Al Ameen J Med Sci 2023; 16(1):80-91 ● US National Library of Medicine enlisted journal ● ISSN 0974-1143

ORIGINAL ARTICLE CODEN: AAJMBG

Potential acceptance of COVID-19 vaccination among population residing in the urban and rural field practice areas of a tertiary care teaching hospital of West Bengal: A comparative study

Mausumi Basu, Ankita Mishra*, Meghna Mukherjee, Prince Kerketta, Ratul Kumar Bysack, C. Vanlaldiki and Anamitra Chakraborty

Department of Community Medicine, IPGME & R, SSKM Hospital, 244 AJC Bose Road, Kolkata-700020, West Bengal, India

Received: 17th January 2022; ***Accepted:*** 02nd December 2022; ***Published:*** 01st January 2023

Abstract: *Background:* "Covishield" and "Covaxin" were the two vaccines which were approved for emergency use in India. As there is uncertainty regarding these vaccines, this study aimed to estimate the proportion of acceptance of vaccination against COVID-19 in West Bengal; to identify the possible barriers of vaccine acceptance prevalent among the study population and; to find out the association of acceptance of COVID-19 vaccination with the socio-demographic and other predictor variables. *Methods:* Oobservational study with cross sectional design was conductedon 294 participants in Muchisa, Budge Budge II and Ward No. 81 of Borough 10, Kolkata Municipal Corporation (KMC) selected by Stratified Random Sampling in 2021 using a predesigned, pretested and structured schedule. The statistical analysis was done using Microsoft Office Excel 2007 and Statistical Package for the Social Sciences Version 16.0. The data were explored using Pearson's chi-square test and logistic regression. A p-value of <0.05 was considered significant. *Results:* The potential acceptance of Covid-19 vaccination was 59.5% with higher adoption in urban population. The most potential barrier in acceptance of vaccine was "fear of side effects". Higher level of education and history of Covid-19 in the locality were associated with higher acceptance of the vaccination in both the urban and rural areas. *Conclusion:* A study emphasized on the need for mass campaigns and other behavior change communication activities for addressing the myths surrounding the disease and the newer vaccines and hence improving the currently low vaccine acceptance.

Keywords: Covid-19 Vaccine, Rural Population, Acceptance, West Bengal, Urban Population.

Introduction

'Pandemic public health paradox', i.e. vaccine hesitancy against any pandemic, observed during in influenza A H1N1in 2009 [1] is a major global public health challenge even in the COVID-19 pandemic. "COVID-19 vaccination drive" was initiated across India on 16th January, 2021[2]. The two vaccines approved by India's drug regulator for emergency use are "Covishield" (AstraZeneca, Oxford University and Serum Institute) and India's very own "Covaxin" (Bharat Biotech) [2].

The first group to be vaccinated included healthcare and frontline workers. Approximately 2.24 lakh healthcare and frontline workers were inoculated in the first two days of the drive of which 447 cases of adverse event following immunization had been reported across the country [3]. The second drive was initiated on 1st March, 2021 to vaccinate persons over 60 years of age and persons between 45 and 59 years with co-morbid conditions [4]. The Government of India plans to vaccinate over 300 million of India's population free of cost over the next six to eight months [2].

The vaccination is voluntary, but it is advisable to get completely vaccinated by taking two intramuscular doses of the vaccine at minimum interval of 4 weeks in case of Covaxin and 12 weeks for Covishield to limit the spread of the disease. The most commonly witnessed side effects of the vaccine are mild fever and pain [3]. Till 9th June 2021, 480.26 million (6.16%) were administered both doses & 463.98 million (5.95%) had received the

first dose of the Covid-19 vaccine globally, whereas in India, 45.63 million (3.31%) were fully vaccinated & 145.59 million (10.55%) were partially vaccinated [5].

The success of any mass vaccination program including COVID 19 vaccination is largely dependent on acceptance of the eligible candidates and if majority of the population do not turn up for vaccination because of uncertainty regarding safety and efficacy of the vaccines, the ultimate objective of the vaccination drive will not be fulfilled. This study will serve to explore the possible barriers in acceptance of the vaccine and henceforth help in guiding the development of information, education and communication (IEC) materials for addressing the concerns of the study population regarding the novel vaccine. Besides, there is paucity of studies regarding potential acceptance of COVID 19 vaccination conducted in India, especially in this eastern part of the country.

With this background, the study was conducted to compare the proportion of potential acceptance of vaccination against COVID-19 among the inhabitants of urban and rural field practice areas of a tertiary care teaching hospital of West Bengal; to identify the possible barriers of acceptance of the vaccine prevalent among the study population and; to find out the association of acceptance of COVID-19 vaccination with the socio-demographic and other predictor variables.

Material and Methods

Study type, design and setting: An observational study with cross sectional design was conducted in Muchisa, Budge Budge II (Rural field practice area of a tertiary care teaching hospital of Kolkata) and Ward No. 81 of Borough 10, Kolkata Municipal Corporation (KMC) (Urban field practice area of a tertiary care teaching hospital of Kolkata).

