues, since online questionnaire was sent. The participants were assured of their anonymity and confidentiality of the given information.

**Inclusion criteria:** The beneficiaries, who attended the COVID-19 Vaccination Centre and were vaccinated with atleast one dose of any COVID-19 vaccine were included in the study.

**Exclusion criteria:** Vaccinated person who were severely ill and also the beneficiaries or any of their family members who were unable to read, type and understand in english and also incompletely filled up the Google form were excluded from the study.

**Sample size calculation:** Based on a study finding by Kamal D et al., 57% of recipients reported atleast one or more adverse events following COVID-19 immunisation, anticipated P was 57% [19]. Assuming confidence level of 95% and absolute precision of 5%, the minimum required sample size was calculated as 392. Considering 10% non response rate, the minimum required sample size was 432. Beneficiaries attending the vaccination centre on any single day of the week were selected randomly. Considering average turnover to be 280 beneficiaries per day, the beneficiaries were selected by systematic random sampling and every 10<sup>th</sup> beneficiary was chosen. Hence, a sample size of 448 beneficiaries, who have filled up the questionnaires completely was selected for final study.

## Questionnaire

A survey questionnaire was prepared by the authors initially after review of literature related to adverse events of COVID-19 vaccine and motivational factors for COVID-19 vaccination [17,19-21]. Content validity and face validity of this study tool was checked by the experts from Departments of Community Medicine, General Medicine and Respiratory Medicine. Reliability of the study questionnaire was assessed and Cronbach's alpha value measured was 0.74. This pretested and predesigned questionnaire by means of online Google form was sent to the participants in their registered mobile numbers. The questionnaire consisted of five parts.

- **First part:** It consisted of six questions on socio-demographic variables
  - Age
  - Gender
  - Religion
  - Occupation
  - Education
  - Type of family
- **Second part:** It included three questions related to clinical history of the patient:
  - Co-morbidity status
  - Medication history
  - Past history of COVID-19 infection
- **Third part:** It contained three questions on COVID-19 vaccination history:
  - Type of COVID-19 vaccine (Covishield or Covaxin, because these two vaccines were only available in the study institution during data collection period),
  - Number of doses taken,
  - Interval between vaccination and past COVID-19 infection (if any).
- **Fourth part:** It included four questions pertaining to details of the post vaccination symptoms (if any), their onset of development and duration of symptoms.

- **Fifth part:** It incorporated question on motivational factors for vaccination, where 12 options like fear of disease or hospitalisation, availability of vaccine at free of cost, social media effect, self motivation, others etc. were given for 'yes' or 'no' subjective responses.

## STATISTICAL ANALYSIS

All collected data were compiled and analysed by Microsoft excel 16.0 and Epi info 7.2.4. Results were presented in proportions (%) and Chi-square test of significance was applied. The significance level was fixed as p-value <0.05.

## RESULTS

In the present study, most of the participants like 262 (58.5%) were in 18-44 years of age group, 248 (55.4%) female, 384 (85.7%) were Hindu by religion. Among the vaccinated population maximum i.e. 132 (29.5%) were medical or paramedical students, 290 (64.7%) passed graduation and above and 306 (68.3%) belonged to nuclear family [Table/Fig-1].

Variables	n (%)
<b>Age group (years)</b>	
18-44	262 (58.5)
45-60	98 (21.9)
>60	88 (19.6)
<b>Gender</b>	
Female	248 (55.4)
Male	200 (44.6)
<b>Religion</b>	
Hindu	384 (85.7)
Muslim	56 (12.5)
Christian	6 (1.3)
Buddhist	2 (0.4)
<b>Occupation</b>	
Medical or paramedical student	132 (29.5)
Private sector service	102 (22.8)
Government service	60 (13.4)
Industrial worker	52 (11.6)
Homemaker	48 (10.7)
Business	28 (6.3)
Agriculture	6 (1.3)
Unemployed	20 (4.5)
<b>Education</b>	
Illiterate	6 (1.3)
Studied upto class 4	26 (5.8)
Studied upto class 10	16 (3.6)
Studied upto class 12	110 (24.6)
Graduation and above	290 (64.7)
<b>Type of family</b>	
Joint	142 (31.7)
Nuclear	306 (68.3)

[Table/Fig-1]: Socio-demographic profile of the study population (N=448).

