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Attitudes towards COVID-19 vaccination among adults residing in a tribal village of a district in Western India: A cross-sectional study

Zaveri, N H [1], Chinchodkar, K N [1], Swami, A A [1], Kumar, S [1], Netragaonkar, R [1]*

ABSTRACT

Introduction

The SARS-CoV-2 virus, the causative agent of coronavirus disease 2019 (COVID-19), has caused a global pandemic with 532,022,559 confirmed cases and 6,311,923 deaths all over world, as of 31 May 2022. The objective of this study was to survey attitudes towards COVID-19 vaccination in a tribal village in Western Gujarat, India and to determine the coverage rate of COVID-19 vaccination in the same population.

Methods

A community-based cross-sectional study was conducted amongst adults in a tribal village of the Dahod district of Western Gujurat, India (n=390; aged ≥18 years). Acceptance of a COVID-19 vaccine was inferred if participants indicated that they "definitely" or "probably will" accept vaccination against COVID-19 once a vaccine became available or if they had already received one or two doses of the vaccine. Associations were explored by applying a chi-square test among demographic variables and vaccine registration or received vaccination.

Results

In total, 270 (69%) of the participants at least registered for COVID-19 vaccination. The vaccine coverage rate was 264 (68%) but 126 (32%) were hesitant to take the vaccine. Among the reasons given for hesitation, 16% cited lack of information, 15% were concerned about rumours they had heard and 18% felt the vaccine was dangerous. Male and female subjects were equally likely to register and to take the COVID-19 vaccine (p>0.05). Participants belonging to the age group 18-44 were more likely register and take vaccine than those aged >44 years (73% vs 55%, respectively, p <0.05).

Conclusion

Overall, 69% of the study participants at either were registered to or had actually received a vaccine against COVID-19. The study found that various factors influenced levels of acceptance and hesitance including concern over side effects, worries that the vaccines have been developed too quickly, and complacency that COVID-19 is not a serious disease. Since vaccination is an essential preventive measure that can break the progression of the COVID-19 pandemic, factors that influence low vaccine acceptance in tribal villages need to be understood so that they can be urgently addressed by more targeted public health strategies.

Keywords: COVID-19, Vaccine, Awareness, Hesitancy

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1 Department of Community Medicine, Zydus Medical College and Hospital, Dahod – 389151, Gujarat, India

***Corresponding author** Niyati Harshadkumar Zaveri, Department of Community Medicine, Zydus Medical College and Hospital, Dahod – 389151, Gujarat, India, niyatio903@gmail.com

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INTRODUCTION

Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) was first reported on December 31, 2019 in Wuhan, Hubei, China, and subsequently caused a pandemic affecting 220 countries.[1,2] SARS-CoV-2 is the causative virus for coronavirus disease 2019 (COVID-19).[1–4] The SARS-CoV-2 pandemic has had a devastating effect on lives of people worldwide,[5] causing a global pandemic with 532,022,559 confirmed cases and 6,311,923 deaths all over world, as of 31 May 2022.[6] At the beginning of the pandemic, the most important strategy most countries used to control the spread of the COVID-19 was non-pharmaceutical interventions (NPIs), including mask policies, hand sanitization, social distancing, travel restrictions, schools closures and partial or complete lockdowns.[7] NPIs were able to control the disease somewhat but vaccines provide an additional effective, non-harmful and affordable strategy to control COVID-19. One year after the beginning of the pandemic, however, in December 2020, there had not yet been any approved antiviral drugs for the disease.[8] As of 29th April 2022, Remdesivir is the only antiviral drug that had been approved by the US Food and Drug Administration (FDA) for the treatment of COVID-19, showing maximum effectivity if used within the first seven days of appearance of symptoms. Ritonavir-boosted nirmatrelvir (Paxlovid), molnupiravir and certain anti-SARS-CoV-2 monoclonal antibodies (mAbs) have also received FDA emergency use authorizations for treatment of COVID-19.[9]

Vaccines are proving to be a more effective measure to control the COVID-19 epidemic but vaccine development and roll-out is not without challenges. There is huge global inequality in access to COVID-19 vaccination.[10] Developed countries are putting considerable effort into providing vaccines to all their citizens, while developing countries struggle with poor vaccine access.[11] Another challenge is vaccine hesitancy, which refers to people's unwillingness to take a vaccine that has been proven to provide safe and effective protection against a disease.[12] Vaccine denial and hesitancy is as old as vaccines themselves and has been present since the time of Edward Jenner's development of smallpox inoculation. People have opposed vaccination technology throughout history.[13]

