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Original Research Article

Knowledge, attitude and practice towards COVID-19 vaccination acceptance in West India

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ABSTRACT

Background: Coronavirus disease 2019 (COVID-19) pandemic has affected more than 200 countries causing loss of life and livelihood. The accelerated development of the COVID-19 vaccine is a vital development, and early data suggests that it is both, safe and efficacious. However, the acceptance of COVID-19 vaccine depends on various socio-demographic characteristics. The aim of this study was to understand the knowledge and attitude towards COVID-19 vaccine in India.
Methods: This is a cross-sectional study done in an urban slum in Mumbai, India. The main outcome variable was the responses related to COVID-19 vaccine acceptance among the study participants.
Results: A total of 1342 participants were included in the study. Almost two thirds (64.5%) of the young adults aged between 18 and 40 years were unaware about the COVID-19 vaccine availability, followed by 56.4% person aged between 40 and 60 years and 46.2% of the persons aged more than 60 years were unaware about the vaccine availability. Among the study participants, nearly 79% were willing to take COVID-19 vaccine when it is available for use and only 2% did not want the vaccination. More than 2/3rd of the people who responded that they are willing to accept the COVID vaccine belong to the no income group.
Conclusions: The most important factor for vaccine hesitancy is the occurrence of mild or serious adverse effects following immunization. Vaccine acceptability may be increased once additional information about vaccine safety and efficacy is available in the public domain, preferably from a trusted, centralized source of information.

Keywords: COVID-19 vaccine, Vaccine acceptance, Knowledge and attitude towards COVID-19 vaccine

INTRODUCTION

A safe and effective vaccine for the Coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), has been on the wish list of healthcare agencies across the globe.[1] The process of vaccine development is a slow and time consuming process, and has to go through multiple checks for potency, efficacy and safety, particularly in high-risk individuals viz., elderly, pregnant women, and people with co-morbidities, and immunodeficiencies.[2]

In addition, the acceptability of the newly launched vaccine is yet another parameter to be considered, since

vaccine coverage rate among the population is essential for a successful immunization program. The launch of the COVID-19 vaccine has been an accelerated program, with the vaccine going to market merely nine months after discover of the virus. While there is some early data to suggest safety and efficacy of the approved vaccines, long term efficacy and any long term side effects are largely unknown.

Understandably, the acceptance of the new vaccine remains uncertain by both, healthcare experts and the public at large. In addition, a strong anti-vaccine movement, with multiple pseudo-scientific conspiracy theories have flooded the media reports. It is for these reasons that vaccine hesitancy may become an important challenge in the immunization campaign against COVID-19.[3]

Vaccination against COVID-19 is voluntary in most countries, and it is therefore important to understand the current views of local populations before the vaccination program is rolled out.

In India, at the time of submission of this article, no vaccine has received regulatory approval, but it is anticipated that the Astra Zeneca vaccine and others may get approval in early January 2021.

The knowledge and perspective regarding COVID-19 vaccine has not been studied and it is anticipated that there will be great variation in vaccine related perspectives and attitudes across countries, and within countries as well, depending on demographic factors, education levels and overall knowledge regarding COVID-19 and the vaccines available.

In this study, we analyse the various sociodemographic and economic variables, as well as the beliefs and barriers that may prove to be hurdles during the immunisation program. To the best of our knowledge, this is the first prospective survey to study knowledge and attitude towards COVID-19 vaccine in a slum population in India's most populated city, Mumbai.

METHODS

This cross-sectional, non-interventional, observational questionnaire based study was conducted from the 5th-10th of October, 2020 in an urban slum in Mumbai, Maharashtra. The questionnaire was administered to subjects who volunteered to be part of a large COVID-19 sero-survey, along with a diabetes and eye screening program.

The Inclusion criteria for the study was voluntary participation, and limited to subjects above the age of 18 years. Exclusion criteria was residents of that slum not giving the consent to participate in the study.