A total 138 (30.8%) out of 448 study population were suffering from associated co-morbidities, whereas 10 (2.2%) people did not know about their disease status. Common co-morbidity was found to be hypertension 64 (14.3%) followed by diabetes 40 (8.9%), thyroid disease 26 (5.8%), heart disease 14 (3.1%), lung disease 8 (1.8%), renal disease and neurological disease 4 (0.9% each) [Table/Fig-2]. Among 138 diseased subjects, 116 (84.1%) were taking regular medications. Total 72 (16.1%) out of 448 of the participants had suffered from COVID-19 infections in the past before vaccination.

Co-morbidities	n (%)
Present	138 * (30.8)
Hypertension	64 (14.3)
Diabetes	40 (8.9)
Thyroid disease	26 (5.8)
Heart disease	14 (3.1)
Lung disease	8 (1.8)
Renal disease	4 (0.9)
Neurological disease	4 (0.9)
Absent	300 (67)
Don't know	10 (2.2)
Total	448 (100)

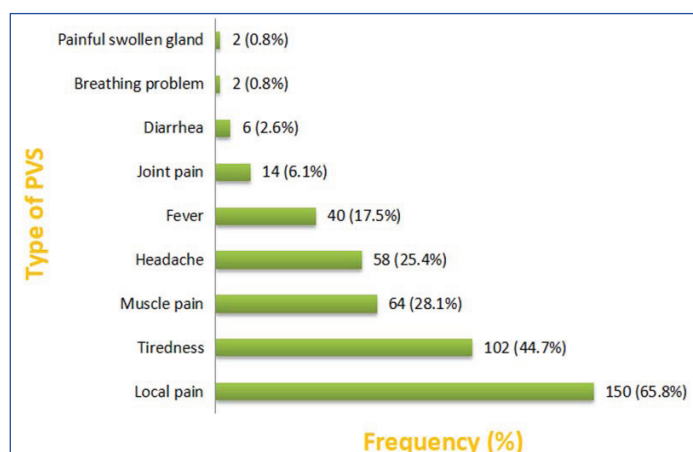
**[Table/Fig-2]:** Associated co-morbidities of study population (N=448).  
\* Multiple responses

Among 448 participants 114 (25.4%) has taken Covaxin and 334 (74.6%) taken Covishield. Among all vaccinated persons 382 (85.3%) have completed second dose of vaccination. Out of 72 participants with past history of COVID-19 infections, most of them 60 (83.3%) have taken vaccines after 3 months of COVID-19 infection [Table/Fig-3].

Interval	n (%)
Within 1 month	4 (5.6)
1-3 months	8 (11.1)
After 3 months	60 (83.3)
Total	72 (100)

**[Table/Fig-3]:** Interval between past COVID-19 infection and COVID-19 vaccination (n=72).

It has been found that 228 (50.9%) out of 448 study population reported any post vaccination symptom. Most common symptom was found to be local pain at injection site 150 (65.8%) followed by tiredness or lethargy 102 (44.7%). Least common PVS reported to be breathing problem and painful swollen gland 2 (0.8% each) [Table/Fig-4]. Most of the vaccinated patients like 178 (39.7%) developed PVS within two days of vaccination. As reported by the participants, most like 161 (35.9%) among them suffered from PVS for one to three days [Table/Fig-5].

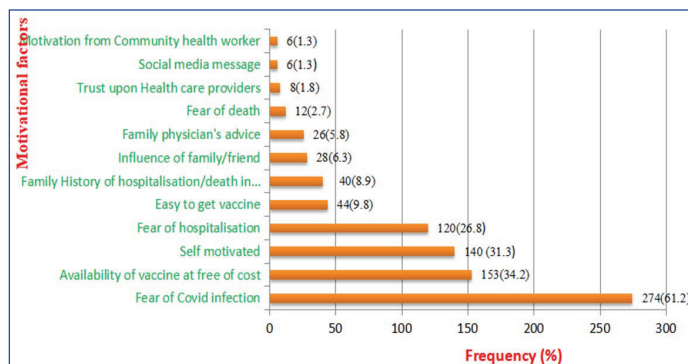


**[Table/Fig-4]:** Post Vaccination Symptoms (PVS) (n=228).  
\*Multiple responses

Onset of PVS	n (%)	Duration of PVS	n (%)
Within 30 min	44 (9.9)	<1 day	53 (11.8)
30 min to 2 days	178 (39.7)	1-3 days	161 (35.9)
3-7 days	4 (0.9)	4-7 days	10 (2.3)
After 7 days	2 (0.4)	>7 days	4 (0.9)
No symptom	220 (49.1)	No symptom	220 (49.1)
Total	448 (100)	Total	448 (100)