This study was conducted with the objective of finding out attitudes towards COVID-19 vaccination in tribal communities in Gujurat, rural India, and to determine the coverage rate of COVID-19 vaccination in the study population. This tribal population was selected because according to census 2011 (the most recent), literacy rate of this tribal area was 59% which is comparatively lower than other districts of Gujarat.[14] According to NFHS 5 preschool attendance rate is only 40% and coverage of all basic vaccination was 66% only, lower than the national average.[15] Also, the institute where the study was conducted is situated in the headquarters of the tribal district of Gujarat.

METHODS AND MATERIALS

We conducted a descriptive cross-sectional study in a tribal village of the Dahod district of Gujurat in the western part of India, during August to October 2021. Everyone in the village who was eligible for COVID-19 vaccination i.e., all those above 18 years of age, were included in the study. Sample size was estimated using Cochran's (1965) formula, as follows:

$$n = \frac{Z^2 pq}{d^2}$$

Where, Z= 1.96 for 95% CI and 5% margin of error, d=0.05 (precision), p=proportion=33%[16]=0.33, q=1-p=1-0.33=0.77. This gave a minimum sample size of n = 390. Simple random sampling was used for the study. The target population was the tribal population of western Gujarat, while the population sample was taken from one village within this area. After framing inclusion and exclusion criteria (all adults ≥18 years were included; those under 18 were excluded), the eligible population in the village was 1,149 adults.

The required sample size was drawn by sampling frame. The command "=randbetween(1,1149)" was entered In Microsoft Excel and dragged 390 times in a single column. Those who did not want to participate were excluded.

We acknowledge that this study is limited in that it surveys the population of only one tribal village in one district of the western part of India. As such, the findings may not be generalizable to other villages in the region, or in India as a whole.

Data was collected by house-to-house survey using a self-administered questionnaire, which was translated into Gujarati language. If the person was illiterate, the questions were asked verbally. Data analyses were performed using Microsoft Excel and Statistical Package for Social Sciences (SPSS) (version 20.0). The statistical significance level was set at p=0.05. Descriptive analyses were conducted to calculate frequencies with percentages and proportions of categorical variables in the total study sample. Chi-square tests were used to assess whether proportions of registration for COVID-19 vaccination differed across categories of demographic variables. Associations between different factors and vaccine registration were assessed using chi-square.

RESULTS

In total, 390 adults completed the survey questionnaire, of whom 115 (29.5%) self-reported having suffered from COVID-19. Participants were grouped into five age categories: 33% (130) were aged 18-27 years, 37% (n=146) were aged between 28-37 years, 16% (n=62) were aged 38-47, 6% (n=24) were aged 48-57 and 7% (n=28) were aged above 58 years of age, with mean(±SD) age 34.39 (±12.14).

181 villagers (47%) had received at least one dose of vaccine at the time of the study, 83 (21%) had received two doses and 126 (32%) had not received any doses. So, 181+83=264 had received at least one dose, giving a vaccine coverage rate of 264 (68%) (Fig 1). Among the 264 vaccinated villagers, 200 (76%) reported at least one side-effect after receiving the vaccine. The most common side-effect was fever, reported by 84 (22%), followed by body ache, reported by 64 (16%), headache (n=44, 11%) and joint pain (n=44, 11%).

Most of the study participants (n=333, 85%) were living below the poverty line (defined as an income less than 150 Indian rupees per head of purchasing power; parity was verified by availability of BPL card at the time of survey), and most were farmers (n=209, 54%). Illiteracy was high at 45% (n=174) (Table 1).

Registration for COVID-19 vaccine according to demographic characteristics

Vaccine registration (i.e., having completed online registration for at least the first dose of COVID-19) was almost same in the women and men at 69% and 70% respectively. Gender, age, marital status, occupation and education did not significantly associate with likelihood to register for vaccination (p>0.05) whereas BPL/APL status does appear to play a significant role in vaccine registration as participants below the poverty line (BPL) were in the category most likely to register for COVID-19 vaccination (p<0.05) (Table 1).