All questionnaires were administered over a 5-day period in different parts of the slum to ensure adequate representation of the whole slum area. Recruitment was on a first come, first served basis and capped at 300 tests per day.

All participants in the screening program were administered a pre-designed, validated questionnaire, after an informed consent. The study participants were offered the questionnaire in one of three languages: English, Hindi and Marathi. The questionnaires in the different languages had earlier been validated by forward-back translations for comprehension.

The questionnaire had questions designed to elicit the following: demographic details, information related to knowledge, attitudes and perspectives regarding COVID-19.

For the purpose of this report, we have analysed only those responses which are related to the COVID-19 vaccine.

The responses to the following questions were analysed in detail. Q1. Is there a vaccine for COVID19 available today (forced choice responses: yes / no / don't know), Q2. If there was a vaccine available for COVID19 I would take it (forced choice responses: yes / no / don't know)

The study was conducted in accordance with the tenets of the Declaration of Helsinki. The study protocol was approved by the Institutional Ethics Committee at Ashwini Rural Medical College, Hospital and Research Center, Sholapur, Maharashtra.

Statistical analysis

Frequency and percentages were calculated for categorical variables. Median and range was reported for continuous variables. The overall and risk-group specific RT-PCR positivity rates were reported with 95% confidence intervals using Open Epi (open source epidemiologic statistics for public health). Additionally, positive RT-PCR rates were reported according to demographics, comorbidities, work related risk/exposures and prevention practices. Difference in proportion was examined by $\chi 2$ tests with Yates' correction, if required. According to needs, Fishers' exact test was also used. P value of <0.05 using two-tailed test was considered as statistically significant.

RESULTS

Of the 1342 respondents, nearly half were in the age group of 40-60 years, gender distribution was almost equal and almost 90% of them were either illiterate or educated less than high school and more than half of them had no income (Table 1).

Table 1: Socio-demographic characteristics of study participants (n=1342).

Variables	N (%)
Age (in years)	
18-40	524 (39)
40-60	647 (48.2)
>60	171 (12.7)
Gender	
Male	632 (47.1)
Female	710 (52.9)
Education	
Illiterate	405 (30.2)
<10th standard	841 (62.7)
Graduate	83 (6.2)
post-graduate	13 (1.0)
Income per year	
No income	756 (56.3)
<50,000	472 (35.2)
>2,00,000	21 (1.6)
50,000-2,00,000	93 (6.9)
Occupation	
Blue collar	485 (36.1)
Housewife	517 (38.5)
Retired	85 (6.3)
Small business	85 (6.3)
Student	47 (3.5)
Unemployed	97 (7.2)
White collar	26 (1.9)

Only 9% of the respondents were aware of COVID-19 vaccine, with rest either believing that it did not exist (58%), or they didn't know about it. (Figure 1).

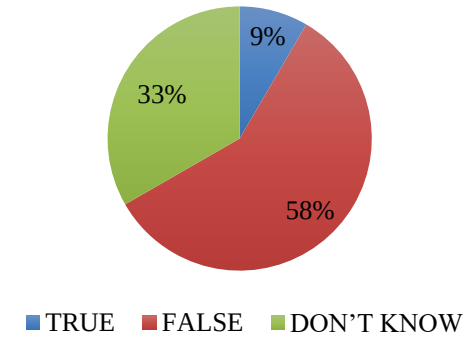

Figure 1: Responses for the Question: Is there a vaccine for COVID-19 available today?

We have found that majority (64.5%) of the young adults aged between 18 and 40 years were unaware about the COVID vaccine availability, followed by 56.4% person aged between 40 and 60 years and 46.2% of the persons aged more than 60 years were unaware about the vaccine availability. Our study also found that more than half (56.4%) of the person aged between 40 and 60 years and majority (64.4%) of the females don't know about the COVID vaccine availability. In our study, majority (64) of those who told that there is no COVID vaccine were educated less than 10th standard. We found that more than half (54.9%) who reported no awareness belong to no income group. Nearly two-third (61.3%) of those who responded don't know about the COVID vaccine availability also belong to no income group. More than half of housewife (53.0%), unemployed (58.8%), white collar job (58.3%), blue collar job (63.5%) were unaware about COVID vaccine availability (Table 2).