Study participants: The adult (≥18 years) population of Muchisa and KMC Ward 81 (permanent residents) who were present at the time of data collection were included in the study after obtaining informed written consent. Severely ill individuals, health care workers and other front line workers were excluded from the study.

Study tools: A predesigned, pre-tested, structured schedule was employed for data collection. The schedule was designed in consultation with following three experts: one from public health, one epidemiologist, and one from community medicine department. It was pretested among thirty similar study population who were not included in final sample size, after which minor corrections were made.

Sample size estimation and sampling technique: The sample size was calculated using the Cochran's formula for finite population, $N = \{Z^2p(1-p)\}/e^2\}$, where the Standard Normal Deviate (Z) = 1.96 for 95% confidence level. Considering prevalence of acceptance of Covid-19 vaccination (p) = 71.5% (Lazarus JV *et al*) [6], with a relative error (e) = 10%, the sample size calculated was 154. After considering a design effect of 1.5 (Stratified Random Sampling) and a non-response rate of 10%, we deduced a sample size of 254.

For equal representation across residence, age groups and gender, the population was stratified into 12 strata, namely, males of age 18-39 years having urban residence, males of age 40-59 years having urban residence, males of age ≥60 years having urban residence, males of age 18-39 years having rural residence, males of age 40-59 years having rural residence, males of age ≥60 years having rural residence, females of age 18-39 years having urban residence, females of age 40-59 years having urban residence, females of age ≥60 years having urban residence, females of age 18-39 years having rural residence, females of age 40-59 years having rural residence, females of age ≥60 years having rural residence.

By following Equal Allocation procedure of total sample size to each of the stratum, 21 samples were collected from each stratum, such that the total number of samples obtained from Rural and Urban areas were 127 each.

Data collection technique: Borough 10 of Kolkata Municipal Corporation has 12 wards including Ward 81 [7]. DPS Road, Tollybazar to Fari to KIT Quarter, New Alipur Block, TG

Road, BL Ganguly Lane, Promothonath Sarani, Chetla Road, Port Colony, TC Road, Sahapur Colony, 16 MT Lane and Garden, Railway Siding, Durgapur Colony and 22/1 DH Road are sub-divisions of KMC Ward 81 catering to a population of 45,218 (December, 2020).

Budge Budge II Block of South 24 Parganas has 61 villages, Muchisa is one of them [8]. Muchisa village with a total population of 4176 (April, 2020) is further divided into seven paras, namely, Roy Para, Bairagi Para, Parmanik Para, Sardar Para, Mal Para, Dhal Para and Adak Para. Data were collected from participants in these areas by face to face interview over a period of 6 weeks from 6th February – 12th March, 2021 after explaining the nature & purpose of the study and after ensuring their anonymity & confidentiality.

Statistical analysis: Data were then tabulated in Microsoft Office Excel 2010 (Microsoft Corp, Redmond, WA, USA) and analysis was done using Statistical Package for the Social Sciences (SPSS, IBM, New York City, USA) Version 25.0. Descriptive statistical measures were employed to summarize the data. The dependent variables did not follow normal distribution (Kolmogorov-Smirnow test: p value = 0.00; Shapiro-Wilk test: p value = 0.00). Data were checked for multi-collinearity, Variance Inflation Factor was found to be less than 10 and tolerance was greater than 0.1. Thus, Pearson's Chi-square test and binary logistic regression were used to test the association between the dependent and the independent factors. Binary logistic regression was performed separately for rural and urban population to ascertain relationship between the dependent (acceptance of Covid-19 vaccine) and the independent variables (socio-demographic characteristics and other predictor variables). A p-value of <0.05 was considered significant.

Ethics statement: Data collection was initiated after applying for approval from the Institutional Ethics Committee (IEC) of IPGMER/SSKM hospital (IPGME&R/IEC/2021/123 dated 06.02.2021). Informed written consent of the suitable participants was taken prior to enrolment.

Operational definitions:

1. *Urban* – An area governed by either a municipality, corporation, cantonment board or notified town area committee or accommodating at least 5,000 people with "at least 75 per cent of the male main working population engaged in non-agricultural pursuits"; and a population density of "at least 400 persons per sq. km" [9].
2. *Rural* – An area which comes under a Gram Panchayat and where a minimum of 75% of male working population is involved in agriculture and allied activities [10].
3. *Modified BG Prasad Scale 2020* – This scale is used to measure the socioeconomic status of families based on per capita monthly income. The classifications are done considering the base of Consumer Price Index (CPI) for 1960 as 100 [11].

Results

Table 1 showed distribution of the study population based on socio-demographic characteristics. A total of 264 rural and urban people of different age groups and gender were interviewed with equal representation to each group. A greater chunk of the study population were followers of Hinduism (76.5%), belonged to general caste (77.7%) and were either unmarried, divorced or separated (75.8%).55.7% were from nuclear families while 50.4% were akin to Lower Class (Class V) as per Modified BG Prasad Scale 2020 [11].