COVID-19 vaccine hesitancy

A total of 270 (69%) participants had registered online to receive a COVID-19 vaccine and out of these, only 6 (1%) had not received any dose at the time of the study with the rest (n= 264 (67%) having received at least one dose. This left 126 (32%) who appeared to show some hesitancy towards taking the vaccine (as vaccines were readily available to all) (Fig 1). Some of the reasons for this, which include not being able to access their preferred vaccine, are shown in Table 2.

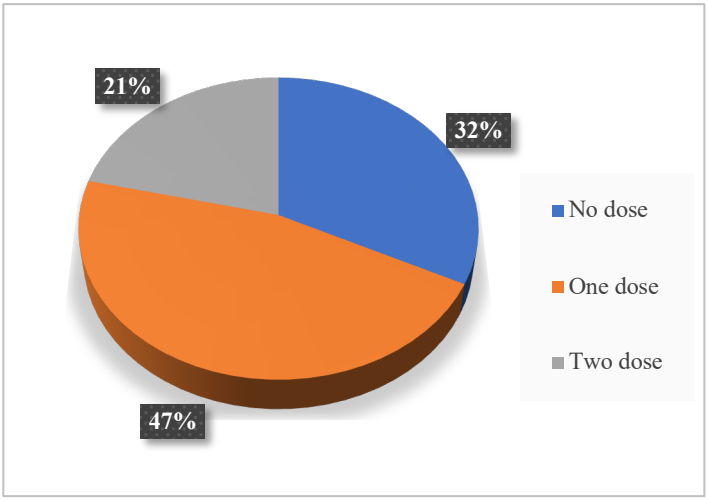

Fig 1 Status of Vaccine of Participants (n=390)

Table 1 Demographic information of participants (n=390)

Variables		Vaccine registration		Total	p-value
		No, n (%)	Yes, n (%)		
Gender	Female	54 (31%)	119 (69%)	173	0.865
	Male	66 (30%)	151(70%)	217	
Age group	18-27	42 (32%)	88 (68%)	130	0.068
	28-37	34 (23%)	112 (77%)	146	
	38-47	21 (34%)	41 (66%)	62	
	48-57	11 (46%)	13 (54%)	24	
	58 & above	12 (43%)	16 (57%)	28	
Marital status	Married	109 (30%)	253 (70%)	362	0.311
	Unmarried	11 (39%)	17 (61%)	28	
Below/Above Poverty Line	Above Poverty Line	11 (19%)	46 (81%)	57	0.042*
	Below Poverty Line	109 (33%)	224 (67%)	333	
Occupation	Farmer	64 (31%)	145 (69%)	209	0.169
	Job (Private/Public sector,8 hours desk job)	1 (6%)	15 (94%)	16	
	Labour	17(34%)	33 (66%)	50	
	None/Retired/ Student/Housewife	38 (33%)	77 (67%)	115	
Education	Illiterate	60 (34%)	114 (65%)	174	0.238
	Primary	42 (31%)	95 (69%)	137	
	Secondary	11 (23%)	36 (77%)	47	
	Higher secondary	7(28%)	18 (72%)	25	
	Graduate and above	0 (0%)	7 (100%)	7	

Table 2 Reasons for not taking/hesitancy in taking the vaccine (n=126)

Hesitancy	N (%)
Don't want to take it	10 (2.5%)
Doubt vaccine effectiveness	11 (3%)
Favourite vaccine is not available	7 (2%)
Fear of needles	31 (8%)
Vaccine is dangerous/Fear of death	69 (18%)
Fear of infertility	9 (2%)
Religious beliefs	2 (0.5%)
Rumours	58 (15%)
Individual felt they were too old to be vaccinated	9 (2%)
Fear of side effects	50 (13%)
Due to the other medication	1 (0.25%)
I will take in future	5 (1%)
Did not feel disease is likely to be fatal	62 (16%)

Reasons given for vaccine hesitancy included 18% of the total 390 (n=69) who thought the vaccine was dangerous or feared it could kill them, while 16% (n=62) felt that COVID-19 is not a fatal disease and so vaccination against it is not necessary, 15% (n=58) resisted due to rumours they had heard, and 13% (n=50) because they feared vaccine side effects. Ten respondents (2.5%) did not want to take the vaccine but did not give a specific reason why. (Table 2). Table 3 shows associations between previous symptoms of COVID-19 and whether or not the study participant had taken a COVID-19 test. The association was assessed by applying chi-square test. Out of the 390 participants, 90 (23% of all participants) had experienced symptoms of COVID-19 but 62 (69% of the 90 participants who had experienced symptoms) had not taken a COVID-19 test. Out of the participants who had not experienced previous symptoms, only 21 (7%) had taken a test; this difference was statistically significant ($p<0.05$). In the initial phase of COVID-19, people were afraid of the disease so much that they would do the test even if there were no symptoms, very mild symptoms or they had come in contact with COVID positive person.