**[Table/Fig-5]:** Onset and duration of post vaccination symptom (PVS) (n=448).

Most common motivational factors of COVID-19 vaccination were found to be fear of COVID-19 infection 274 (61.2%), availability of vaccine at free of cost 153 (34.2%), self-motivated 140 (31.3%) and fear of hospitalisation 120 (26.8%) [Table/Fig-6].



**[Table/Fig-6]:** Motivational factors for COVID-19 vaccination (N=448)\*.  
\*Multiple responses

**Factors related to Post Vaccination Symptoms (PVS):** It has been found that onset of PVS among study population differ significantly (p-value<0.05) according to their age (p-value<0.001), gender (p-value=0.019), co-morbidities (p-value=0.014), interval between COVID-19 vaccination and past COVID-19 infection (p-value=0.006) and type of COVID-19 vaccine (p-value=0.010) [Table/Fig-7].

Factors	Variables related to onset of PVS					Statistical tests
	<30 min n (%)	30 min to 2 days n (%)	3-7 days n (%)	>7 days n (%)	No symptom n (%)	
<b>Age group (years)</b>						
18-44	30 (11.5)	102 (38.9)	0	0	130 (49.6)	$\chi^2=30.490$ df=8 p-value <0.001
45-60	6 (6.1)	48 (49)	0	2 (2)	42 (42.9)	
>60	8 (9.1)	28 (31.8)	4 (4.5)	0	48 (54.5)	
<b>Gender</b>						
Female	31 (12.5)	95 (38.3)	0	0	122 (49.2)	$\chi^2=11.783$ df=4 p-value =0.019
Male	13 (6.5)	83 (41.5)	4 (2)	2 (1)	98 (49)	
<b>Co-morbidities</b>						
Don't know	0	6 (60)	0	0	4 (40)	$\chi^2=19.261$ df=8 p-value =0.014
Absent	36 (12)	108 (36)	0	2 (0.7)	154 (51.3)	
Present	8 (5.8)	64 (46.4)	4 (2.9)	0	62 (44.9)	
<b>Interval between COVID-19 vaccination and past COVID-19 infection</b>						
<1 month	0	0	0	0	4 (100)	$\chi^2=27.908$ df=12 p-value =0.006
1-3 months	0	4 (50)	0	0	4 (50)	
>3 months	4 (6.7)	34 (56.7)	0	2 (3.3)	20 (33.3)	
No past COVID-19 infection	40 (10.6)	140 (37.2)	4 (1.1)	0	192 (51.1)	
<b>Type of vaccine</b>						
Covaxin	10 (8.8)	48 (42.1)	4 (3.5)	0	52 (45.6)	$\chi^2=13.170$ df=4 p-value =0.010
Covishield	34 (10.2)	130 (38.9)	0	2 (0.6)	168 (50.3)	

**[Table/Fig-7]:** Factors related to onset of post vaccination symptoms (N=448).

There is statistically significant difference (p-value <0.05) found in relation to duration of PVS with interval between COVID-19 vaccination and past COVID-19 infection (p-value <0.001) and also with type of COVID-19 vaccine (p-value=0.014) [Table/Fig-8].

Some background characteristics like age group, gender, religion, occupation, education and co-morbidities were statistically tested against most common four motivational factors and the results have been depicted in [Table/Fig-9]. Only yes responses (%) regarding motivational factors are mentioned in the [Table/Fig-9]. It has been seen that fear of COVID-19 infection significantly different