The potential acceptance of Covid-19 vaccination among the study population was 59.5%. The vaccine was most acceptable to 18-39 years old in urban areas followed by 40-59 years in both urban and rural setups. [Figure 1] All those who were willing to enroll themselves in this Covid-19 vaccination drive wished to take it at a government centre. 35.2% subjects were aware that the vaccine was available in injectable form but only 20.8% were well informed that 2 doses of the vaccine are needed to guard against Covid-19. The most common source of information on Covid-19 vaccine for the participants was news on television followed by interaction with family and friends.

Table-1: Distribution of the study population according to their socio-demographic profile. (N = 264)		
Socio-demographic Variables	**Number (n)**	**Percentage (%)**
1. Age Group (Completed Years)		
a. 18-39	88	33.3
b. 40-59	88	33.3
c. ≥60	88	33.3
2. Gender		
a. Male	132	50.0
b. Female	132	50.0
3. Religion		
a. Muslim/Christian	62	23.5
b. Hindu	202	76.5
4. Caste		
a. Scheduled Caste (SC)/Scheduled Tribe (ST)/Other Backward Class (OBC)	59	22.3
b. General	205	77.7
5. Type of Family		
a. Nuclear	147	55.7
b. Joint	117	44.3
6. Education		
a. Illiterate	33	12.5
b. Primary	41	15.5
c. Middle	31	11.7
d. Secondary	37	14.0
e. Higher Secondary	46	17.4
f. Graduate &Above	76	28.8
7. Marital Status		
a. Married	64	24.2
b. Unmarried/Widowed/Separated	200	75.8
8. Socio-economic Status as per Modified BG Prasad Scale 2020		
a. Upper (Class 1)	3	1.1
b. Upper Middle (Class II)	60	22.7
c. Middle (Class III)	52	19.7
d. Lower Middle (Class IV)	16	6.1
e. Lower (Class V)	133	50.4
9. Occupation		
a. Unemployed	3	1.1
b. Unskilled	60	22.7
c. Semiskilled & Skilled	52	19.7
d. Others (Homemaker/Retired/Student)	133	50.4

Fig-1: Donut diagram showing distribution of the study population according to their willingness to get vaccinated against COVID-19. (N=264)

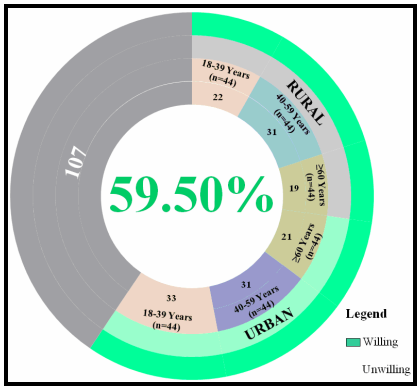


Figure 2 describes the barriers in adoption of Covid-19 vaccination in various age groups of urban and rural areas. The most consistently witnessed obstacle in acceptance of the vaccine among the different age groups was the "fear of side effects". 35.6% participants were willing to take any vaccine against Covid-19 provided to them while 18.9% desired Covishield and 4.9% wished to take India's very own Covaxin [Figure 3].

Fig-2: Barriers in acceptance of Covid-19 vaccination in different age groups of urban and rural areas. (N=107)