We also assessed if there was an association between those who had previously experienced symptoms of COVID-19 and those who had registered for the COVID-19 vaccine by applying a chi-square test. Having previously had symptoms of COVID-19 does not show significant association with being more or less likely to have registered for vaccination. ($p>0.05$).

Table 3 Association between prior COVID-19 symptoms, hesitancy to test and uptake of vaccination

Previous symptoms	COVID-19 test taken		Total	p-value
	No n (%)	Yes n (%)		
Yes	62 (69%)	28 (31%)	90	0.000
No	279 (93%)	21 (7%)	300	
Previous symptoms	**COVID-19 vaccine**		**Total**	**p-value**
	Taken	**Not taken**		
Yes	57(63%)	33 (37%)	90	0.313
No	207(69%)	93 (31%)	300	

DISCUSSION

This study shows that vaccination hesitancy within the study population is a serious concern. A study conducted by Dey et al.[17] has also suggested that a large proportion of priority populations in India choose to remain unvaccinated. This indicates that there needs to be various measures such as incentives, policies or protocols for the populations, so that vaccine acceptance can increase. We noted reasons including fear of death, various rumors about vaccines (given in Table 2), complacency that the disease is not fatal, and fear of vaccine side effects. Similar reasons have been identified in many other studies, e.g. by Chowdhury et al,[18] and Danabal et al.[19] These studies record the most common reasons for vaccine hesitancy and refusal in India to be concerns about side effects and safety of the available vaccines. Others, including Dror et al,[20] Sallam[21] and Khubchandani et al,[22] have also shown a variety of reasons for vaccine hesitancy in India with women, and people who do not feel that COVID-19 is a serious disease, less likely to get vaccinated. Specific measures should be taken to target these populations.

Fear of side-effects is not irrational: according to Menni et al. in a study from the UK,[23] systemic side-effects (affecting the entire body) such as fever and body aches were reported by 13.5% of individuals who received the first dose of the vaccine and local side-effects (local to the injection site) were higher, particularly in people who had been earlier infected with COVID-19. In our study, out of those who were vaccinated, 25% indicated one or more systemic adverse effect, and 66% reported one or more local adverse effect. The most common side-effects seen

were fatigue, headache, tenderness and local pain around the injection site. Other side-effects, such as allergic skin reactions, rashes and red welts on the lips and face were seen in 1.7%.[23] However, these side-effects soon pass and are much less debilitating than COVID-19 itself; this may need to be better communicated to those who are concerned.

CONCLUSION

In this current study, 69% of the study participants accepted the COVID-19 vaccine but 31% displayed some hesitancy. Several factors influenced the level of acceptance towards COVID-19 vaccination, including concern over side-effects and vaccine safety. Since vaccination is an essential measure to prevent further cases of COVID-19 and to help bring the pandemic to an end, factors relating to low vaccine acceptance need to be urgently addressed by public health strategies. Public health strategies are urgently needed to address concerns circulating around the COVID-19 vaccines. Transparent communication about vaccine effectiveness and safety will contribute to increasing public trust in future COVID-19 vaccination programmes.