Factors	Variables related to duration of PVS					Statistical tests
	<1 day n (%)	1-3 days n (%)	4-7 days n (%)	>7 days n (%)	No symptom n (%)	
<b>Age group (years)</b>						
18-44	33 (12.6)	91 (34.7)	6 (2.3)	2 (0.8)	130 (49.6)	$\chi^2 = 5.166$ df=8 p-value = 0.740
45-60	12 (12.2)	40 (40.8)	2 (2)	2 (2)	42 (42.9)	
>60	8 (9.1)	30 (34.1)	2 (2.3)	0	48 (54.5)	
<b>Gender</b>						
Female	36 (14.5)	82 (33.1)	6 (2.4)	2 (0.8)	122 (49.2)	$\chi^2 = 4.798$ df=4 p-value = 0.309
Male	17 (8.5)	79 (39.5)	4 (2)	2 (1)	98 (49)	
<b>Co-morbidities</b>						
Don't know	0	6 (60)	0	0	4 (40)	$\chi^2 = 7.634$ df=8 p-value = 0.470
Absent	33 (11)	103 (34.3)	6 (2)	4 (1.3)	154 (51.3)	
Present	20 (14.5)	52 (37.7)	4 (2.9)	0	62 (44.9)	
<b>Interval between COVID-19 vaccination and past COVID-19 infection</b>						
<1 month	0	0	0	0	4 (100)	$\chi^2 = 45.244$ df=12 p-value < 0.001
1-3 months	2 (25)	0	2 (25)	0	4 (50)	
>3 months	4 (6.7)	34 (56.7)	0	2 (3.3)	20 (33.3)	
No past COVID-19 infection	47 (12.5)	127 (33.8)	8 (2.1)	2 (0.5)	192 (51.1)	
<b>Type of vaccine</b>						
Covaxin	6 (5.3)	52 (45.6)	4 (3.5)	0	52 (45.6)	$\chi^2 = 12.420$ df=4 p-value = 0.014
Covishield	47 (14.1)	109 (32.6)	6 (1.8)	4 (1.2)	168 (50.3)	

[Table/Fig-8]: Factors related to duration of post vaccination symptoms (N=448).

(p-value < 0.05) among different age groups (p-value=0.001), religions (p=0.030), occupations (p-value < 0.001) and educations (p-value=0.002). There was statistically significant difference found in relation to fear of hospitalisation with gender (p-value=0.025),

occupation (p-value < 0.001) and education (p-value=0.021). COVID-19 vaccination due to self-motivation varied significantly in relation to participants' age group (p-value < 0.001), gender (p-value < 0.001), religions (p-value=0.039), occupations (p-value < 0.001), educations (p-value=0.002) and co-morbidities (p-value=0.001) also. While considering availability of COVID-19 vaccine at free of cost, it is significantly different according to age group (p-value < 0.001), gender (p-value=0.019), occupation (p-value=0.044) and education (p-value < 0.001).

Other eight motivational factors also statistically tested against above mentioned background characteristics and the test results are mentioned in [Table/Fig-10]. It has been found that motivation due to easy vaccine availability significantly vary according to occupation (p-value < 0.001) and education (p-value=0.046). People with different age group (p-value < 0.001), gender (p-value < 0.001), religion (p-value=0.005), occupation (p-value < 0.001) and education (p-value=0.019) significantly motivated for COVID-19 vaccination on family history of hospitalisation or death due to COVID-19. Influence of family or friends to get vaccinated found to be significantly different according to age (p-value < 0.001), education (p-value < 0.001) and co-morbidities (p-value=0.001). There was significant variation in age (p-value=0.012) and occupation (p-value < 0.001) due to motivation by family physician's advice. It has been found that fear of death varied significantly according to age group (p-value=0.026), gender (p-value=0.006), occupation (p-value=0.002) and presence of co-morbidities (p-value=0.023). Participants with varied occupation (p-value < 0.001) and education (p-value=0.010) significantly motivated due to trust on healthcare providers. Social media could motivate significantly for vaccination only due to presence of co-morbidities (p-value < 0.001). No participants got significantly motivated by community health workers.

## DISCUSSION

In this study about 16% of the participants suffered from past COVID-19 infections and majority (83.3%) of them took vaccines after three months of infections. Similarly a study performed in Czech Republic stated that 19.3% vaccinated individuals had been