Table 2: Association between socio-demographic characteristics and knowledge of COVID vaccine availability (question: there is a vaccine for COVID available today).

Variables	True	False	Don't Know	Chi-square value	P value
	N (%)	N (%)	N (%)		
Age (in years)					
18-40	59 (11.3)	338 (64.5)	127 (24.2)	45.068	0.001
40-60	46 (7.1)	365 (56.4)	236 (36.5)		
>60	8 (4.7)	79 (46.2)	84 (49.1)		
Gender					
Male	50 (7.9)	407 (64.4)	175 (27.7)	19.386	0.001
Female	63 (8.9)	375 (52.8)	272 (38.3)		
Education					
illiterate	22 (5.4)	169 (41.7)	214 (52.8)	114.425	0.001
<10th standard	75 (8.9)	544 (64.7)	222 (26.4)		
graduate	15 (18.1)	58 (69.9)	10 (12.0)		
post-graduate	1 (7.7)	11 (84.6)	1 (7.7)		
Income per year					
no income	67 (8.9)	415 (54.9)	274 (36.2)	17.29	0.008
<50,000	31 (6.6)	296 (62.7)	145 (30.7)		
50,000-2,00,000	14 (15.1)	55 (59.1)	24 (25.8)		
>2,00,000	1 (4.8)	16 (76.2)	4 (19.0)		

Continued.

Variables	True	False	Don't Know	Chi-square value	P value
	N (%)	N (%)	N (%)		
Occupation					
Blue collar	32 (6.6)	308 (63.5)	145 (29.9)	56.26	0.001
Housewife	47 (9.1)	274 (53.0)	196 (37.9)		
Retired	4 (4.7)	39 (45.9)	42 (49.4)		
Small business	4 (4.7)	59 (69.4)	22 (25.9)		
Student	5 (10.6)	31 (66.0)	11 (23.4)		
unemployed	12 (12.4)	57 (58.8)	28 (28.9)		
white collar	9 (34.6)	14 (58.3)	3 (11.5)		
Total	113 (8.4)	782 (58.3)	447 (33.3)		

Table 3: Association between socio-demographic characteristics and when will a vaccine for COVID be available.

Variables	2020-2021	After 2021	Don't know	Chi-square value	P value
	N (%)	N (%)	N (%)		
Age (in years)					
18-40	92 (17.6)	14 (2.7)	418 (79.8)	15.73	0.003
40-60	97 (15.0)	10 (1.5)	540 (83.5)		
>60	12 (7.0)	1 (0.6)	158 (92.4)		
Gender					
Male	102 (16.1)	12 (1.9)	518 (82.0)	1.29	0.525
Female	99 (13.9)	13 (1.8)	598 (84.2)		
Education					
illiterate	43 (10.6)	6 (1.5)	356 (87.9)	12.05	0.061
<10th standard	146 (17.4)	18 (2.1)	677 (80.5)		
graduate	11 (13.3)	1 (1.2)	71 (85.5)		
post-graduate	1 (7.7)	0 (0)	12 (92.3)		
Income per year					
No income	101 (13.4)	12 (1.6)	643 (85.1)	20.057	0.003
<50,000	77 (16.3)	7 (1.5)	388 (82.2)		
50,000-2,00,000	22 (23.7)	4 (4.3)	67 (72.0)		
>2,00,000	1 (4.8)	2 (9.5)	18 (85.7)		
Occupation					
Blue collar	77 (15.9)	10 (2.1)	398 (82.1)	26.773	0.008
Housewife	78 (15.1)	8 (1.5)	431 (83.4)		
Retired	4 (4.7)	0 (0)	81 (95.3)		
Small Business	21 (24.7)	0 (0)	64 (75.3)		
Student	6 (12.8)	2 (4.3)	39 (83.0)		
unemployed	14 (14.4)	3 (3.1)	80 (82.5)		
white collar	1 (3.8)	2 (7.7)	23 (88.5)		
Total	201 (15.0)	25 (1.9)	1116 (83.2)		

Table 4: Association between socio-demographic characteristics and knowledge of COVID vaccine availability (question: there is a vaccine for COVID available today).