REFERENCES

1. WHO Coronavirus Disease (COVID-19) Dashboard: World Health Organization; 2020 [cited 2020 13 December]. Available from: https://covid19.who.int/.
2. Helmy YA, Fawzy M, Elaswad A, Sobieh A, Kenney SP, Shehata AA. The COVID-19 Pandemic: A Comprehensive Review of Taxonomy, Genetics, Epidemiology, Diagnosis, Treatment, and Control. J Clin Med. 2020; 9(4):1225.
3. Wu F, Zhao S, Yu B, Chen Y-M, Wang W, Song Z-G, et al. A new coronavirus associated with human respiratory disease in China. Nature. 2020; 579(7798):265–9.
4. Cucinotta D, Vanelli M. WHO Declares COVID-19 a Pandemic. Acta Biomedica. 2020; 91(1):157–60. Epub 2020/03/20.
5. Acuti Martellucci C, et al. SARS-CoV-2 pandemic: an overview. Adv Biol Regul. 2020; 77:100736.
6. Reported Cases and Deaths by Country or Territory. Available at: https://www.worldometers.info/coronavirus/.
7. Nicola M, Alsafi Z, Sohrabi C, Kerwan A, Al-Jabir A, Iosifidis C, et al. The socio-economic implications of the coronavirus pandemic (COVID-19): A review. International Journal of Surgery. 2020; 78:185–93.
8. Kaddoura M, AlIbrahim M, Hijazi G, Soudani N, Audi A, Alkalamouni H, et al. COVID-19 Therapeutic Options Under Investigation. Front Pharmacol. 2020; 11:1196.
9. Antiviral Drugs That Are Approved, Authorized, or Under Evaluation for the Treatment of COVID-19. Available at: https://www.covid19treatmentguidelines.nih.gov/therapies/antiviral-therapy/summary-recommendations/#:~:text=Remdesivir%20is%20the%20only%20drug,the%20treatment%20of%20COVID%2D19.
10. Mathieu E, Ritchie H, Ortiz-Ospina E, Roser M, Hasell J, Appel C, et al. A global database of COVID-19 vaccinations. Nat Hum Behav. 2021;5(7):1–7.
11. Kumar VM, Pandi-Perumal SR, Trakht I, Thyagarajan SP. Strategy for COVID-19 vaccination in India: the country with the second highest population and number of cases. NPJ Vaccines. 2021;6(1):1–7.
12. MacDonald NE. Vaccine hesitancy: Definition, scope and determinants. Vaccine. 2015;33(34):4161–4.
13. Leask J. Vaccines — lessons from three centuries of protest. Nature. 2020;585(7826):499–501.
14. Dohad (Dahod) District: Population 2011-2022 data. Available at: https://www.census2011.co.in/census/district/199-dohad.html
15. National Family Health Survey 5 (2019-21), Ministry of Health and Family Welfare, Government of Gujarat. [Interneet] Available at: http://rchiips.org/nfhs/factsheet_NFHS-5.shtml
16. MoHFW (2021) COVID-19 vaccination. Ministry of Health and Family Welfare, Government of Gujarat, Chief District Health Office, Dahod district vaccination daily report, July 2021.
17. Dey, S. Only 37% of 3 crore health, frontline workers fully vaccinated. Available: https://timesofindia.indiatimes.com/india/only-37-of-3-crore-health-frontlineworkers-fully-vaccinated/articleshow/82135322.cms. 2021
18. Chowdhury S.R., Motheram A, Pramanik S. Covid-19 vaccine hesitancy: Trends across states, over time. Available at: https://www.ideasforindia.in/topics/human-development/covid19-vaccine-hesitancy-trends-across-states-over-time.html. 2021.
19. Danabal K.G.M., et al Attitude towards COVID-19 vaccines and vaccine hesitancy in urban and rural communities in Tamil Nadu, India–a community-based survey. BMC Health Serv. Res. 21 (1), p.1–10, 2021.
20. Dror, A.A., et al. Vaccine hesitancy: the next challenge in the fight against COVID-19. Eur. J. Epidem 35 (8), 775–779, 2020.
21. Sallam M. COVID-19 vaccine hesitancy worldwide: a concise systematic review of vaccine acceptance rates. NIM, National Center for Biotechnology Information, 9 (2), 160. Available at: https://doi.org/10.3390/ vaccines9020160. 2021.
22. Khubchandani J., Sharma S., Price J.H., Wiblishauser M.J., Webb F.J. COVID19 morbidity and mortality in social networks: does it influence vaccine hesitancy? Int. J. Environ. Res. Publ. Health, 18 (18), 9448,
23. Menni C., Klaser K., May A, Polidori L, Capdevila J., Louca P., et al. Vaccine side-effects and SARS-CoV-2 infection after vaccination in users of the COVID Symptom Study app in the UK: a prospective observational study. Lancet Infect Dis 2021; 21: 939–49.