Background characteristics	Motivational factors for COVID-19 vaccination							
	Fear of COVID-19 infection		Fear of hospitalisation		Self motivated		Vaccine at free of cost	
	Yes n (%)	Statistical tests	Yes n (%)	Statistical tests	Yes n (%)	Statistical tests	Yes n (%)	Statistical tests
<b>Age group (years)</b>								
18-44	142 (54.2)	$\chi^2 = 14.676$ df=2 p-value=0.001	68 (26)	$\chi^2 = 0.967$ df=2 p-value=0.617	120 (45.8)	$\chi^2 = 62.225$ df=2 p-value < 0.001	55 (21)	$\chi^2 = 80.943$ df=2 p-value < 0.001
45-60	74 (75.5)		30 (30.6)		10 (10.2)		70 (71.4)	
>60	58 (65.9)		22 (25)		10 (11.4)		28 (31.8)	
<b>Gender</b>								
Female	148 (59.7)	$\chi^2 = 0.515$ df=1 p-value=0.473	56 (22.6)	$\chi^2 = 5.009$ df=1 p-value=0.025	96 (38.7)	$\chi^2 = 14.389$ df=1 p-value < 0.001	73 (29.4)	$\chi^2 = 5.495$ df=1 p-value=0.019
Male	126 (63)		64 (32)		44 (22)		80 (40)	
<b>Religion</b>								
Hindu	244 (63.5)	$\chi^2 = 8.958$ df=3 p-value=0.030	102 (26.6)	$\chi^2 = 0.964$ df=3 p-value=0.810	124 (32.3)	$\chi^2 = 8.339$ df=3 p-value=0.039	127 (33.1)	$\chi^2 = 4.713$ df=3 p-value=0.194
Muslim	28 (50)		16 (28.6)		14 (25)		22 (39.3)	
Christian	2 (33.3)		2 (33.3)		0		4 (66.7)	
Buddhist	0		0		2 (100)		0	
<b>Occupation</b>								
Medical/paramedical student	60 (45.5)	$\chi^2 = 31.606$ df=7 p-value < 0.001	20 (15.2)	$\chi^2 = 27.199$ df=7 p-value < 0.001	72 (54.5)	$\chi^2 = 54.792$ df=7 p-value < 0.001	29 (22)	$\chi^2 = 14.450$ df=7 p-value=0.044
Private sector service	76 (74.5)		32 (31.4)		30 (29.4)		38 (37.3)	
Government service	40 (66.7)		26 (43.3)		14 (23.3)		24 (40)	
Industrial worker	26 (50)		12 (23.1)		10 (19.2)		18 (34.6)	
Homemaker	38 (79.2)		16 (33.3)		6 (12.5)		20 (41.7)	
Business	18 (64.3)		4 (14.3)		6 (21.4)		12 (42.9)	
Agriculture	4 (66.7)		4 (66.7)		0		2 (33.3)	
Unemployed	12 (60)		6 (30)		2 (10)		10 (50)	

Education								
Illiterate	2 (33.3)	$\chi^2 = 16.780$ df=4 p-value=0.002	2 (33.3)	$\chi^2 = 11.569$ df=4 p-value=0.021	0	$\chi^2 = 30.651$ df=4 p-value<0.001	4 (66.7)	$\chi^2 = 23.832$ df=4 p-value<0.001
Studied upto class 4	14 (53.8)		10 (38.5)		0		14 (53.8)	
Studied upto class 10	12 (75)		2 (12.5)		2 (12.5)		12 (75)	
Studied upto class 12	52 (47.3)		18 (16.4)		52 (47.3)		27 (24.5)	
Graduation and above	194 (66.9)		88 (30.3)		86 (29.7)		96 (33.1)	
Co-morbidities								
Don't know	8 (80)	$\chi^2 = 3.236$ df=2 p-value=0.198	2 (20)	$\chi^2 = 2.751$ df=2 p-value=0.253	4 (40)	$\chi^2 = 14.345$ df=2 p-value=0.001	6 (60)	$\chi^2 = 3.678$ df=2 p-value=0.159
Absent	176 (58.7)		74 (24.7)		110 (36.7)		97 (32.3)	
Present	90 (65.2)		44 (31.9)		26 (18.8)		50 (36.2)	

[Table/Fig-9]: Determinants of common motivational factors for COVID-19 vaccination (N=448).