Variables	True	False	Don't know	Chi-square value	P value
	N (%)	N (%)	N (%)		
Age (in years)					
18-40	454 (86.6)	9 (1.7)	61 (11.6)	44.15	0.001
40-60	497 (76.8)	13 (2.0)	137 (21.2)		
>60	110 (64.3)	8 (4.7)	53 (31.0)		
Gender					
Male	514 (81.3	12 (1.9)	106 (16.8)	3.765	0.152
Female	547 (77.0)	18 (2.5)	145 (20.4)		

Continued.

Variables	True	False	Don't know	Chi-square value	P value
	N (%)	N (%)	N (%)		
Education					
Illiterate	262 (64.7)	9 (2.2)	134 (33.1)	86.05	0.001
<10th standard	712 (84.7)	17 (2.0)	112 (13.3)		
Graduate	74 (89.2)	4 (4.8)	5 (6.0)		
Post-graduate	13 (100.0)	0 (0)	0 (0)		
Income per year					
No income	579 (76.6)	22 (2.9)	155 (20.5)	15.38	0.017
<50,000	378 (80.1)	8 (1.7)	86 (18.2)		
50,000-2,00,000	86 (92.5)	0 (0)	7 (7.5)		
>2,00,000	18 (85.7)	0 (0)	3 (14.3)		
Occupation					
Blue collar	387 (79.8)	7 (1.4)	91 (18.8)	51.26	0.001
Housewife	390 (75.4)	15 (2.9)	112 (21.7)		
Retired	51 (60.0)	4 (4.7)	30 (35.3)		
Small Business	77 (90.6)	0 (0)	8 (9.4)		
Student	45 (95.7)	1 (2.1)	1 (2.1)		
Unemployed	87 (89.7)	2 (2.1)	8 (8.2)		
White collar	24 (92.3)	1 (3.8)	1 (3.8)		
Total	1061 (79.1)	30 (2.2)	251 (18.7)		

Among the study participants, nearly 79% were willing to take COVID-19 vaccine when it is available for use and only 2% did not want the vaccination. (Figure 2), the others were not sure of their response. In our analysis we have found that nearly more than two third of the participants in all age groups were willing to take vaccine once it is available. More than 2/3rd males and females were willing to take the COVID vaccine and it was found that only thirteen postgraduates were willing to accept the COVID vaccine. Majority (67%) of the people who may accept the COVID vaccine in future were educated less than high school. More than 2/3rd of the people who responded that they are willing to accept the COVID vaccine belong to the no income group. It has been found that more than half of the people who were willing to accept the COVID vaccine were blue collar workers and housewife (Table 4).

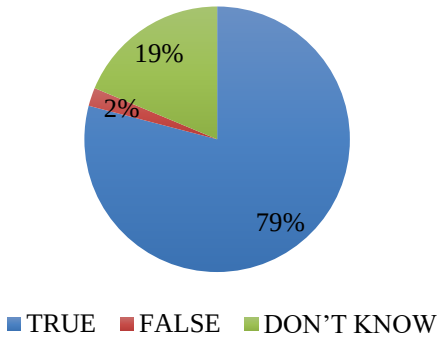

Figure 2: Responses for the question: if there is an available vaccine for COVID-19 disease, i would like to take it.

DISCUSSION

The COVID-19 pandemic has seen healthcare agencies adopt unprecedented infection prevention and control measures, and fast track vaccine approvals to urgently control the spread of the disease. The latter is a key strategy to stop further escalation of the COVID-19 pandemic, and just may be the game changer as the world battles its most serious health crisis of the century. More than 100 COVID-19 vaccine candidates are being developed and are in different phases of clinical trial. Many countries fast-tracked the use of COVID-19 vaccine to public through emergency use authorization (EUA) from their concerned health ministry or department.