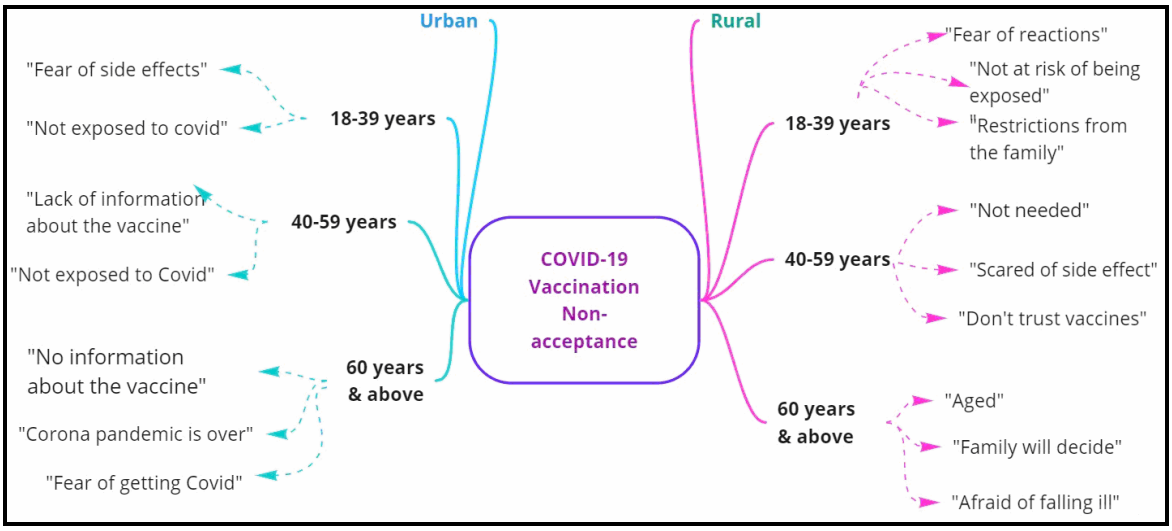
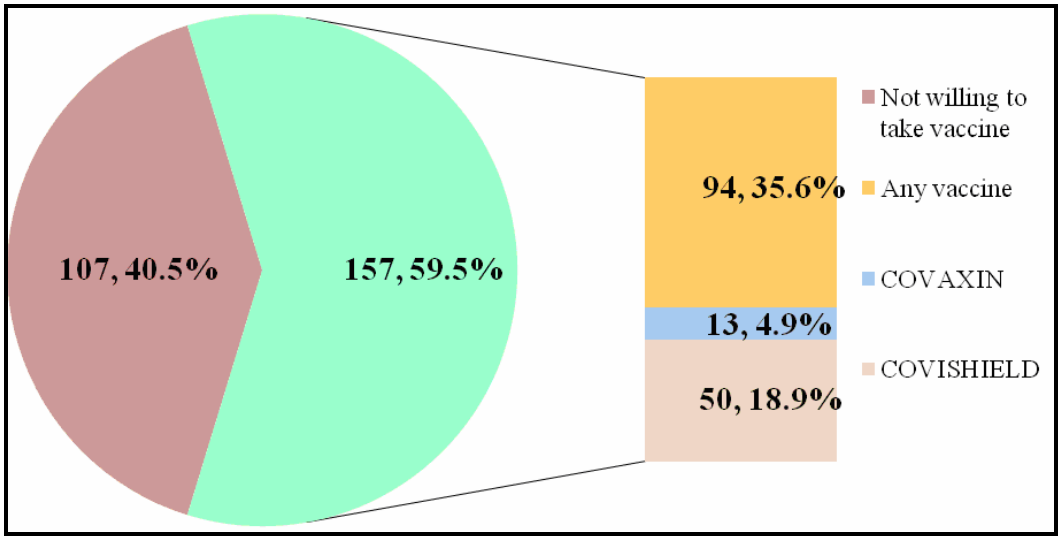


Fig-3: Pie diagram showing distribution of the study population according to their preference of vaccine. (N=264)



Pearson's Chi-square test in Table 2 revealed that socio-demographic characteristics like age group (p 0.003), gender (p 0.001), type of family (p 0.017), education (p <0.001), employment status (p <0.001) and socio-economic status (p <0.001) were associated with acceptance of the vaccine. Besides, perceptions of the study population on comparability of the vaccine supplied by the government with the purchased vaccine (p <0.001), its efficacy in preventing subsequent infections (p <0.001) and its safety (p <0.001) were also noted to influence vaccine acceptance. Apart from these factors, history of Covid-19 in the family (p <0.001) or in the neighborhood (p <0.001) were significantly related to the dependent variable.

Table-2: Association of potential vaccine acceptance with socio-demographic characteristics and perceptions of the study population along with other variables. (N=264)

	Variables		COVID-19 Vaccination				Chi-square	p-value
		n	Not Accepted		Accepted			
			No	% age	No	% age		
A	**Socio-demographic Characteristics**							
	1. Area							
	a. Rural	132	60	45.5	72	54.5	2.656[a]	0.132
	b. Urban	132	47	35.6	85	64.4		
	2. Age Group							
	a. 18-39	88	33	37.5	55	62.5	**11.912[a]**	**0.003**
	b. 40-59	88	26	29.5	62	70.5		
	c. ≥60	88	48	54.5	40	45.5		
	3. Gender							
	a. Male	132	40	30.3	92	69.7	**11.456[a]**	**0.001**
	b. Female	132	67	50.8	65	49.2		
	4. Marital status							
	a. Unmarried/Widowed/ Separated/Divorced	64	28	43.8	36	56.3	.363[a]	0.561
	b. Married	200	79	39.5	121	60.5		
	5. Family							
	a. Nuclear	147	50	34.0	97	66.0	**5.844[a]**	**0.017**
	b. Joint	117	57	48.7	60	51.3		
	6. Education							
	a. Graduate & above	33	1	3.0	32	97.0	**54.723[a]**	**<0.001**
	b. Higher Secondary	41	10	24.4	31	75.6		
	c. Secondary	31	11	35.5	20	64.5		
	d. Middle	37	10	27.0	27	73.0		
	e. Primary	46	22	47.8	24	52.2		
	f. Illiterate	76	53	69.7	23	30.3		
	7. Occupation							
	a. Unemployed	3	0	0.0	3	100.0	**31.778[a]**	**<0.001**
	b. Unskilled	60	14	23.3	46	76.7		
	c. Semiskilled & Skilled	52	14	26.9	38	73.1		