Variables	Other motivational factors for COVID-19 vaccination							
	Easy to get vaccine	Family history of death/hospitalisation	Influence of family/friend	Family physician's advice	Fear of death	Trust on healthcare provider	Social media message	Motivation from community health worker
Age group (years)	$\chi^2 = 2.062$ df=2 p=0.357	$\chi^2 = 26.984$ df=2 p<0.001	$\chi^2 = 16.950$ df= 2 p<0.001	$\chi^2 = 8.836$ df=2 p=0.012	$\chi^2 = 7.271$ df=2 p=0.026	$\chi^2 = 2.281$ df=2 p=0.320	$\chi^2 = 1.629$ df= 2 p=0.443	$\chi^2 = 4.317$ df=2 p=0.115
Gender	$\chi^2 = 0.567$ df= 1 p=0.452	$\chi^2 = 16.378$ df=1 p<0.001	$\chi^2 = 0.039$ df= 1 p=.844	$\chi^2 = 3.188$ df=1 p=0.074	$\chi^2 = 7.469$ df= 1 p=0.006	$\chi^2 = 0.095$ df=1 p=0.758	$\chi^2 = 0.315$ df= 1 p=0.575	$\chi^2 = 0.315$ df=1 p=0.575
Religion	$\chi^2 = 4.100$ df= 3 p=0.251	$\chi^2 = 12.810$ df=3 p=.005	$\chi^2 = 0.610$ df= 3 p=.894	$\chi^2 = 1.143$ df=3 p=0.767	$\chi^2 = 5.023$ df= 3 p=0.170	$\chi^2 = 1.273$ df=3 p=0.736	$\chi^2 = 1.014$ df= 3 p=0.798	$\chi^2 = 1.014$ df=3 p=0.798
Occupation	$\chi^2 = 26.815$ df= 7 p<0.001	$\chi^2 = 44.494$ df=7 p<0.001	$\chi^2 = 10.033$ df= 7 p=.187	$\chi^2 = 29.010$ df=7 p<0.001	$\chi^2 = 22.374$ df= 7 p=0.002	$\chi^2 = 28.400$ df=7 p<0.001	$\chi^2 = 4.225$ df= 7 p=0.754	$\chi^2 = 8.340$ df=7 p=0.304
Education	$\chi^2 = 9.664$ df= 4 p=0.046	$\chi^2 = 11.834$ df=4 p=0.019	$\chi^2 = 34.364$ df= 4 p<0.001	$\chi^2 = 2.003$ df=4 p=0.735	$\chi^2 = 3.432$ df= 4 p=0.488	$\chi^2 = 13.187$ df=4 p=0.010	$\chi^2 = 3.313$ df= 4 p=0.507	$\chi^2 = 0.846$ df=4 p=0.932
Co-morbidities	$\chi^2 = 1.659$ df= 2 p=0.436	$\chi^2 = 1.257$ df=2 p=0.533	$\chi^2 = 14.309$ df= 2 p=0.001	$\chi^2 = 0.637$ df=2 p=0.727	$\chi^2 = 7.506$ df= 2 p=0.023	$\chi^2 = 0.349$ df=2 p=0.840	$\chi^2 = 28.227$ df= 2 p<0.001	$\chi^2 = 0.148$ df=2 p=0.928

[Table/Fig-10]: Determinants of other motivational factors for COVID-19 vaccination (N=448).

previously infected by COVID-19, but the median latency period between the recovery date and the first vaccine dose was 65 days [22].

In the present study, Covishield was taken by 75% of the people compared to 25% taken Covaxin. It may be due to more supply of this particular vaccine in West Bengal state of India. Comparison between proportion and distribution of post vaccination symptoms of the present study with the contrast studies are incorporated in [Table/Fig-11] [3,19-21].

About 39.7% of the vaccinated beneficiaries developed PVS within two days of vaccination. Parallel findings were reported by Kamal D et al., [19]. In the present study, most (35.9%) of the participants suffered from PVS for one to three days and only 0.9% for more than seven days. Almost similar findings suggested by Riad A et al., regarding the duration of side-effects [22].

After review of literature the socio-demographic factors like age, gender, co-morbidities were found relevant with PVS, hence these factors were checked for significance level with PVS [19,22,23]. Again no such references were found indicating PVS varied according to other socio-demographic variables like religion, occupation, education and type of family. In present study, the onset of PVS among participants differ significantly (p-value <0.05) according to their age, gender, co-morbidities, interval between COVID-19 vaccination and past COVID-19 infection and type of COVID-19 vaccine. The onset of PVS in another study among healthcare workers was inversely correlated with the age group (r-value=-0.202; p-value=0.033), and directly correlated with the total number of non communicable diseases (r-value=0.018; p-value=0.914) [22].