The knowledge, attitudes and practices (KAP) of the local population towards the COVID-19 vaccine is critical to understanding the epidemiological dynamics of disease control, and the effectiveness, compliance and success of the vaccination program.

Vaccine hesitancy remains a significant barrier to full population inoculation even in hitherto established vaccination programs. Our study aims to highlight the knowledge regarding the COVID-19 vaccine, and also the predictors of vaccine hesitancy, in an urban slum in India.

We found that nearly half of the study participants belong to the age group 40-60 years and nearly two-thirds were educated less than 10 standards. Our study found that more than half of housewife, unemployed, white collar and blue collar workers were unaware about COVID-19 vaccine. Our study also highlighted that more than two-

thirds of the study participants were willing to take COVID-19 vaccine when it is available for use.

Sharun et al reported that in a similar study, via a self-administer questionnaire online, nearly 85% of the 351 subjects were planning to get the COVID-19 vaccine once it is available for use in the market.[4] Less than two thirds of their subjects, however, were ready to get the vaccine as soon as it was available, and the most important cause of vaccine hesitancy was the fear of side effects.

The results of our study are also similar to those reported in the IPSOS survey: the authors found a vaccine acceptance rate of 87% among the Indian population.[5] Most cross-sectional surveys across the globe have revealed similar responses amongst the study subjects.[3-10] More than two-thirds of the study participants in the USA were willing to get COVID-19 vaccine.[6] On the other hand, in China, the COVID-19 vaccine acceptability rate was found to be more than 90%.[7]

In our study, the majority (67%) of the study participants who were willing to get COVID-19 vaccine were educated less than high school. This has also been emphasized in a study done in Saudi Arabia which reveals that more than half of the study participants willing or planning to get COVID-19 vaccine were educated less than high school.[8] While it will be erroneous to conclude that the educated are less accepting of the vaccine, it may just be possible that those reading more media reports quoting the waning numbers of those affected by COVID-19, as well as the conspiracy theories surrounding the vaccine, may be more reluctant.

We also found that the percentage of vaccine reluctance (2.2%) among the participants was lower when compared to studies done in Brazil (12%), Australia (12%), Malaysia (15%) and Saudi Arabia (16%).[5] This is an interesting observation which requires further elaboration, since most of other countries have equally robust public health education initiatives, and immunization programs. One possible explanation could be that these studies were conducted within six months of the COVID-19 epidemic, when the skepticism about the rapid development of the vaccine could have been higher.

Dror et al reported that employment within the healthcare sector did not influence the subjects' acceptance of a potential COVID-19 vaccine, being 75% in doctors, 66% in nurses and 71% in general population in Israel. Predictably, the reason for this was apprehension regarding the vaccine's safety, given its rapid development. They found men more receptive to the idea of a vaccine, and that the most significant positive predictor for acceptance of a potential COVID-19 vaccine was current influenza vaccination.[9]

CONCLUSION

The rapid development of COVID-19 vaccine might have contributed to the emergence of concerns among the general population. Awareness about the COVID-19 vaccine, and its acceptance, varies depending on sociodemographic characteristics. The most important factor for vaccine hesitancy is the occurrence of mild or serious adverse effects following immunization, and this may be the biggest challenge in the global response against the pandemic.

Vaccine acceptability may be increased once additional information about vaccine safety and efficacy is available in the public domain, preferably by a trusted, centralized source of information. In addition, all efforts must be made to curb the spread of misinformation about the vaccine. Interventional educational campaigns especially targeting the populations at a higher risk of vaccine hesitancy are therefore essential to avoid low inoculation rates. Additional studies to identify the barriers to vaccine acceptance, and the populations at a higher risk for vaccine hesitancy are also critical. They will help the public health policy makers to formulate more definitive, efficient strategies that can help to implement the COVID-19 vaccination program successfully in India.

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