	Variables	n	COVID-19 Vaccination				Chi-square	p-value
			Not Accepted		Accepted			
			No	% age	No	% age		
	d. Semiprofessional & Professional	16	3	18.8	13	81.3		
	e. Others (Homemaker/ Retired/Student)	133	76	57.1	57	42.9		
	8. Number of family members							
	a. <3	19	7	36.8	12	63.2	3.926[a]	0.140
	b. 3-6	196	86	43.9	110	56.1		
	c. >6	49	14	28.6	35	71.4		
	9. Presence of elderly in the family							
	a. No	110	38	34.5	72	65.5	2.802[a]	0.100
	b. Yes	154	69	44.8	85	55.2		
	10. Number of working members in the family							
	a. Nil	3	2	66.7	1	33.3	0.890[a]	0.641
	b. 1	135	55	40.7	80	59.3		
	c. 2 or more	126	50	39.7	76	60.3		
	11. Number of children in the family							
	a. Nil	102	35	34.3	67	65.7	3.960[a]	0.138
	b. 1 child	82	40	48.8	42	51.2		
	c. 2 or more children	80	32	40.0	48	60.0		
	12. Socio-economic status as per Modified BG Prasad Scale 2020							
	a. Upper (Class 1)	10	1	10.0	9	90.0	**19.152[a]**	**0.001**
	b. Upper Middle (Class II)	37	7	18.9	30	81.1		
	c. Middle (Class III)	61	21	34.4	40	65.6		
	d. Lower Middle (Class IV)	95	51	53.7	44	46.3		
	e. Lower (Class V)	61	27	44.3	34	55.7		
B	**Perceptions**							
	1. Comparability with purchased vaccine							
	a. Don't know	58	53	91.4	5	8.6	**108.739[a]**	**<0.001**
	b. Not comparable	34	23	67.6	11	32.4		
	c. Comparable efficacy	172	31	18.0	141	82.0		
	2. Persistence of COVID-19 in the community							
	a. Don't know	17	5	29.4	12	70.6	4.835[a]	0.089

	Variables	n	COVID-19 Vaccination				Chi-square	p-value
			Not Accepted		Accepted			
			No	% age	No	% age		
	b. Absent	66	34	51.5	32	48.5		
	c. Present	181	68	37.6	113	62.4		
	3. Efficacy of COVID-19 vaccine in preventing subsequent infections							
	a. Don't know	31	23	74.2	8	25.8	**58.643[a]**	**<0.001**
	b. Not efficacious	52	39	75.0	13	25.0		
	c. Efficacious	181	45	24.9	136	75.1		
	4. Safety of vaccine							
	a. Don't know	143	79	55.2	64	44.8	**69.172[a]**	**<0.001**
	b. Unsafe	19	17	89.5	2	10.5		
	c. Safe	102	11	10.8	91	89.2		
C	**Other factors**							
	1. Past history of COVID-19 infection							
	a. Absent	256	106	41.4	150	58.6	2.689[a]	0.148
	b. Present	8	1	12.5	7	87.5		
	2. History of infection of family members with COVID-19							
	a. Absent	245	106	43.3	139	56.7	**10.565[a]**	**0.001**
	b. Present	19	1	5.3	18	94.7		
	3. Currently possessing symptoms suggestive of COVID-19							
	a. Absent	240	98	40.8	142	59.2	.101[a]	0.830
	b. Present	24	9	37.5	15	62.5		
	4. History of COVID-19 infection in the neighborhood							
	a. Absent	188	97	51.6	91	48.4	**33.175[a]**	**<0.001**
	b. Present	76	10	13.2	66	86.8		
	5. Presence of co-morbidity							
	a. No	136	49	36.0	87	64.0	2.358[a]	0.134
	b. Yes	128	58	45.3	70	54.7		

Binary logistic regression models were constructed between the dependent and independent variables. Variables like number of family members, number of working members in the family, history of Covid-19 infection in the family were not included in the model as their categorization was not similar across the two groups. In the rural population, belonging to a nuclear family (p 0.003, AOR 4.077), being married (p 0.031, AOR 3.426), higher education (p 0.005, AOR 8.693) and unemployment/ unskilled work (p 0.014, AOR

8.849) had a significantly higher adjusted odds ratio of vaccine acceptance while in urban population, age group of 40-60 years (p 0.002, AOR 9.298), being educated (higher secondary and above (p <0.001, AOR 22.649), primary/ middle/ secondary education (p 0.005, AOR 6.158)) and lower socio economic status (p 0.006, AOR 0.194) were perceived to have a higher odds ratio of acceptance of the vaccine in comparison to the reference. History of covid-19 infection in the neighborhood had a higher odds ratio of vaccine acceptance in both the urban (p <0.001, AOR 9.520) and the rural (p 0.002, AOR 7.599) population [Table 3].