Although, the biological mechanism for the higher incidence of PVS among female is not clear, it may be related to genes, hormones,

Study authors name	Place and year of the study	Proportion of PVS	Type of PVS
Present study	West Bengal, India (2022)	51%	Local pain (commonest), tiredness, muscle pain, headache and fever.
Kamal D et al., [19]	Southern India (2021)	57%	Feeling unwell (commonest), headache and fatigue.
Ramasamy MN et al., [20]	United Kingdom (2021)	88%	Local pain (commonest), tiredness, breathing problem and painful swollen gland.
Ella R et al., [21]	Multicentric study, India (2021)	12.4%	Pain at injection site (commonest), headache, fever and fatigue.
Saha RP et al., [3]	Meta-analysis (2020)		Tenderness, swelling at injection site, headache, fever and fatigue.

[Table/Fig-11]: Comparison of Post Vaccination Symptoms (PVS) with contrast studies [3,19-21].

environmental and immunologic factors [23]. However, no peer-reviewed published data has been found declaring the association of PVS with type of COVID-19 vaccine. This study could not find statistical significance according to age and co-morbidities with duration of PVS. But in another study, the duration of side-effects was significantly and directly correlated with age (r-value=0.097; p-value=0.006), the number of medical treatments (r-value=0.122; p-value<0.05) and the number of side-effects (r-value=0.256; p-value<0.001) [22].

Since, this study was a hospital based study among people attending to get vaccinated, vaccine acceptance was 100%. Higher and lower levels of acceptance were found across the different countries which have been tabulated in [Table/Fig-12] [24-30].

Study authors name	Year of the study	Name of country	Acceptance level
Wong LP et al., [24]	2020	Malaysia	94.3%
Harapan H et al., [25]	2020	Indonesia	93.3%
Wang J et al., [26]	2020	China	91.3%
Abedin M et al., [27]	2021	Bangladesh	74.5%
Sherman SM et al., [28]	2021	United Kingdom	63.5-67%
Al-Mohaithef M et al., [29]	2020	Saudi Arabia	64.7%
La Vecchia C et al., [30]	2020	Italy	53.7%
Present study	2022	West Bengal	100%

**[Table/Fig-12]:** COVID-19 vaccine acceptance level [24-30].

The most common motivational factors of vaccination in this study were fear of COVID-19 infection (61.2%), availability of vaccine at free of cost (34.2%), self-motivation (31.3%) and fear of hospitalisation (26.8%). World Health Organisation (WHO) report has identified almost similar factors for COVID-19 immunisation [31]. Another research by Kalam MA et al., also corroborated with this findings of the present study [32].

The present study found that motivational factors significantly vary ( $p$ -value  $<0.05$ ) among different age, gender, religions, occupations, educations and persons with co-morbidities. A study conducted by Jacob J et al., in India revealed that willingness for COVID-19 vaccination was strongly associated ( $p$ -value  $<0.01$ ) with income, past COVID-19 infection, perceived risk of COVID-19 infection, trust in authority, cost of vaccine and safety of vaccine [33]. The socio-demographic factors were also found significant for pandemic vaccine acceptability in Bangladesh, US and Japan [34-36].

The major strength of this study was, it reflected the vaccinated individuals with different socio-demographic variables in West Bengal, India. It also tried to explore the factors influencing onset and duration of post vaccination symptoms, which can help further to identify the priority groups needed special attention at vaccination centres and also to advise the vaccinated people beforehand to allay their fear of side-effects.

### Limitation(s)

One of the few limitations of this study was being a hospital based study, it included only the vaccinated individuals. Thus, the true proportion of vaccine acceptance could not be assessed. Another methodological limitation was use of online questionnaire, which may cause self-selection bias due to filling up only by the highly motivated participants. The self reporting of collected data may introduce information bias.

### CONCLUSION(S)

Most of the adverse events following COVID-19 immunisation were reported to be mild and self-limited and predominantly duration of symptom was shorter within 72 hours. This message should be percolated to reduce the worries about unforeseen side-effects of COVID-19 vaccine. While the higher motivational factors were found to be the fear of COVID-19 infection or self-motivation, messages from social media or community health workers were negligible. So, these modes of communications must be enhanced and directed to all community people to prevent spread of misinformation. Due to the hospital setting of the study the vaccine acceptance was full. But a community based study is highly recommended to explore the reasons of vaccine hesitancy; which ultimately improves the COVID-19 vaccination drives in India in large.

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