Table-3: Multivariable binary logistic regression of vaccine acceptance in rural and urban population on socio-demographic variables and other predictors. (N=132)

		Rural(N=132)				Urban(N=132)			
		Sig.	AOR	95% Confidence Interval for AOR		Sig.	AOR	95% Confidence Interval for AOR	
				Lower	Upper			Lower	Upper
A	**Socio-demographics Variables**								
1	Age								
	18-39 years	0.833	0.883	0.277	2.817	0.057	3.446	0.962	12.340
	40-60 years	0.879	0.907	0.257	3.194	**0.002**	**9.298**	**2.270**	**38.081**
	>60 years		1				1		
2	Gender								
	Males	0.784	0.828	0.214	3.208	0.350	1.777	0.532	5.936
	Females		1				1		
3	Marital Status								
	Married	**0.031**	**3.426**	**1.117**	**10.504**	0.735	1.238	0.359	4.268
	Unmarried/ Widowed/ Separated		1				1		
4	Family type								
	Nuclear	**0.003**	**4.077**	**1.623**	**10.240**	0.425	0.648	0.223	1.880
	Joint		1				1		
5	Education								
	Higher secondary & above	**0.005**	**8.693**	**1.896**	**39.847**	**<0.001**	**22.649**	**5.359**	**95.714**
	Primary/Middle/ Secondary	0.051	2.671	0.998	7.150	**0.005**	**6.158**	**1.729**	**21.927**
	Illiterate		1				1		
6	Employment								
	Unemployed/ Unskilled work	**0.014**	**8.849**	**1.560**	**50.209**	0.605	1.424	0.372	5.452
	Semi-skilled/Skilled/ Semi-professional/ Professional	0.054	4.538	0.975	21.112	0.870	0.890	0.222	3.567
	Others (Homemakers/ Retired/ Students)		1				1		
7	Socio- Economic Status								
	Class IV and above	0.635	1.288	0.452	3.673	**0.006**	**0.194**	**0.061**	**0.622**
	Less than Class IV		1				1		
	Constant	*0.000*	*0.044*			*0.055*	*0.166*		

		Rural(N=132)				Urban(N=132)			
		Sig.	AOR	95% Confidence Interval for AOR		Sig.	AOR	95% Confidence Interval for AOR	
				Lower	Upper			Lower	Upper
B	**Other Predictor Variables**								
1	Presence of elderly in the family								
	Present	0.762	1.131	0.508	2.518	0.078	0.454	0.188	1.092
	Absent		1				1		
2	Presence of child in the family								
	Present	0.079	0.501	0.232	1.082	0.417	1.469	0.580	3.721
	Absent		1				1		
3	History of COVID-19 in the neighborhood								
	Present	**0.002**	**7.599**	**2.043**	**28.259**	**<0.001**	**9.520**	**3.391**	**26.729**
	Absent		1				1		
4	Co-morbidities								
	Present	0.485	0.771	0.371	1.601	0.186	0.571	0.249	1.310
	Absent		1				1		
	Constant	*0.340*	*1.469*			*0.432*	*1.384*		
Omnibus test p-value <0.05, Hosmer-Lemshow test p-value >0.05, Nagelkerke R^2>0.15									

Discussion

In spite of the fact that vaccination could be a breakthrough in preventing the severity of Covid-19, potential acceptance of the vaccination among the study population was only 59.5%. This percentage was less than the findings of Suresh et al [12] (88%) and Khan et al [13] (86.3%) on participants from all over India, Gautam et al [14] in West Bengal (77.27%), Kumari et al [15] among general population of Delhi (83.6%), and global acceptance rate of 71.5% in a survey by Lazarus et al [6] but was comparable to the research on ordinary citizens by Mahmud et al [16] in Bangladesh (61.2%).

The basis for this difference in acceptance between our study and some other studies [6], [12-16] could be a result of difference in the educational status of the sample in the two studies, as the latter studies are conducted using Google forms which could only be filled by those with a decent literacy level. In the current study and the Bangladesh survey [16], the acceptance was higher in urban population compared to the rural set-up. This could be because people residing in urban areas have higher access to health information [17]. The acceptance was higher in the 18-59 years age group in the present study and another study by Lazarus et al [6] in contrast to the research by Kumari et al [15] where the acceptance was higher for the older age group. This could be attributed to higher awareness among the younger group in West Bengal regarding the complications of the disease and the possible measures for its prevention [18].

In the current research and the study by Saied et al [19] on Egyptian medical students, the most prevalent barrier to vaccine acceptance was “fear of side effects”. This similarity could be ascribed to uncertainty surrounding the newly introduced vaccine. The greater acceptance of Covishield could be because its inoculation in developed countries [20] was initiated way before it was approved by the Indian Government.

Our study did not confirm the association of vaccine acceptance with presence of

vulnerable members in the family reported in a survey by Kourlaba et al [21] on general Greek population. Seale et al [22] in their online survey on Australian adults witnessed the influence of self-reported co-morbid conditions on willingness to get the jab which was not noticed in the present study. In the current research, higher socio-economic status was related with vaccine acceptance contrary to the web based survey of Machida et al [23] on Japanese common people reporting lower income as a predictor of willingness to get vaccinated. Higher educational status was associated with better vaccine acceptance in both urban and rural areas in the current survey as well as in the multi-centric research including participants from 19 countries with high COVID-19 burden by Lazarus et al [24]. The present study and the Kuwait survey by Alqudeimat et al [25] witnessed the impact of gender on adoption of vaccine.

Due to dearth of studies on vaccine acceptance in India, it becomes difficult for us to compare our findings with other surveys conducted locally. The only study we could find from West Bengal was by Gautam et al [14] where majority of the participants wished to take any Covid-19 vaccine available contrary to another study in West Bengal [14] where preference of Covaxin was higher. Comparative analysis conveyed that history of Covid-19 infection in the neighborhood was a triggering factor for taking a jab in both urban and rural areas as this would increase the risk of acquiring the disease. Another factor which influenced the willingness to take a jab in the rural population was the marital status of the respondents. The fear of not being able to take care of the family due to illness could encourage the person to get immunized.

The greatest strength of this study was its face to face interview technique which helped in assessing participants with lower literacy status and those not possessing a gadget with internet connection. Secondly, the study design ensuring equal representation of all gender and age groups adds to the strength of the study. Thirdly, inclusion of people from both the urban and the rural community helps in assessing the difference in vaccine acceptance and its predictors across urban and rural areas. Like numerous researches, this study also was not free from limitations. The first limitation was its short duration. Another limitation could be lack of efforts to increase the potential acceptance of the vaccine by creating awareness about Covid-19 and its prevention by vaccination.

Conclusion

This study revealed low potential acceptance of Covid-19 vaccination among the study population. The acceptance was higher in urban population compared to inhabitants of rural areas. Acceptance of Covishield was better than Bharat Biotech's Covaxin. The most potential barrier in acceptance of vaccine was "fear of side effects". Higher level of education and history of Covid-19 in the locality were associated with higher acceptance of the vaccination in both the urban and rural areas. A salient point which was unearthed in the study was the need for mass campaigns and other behavior change communication activities for addressing the myths surrounding the disease and the newer vaccines.

Financial Support and sponsorship: Nil

Conflicts of interest: There are no conflicts of interest.

References

1. Reintjes R, Das E, Klemm C, Richardus JH, Keßler V, Ahmad A. Pandemic Public Health Paradox. Time Series Analysis of the 2009/10 Influenza A / H1N1 Epidemiology, Media Attention, Risk Perception and Public Reactions in 5 European Countries. *PLOS ONE.* 2016; 11(3):e0151258.
2. India to start COVID-19 vaccination drive from Jan 16. *Channel News Asia* [Internet]. 2021 [cited 2021 Jan 18]. Available from: *https://www.channelnewsasia.com/news/asia/india-starts-covid-19-vaccination-drive-jan-16-13927128*
3. COVID-19 vaccine roll out: Over 400 cases of adverse events reported in 2 days. *Mint* [Internet]. 2021 [cited 2021 Jan 18]. Available from: *https://www.livemint.com/news/india/covid19-vaccine-roll-out-over-400-cases-of-adverse-events-reported-in-2-days-11610891467736.html*
4. Largest Vaccination Drive: Frequently Asked Questions. *MoHFW* [Internet]. 2021 [cited 2021

Mar 10]. Available from: *https://www.mohfw.gov.in/covid_vaccination/vaccination/index.html*
5. Coronavirus (COVID-19) Vaccinations - Statistics and Research [Internet]. *Our World in Data.* [cited 2021 Jun 10]. Available from: *https://ourworldindata.org/covid-vaccinations*
6. Lazarus JV, Ratzan SC, Palayew A, Gostin LO, Larson HJ, Rabin K,et al. A global survey of potential acceptance of a COVID-19 vaccine. *Nat Med*. 2020;1-4.
7. Kolkata Municipal Corporation [Internet]. [cited 2021 Jun 10]. Available from: *https://www.kmcgov.in/KMCPortal/jsp/UHIS_Beneficiaries_Borough10.jsp*
8. Villages & Towns in Budge Budge - II Block of South Twenty Four Parganas, *West Bengal* [Internet]. 2021 [cited 2021 Jun 10]. Available from: *https://www.census2011.co.in/data/subdistrict/2414-budge-budge--ii-south-twenty-four-parganas-west-bengal.html*
9. Census of India 2011: Provisional Population Totals - Urban Agglomerations and Cities. *Government of India* [Internet]. 2011 [cited 2021 Mar 11]; Available from: *http://censusindia.gov.in/2011-prov-results/paper2/data_files/India2/1.%20Data%20Highlight.pdf*
10. Infocus. Rural India: Where is it [Internet]? *Dhanlaxmi Bank;* 2010 [Cited 2020 Dec 26]. Available from: *http://www.dhanbank.com/pdf/reports/InFocus-December%201,%202010.pdf*
11. Debnath DJ, Kakkar R. Modified BG Prasad Socio-economic Classification, Updated – 2020. *Indian J Comm Health*, 2020; 32(1):124-125.
12. Suresh A, Konwarh R, Singh AP, Tiwari AK. Public awareness and acceptance of COVID-19 vaccine: An online cross-sectional survey, conducted in the first phase of vaccination drive in India. *Research Square*, 2021.
13. Khan S, Rahman CKF, CVH, Jose B, Tiwari R, Dhama K. COVID-19 Vaccine Acceptance: Beliefs and Barriers Associated with Vaccination Among the General Population in India. *Journal of Experimental Biology and Agricultural Sciences.* 2020; 8:S210-S218.
14. Gautam A, Dhara B, Mukherjee D, Mukhopadhyay D, Roy S, Ganguly SS, et al. A Digital Survey on the Acceptance and Affordability of COVID 19 Vaccine among the People of West Bengal, India- A Survey Based Study. *medRxiv* 2020. Available from *https://www.medrxiv.org/content/10.1101/2020.11.13.20229534v1.full.pdf+html* [Accessed on 10th June, 2021].
15. Kumari A, Ranjan P, Chopra S, Kaur D, Kaur T, Upadhyay AD, et al. Knowledge, barriers and facilitators regarding COVID-19 vaccine and vaccination programme among the general population: A cross-sectional survey from one thousand two hundred and forty-nine participants. *Diabetes Metab Syndr,* 2021;15(3):987-992.
16. Mahmud S, Mohsin M, Khan JA, Mian AU, Zaman MA. Acceptance of COVID-19 Vaccine and Its Determinants in Bangladesh. *Europe PMC*, 2021. Available from *https://arxiv.org/abs/2103.15206v1* [Accessed on 10th June, 2021].
17. Ghosh S. Equity in the utilization of healthcare services in India: evidence from National Sample Survey. *Int J Health Policy Manag*, 2014; 2(1):29-38.
18. Bhowmick S, Parolia S, Jana S, Kundu D, Karpurkayastha S, Ray K, et al. A Survey to Assess the Knowledge, Attitude and Practice about COVID-19 Pandemic from West Bengal, India. *Journal of Clinical and Diagnostic Research*, 2021; 15(4):5-9.
19. Saied SM, Saied EM, Kabbash IA, Abdo SAE-F. Vaccine hesitancy: Beliefs and barriers associated with COVID-19 vaccination among Egyptian medical students. *Journal of Medical Virology*, 2021; 93(7):4280-4291.
20. Covid-19: Oxford-AstraZeneca vaccine approved for use in UK. *BBC News* [Internet]. 2020 [cited 2021 May 27]. Available from: *https://www.bbc.com/news/health-55280671*
21. Kourlaba G, Kourkouni E, Maistreli S, Tsopela C-G, Molocha N-M, Triantafyllou C, et al. Willingness of Greek general population to get a COVID-19 vaccine. *Glob Health Res Policy*, 2021; 6(1):3-9.
22. Seale H, Heywood AE, Leask J, Sheel M, Durrheim DN, Bolsewicz K, et al. Examining Australian public perceptions and behaviors towards a future COVID-19 vaccine. *BMC Infect Dis*. 2021; 21(1):120.
23. Machida M, Nakamura I, Kojima T, Saito R, Nakaya T, Hanibuchi T, et al. Acceptance of a COVID-19 Vaccine in Japan during the COVID-19 Pandemic. *Vaccines (Basel)* 2021; 9(3).
24. Lazarus JV, Wyka K, Rauh L, Rabin K, Ratzan S, Gostin LO, *et al*. Hesitant or Not? The Association of Age, Gender, and Education with Potential Acceptance of a COVID-19 Vaccine: A Country-level Analysis. *J Health Commun,* 2020; 25(10):799-807.
25. Alqudeimat Y, Alenezi D, AlHajri B, Alfouzan H, Almokhaizeem Z, Altamimi S, et al. Acceptance of a COVID-19 Vaccine and Its Related Determinants among the General Adult Population in Kuwait. *Med Princ Pract*. 2021; 10:2052-2061.

Cite this article as: Basu M, Mishra A, Mukherjee M, Kerketta P, Bysack RK, Vanlaldiki C and Chakraborty A. Potential acceptance of COVID-19 vaccination among population residing in the urban and rural field practice areas of a tertiary care teaching hospital of West Bengal: A comparative study. *Al Ameen J Med Sci* 2023; 16(1): 80-91.

*All correspondences to: Dr. Ankita Mishra, MD Student, Department of Community Medicine, IPGME & R, SSKM Hospital, 244 AJC Bose Road, Kolkata-700020, West Bengal, India. E-mail: 22ankita1992@gmail.com