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Original Research Article

COVID-19 vaccine acceptances and barriers to vaccination in the context of Kerala: a cross-sectional survey

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ABSTRACT

Background: The long-term control of the pandemic COVID-19 pandemic hinges on the uptake of vaccine and high immunization uptake is critical but barriers to immunization exists. Vaccine hesitancy is one of the top 10 threats to global health. Hesitancy will be a challenge to curbing this pandemic. Apt vaccination strategies are very essential to increase vaccine acceptance.
Methods: A cross-sectional study among the population in Kerala where data was collected through an online questionnaire using Google forms and was distributed using social media platforms. Total of 213 data was collected. Study focused on aspects of vaccine communication, preference of COVID-19 vaccine, perceived benefits, and barriers of COVID-19 vaccine acceptance and cues of vaccine.
Results: 80.2% of the respondents were willing to get vaccinated. 78.9% of the respondents have taken previous vaccinations by the government. 70 of them trust government health care departments and media (82.2%) is the least trusted platform regarding vaccination. 56.3% are not getting enough information on COVID vaccine safety, while 81.2% of the respondents did not receive negative information. A majority of them (64.3%) relied on official government websites for information. Majority agrees to the perceived benefits of COVID-19. 80.3% are willing to take free vaccination. 46.9 % are willing to pay for COVID vaccine.
Conclusions: The scenario in Kerala is positive towards the vaccination drive and majority of them are willing to get vaccinated. But strategies must be made effective in terms of elevating the barriers to vaccination.

Keywords: Vaccine acceptance, Vaccine communication, COVID-19 pandemic, Benefits of COVID-19 vaccine, Barriers to COVID-19 vaccine

INTRODUCTION

The globe is at war with the COVID-19 pandemic and it is time to face yet another war with the microbes. For a world which is battered with COVID-19 pandemic, the only hope is vaccination. Wearing mask, sanitization and social distancing were found to be effective in decreasing the spread of the virus, but only the uptake of a preventive vaccine will be the solution for long-term control of the COVID-19 pandemic. The drive for vaccination has begun in some parts of the world. India has also started the daunting task of vaccinating a huge population. The government will have to convince people to opt for the vaccine. The World Health Organization (WHO) describes vaccine hesitation as the refusal or reluctance to vaccinate despite the availability of vaccines that threatens to reverse progress made in tackling vaccine-preventable diseases. Early studies in various countries pertaining to vaccine acceptance reveals that there is reluctance to accept a new vaccine as there is increasing concern about its safety, adverse effects, base line effectiveness.[1] Prominent politicians and activists claiming that it has been produced too hastily and not been tested enough adds to the chaos.[2]

Immunization programs in India began in 1978 as expanded programme on immunization (EPI) and was

renamed as universal immunization programme (UIP) in 1985.[3] Four decades after EPI and UIP, the immunization programs have matured globally and in India. Vaccination coverage has become higher, availability and sustained vaccination coverage of vaccines has also increased over the decades.[3] According to National Family Health Survey (NFHS) 5 Indian children between the age of 12-23 months are fully vaccinated based on information from either vaccination card or mother's recall where in the percentages of rural is 78% and urban is 77.6% with a total of 85.2%. Religion had a small impact where Muslim children were less likely to receive all basic vaccinations than Christian or Hindu children but there was not much difference was found in vaccination coverage in terms of other background characteristics.[5] While comparing to the rest of the Indian states Kerala has been showing relatively higher coverage of vaccination doses over the years. Though the preventive efforts from diseases were practiced in India, the reluctance, opposition and a slow acceptance of vaccination have been the characteristic of vaccination history in the country. The operational challenges keep the coverage inequitable in the country.[3]

Acceptance of a COVID-19 vaccine was highly influenced by the baseline effectiveness of the vaccine. Information regarding the efficacy and safety of an upcoming COVID-19 vaccine should be disseminated to ensure its acceptance and coverage.[7] In 2019 vaccine hesitancy was found to be among the top 10 threats to global health. So apt vaccine safety communication is very essential to curb the vaccine hesitancy and adequate strategies must be chalked out to vaccinate the population. Previous history of vaccination points out that segments of population have been hesitant to take vaccine and this will be a challenge to curbing this pandemic. Introduction of more strategies to persuade the population to become vaccinated is important since acceptance is associated with perceived risk for COVID-19, it is also important to increase the perceived risk in communities.[1] The vulnerable people belonging to tribal groups and migrant population are at larger risk since inequity still continues. Government of India has developed a COVID19 communication strategy which emphasises on Information related to the new COVID-19 vaccine, vaccine hesitancy, vaccine eagerness and COVID appropriate behaviors by using an integrated advocacy, communication and social mobilization strategy nationwide.[9] In order to leave no one behind, this article analyses the vaccine acceptance vaccine communications and vaccine confidence among the people.

Yet even before the coronavirus pandemic, more than 13 million children didn't receive any vaccines and at least 20 million children below the age of one did not receive the recommended vaccines against measles, polio, and other preventable diseases.[10] Now, COVID-19 is leaving many of the world's most underprivileged children without access to immunization. Unless the COVID-19 vaccine response is bold enough, there is a risk for lasting negative impact on routine immunization coverage. Given the current disruptions, this could create pathways to disastrous outbreaks in 2021 and well beyond.[9]

METHODS

This survey is a cross-sectional study conducted among the population in Kerala. Data was collected from all regions in Kerala through an online anonymous questionnaire during January 2020. Google form was used to publish the questionnaire and generate the answer. The link containing the questionnaire was circulated using social media platforms like WhatsApp and email. URL link was spread using social software. The interviewees visited the Link containing questionnaire on their mobile phones or laptops to answer the questionnaire. The inclusion criteria were individuals who: were at least 18 years old; able to read and complete the self-administered questionnaire independently; and voluntarily agreed to participate in this survey. The questionnaire addressed: demographical characteristics (age, chronic conditions), contextual influences, influences arising from personal perception of the vaccine or influences of the social/peer environment, vaccine communication, preference of COVID-19 vaccine, perceived benefits and barriers of COVID-19 vaccine, intention to get vaccinated if a COVID-19 vaccine was available, and cues to action. A total of 213 data was collected of which 120 were female and 93 were male and majority of the respondents belonged to the age group of 15 to 45 years. The data was analyzed using statistical package for the social sciences (SPSS).

RESULTS

Descriptive statistics were conducted to generate summary tables for study variables. 213 respondents answered the survey; women accounted for 43.7% of respondents. 171 of the respondents were willing to get vaccinated while 42 of them were not willing to get vaccinated of which the majority fall in the age category of 30-45 years. 52.40 % were Hindus and 28.60% were Christians who showed reluctance in vaccination. Organized sector (40.50%) and students (31%) showed reluctance in vaccine acceptance. The study revealed that the population that belonged to a higher education status of university and above showed more reluctance towards acceptance of vaccination which is 20%. Marital status of the participants showed no specific difference in the acceptance of vaccination. Participants with good health (54.80%) were found to be more reluctant to accept vaccine while 26.90% of them who claimed to have very good health were willing to get vaccinated. Participants who followed allopathic medicine (61.90%) will not accept vaccination and 19% of Ayurvedic followers and 16.70% homeopathic followers are also reluctant to get vaccinated (Table 1).

78.9% of the respondents have been vaccinated previously while there are 21.1% of the respondents who have not taken the previous vaccines recommended by the government. Majority (72.3%) of the respondents says that they have received vaccination related support from

leaders in the community. Majority suggests that their religious beliefs are not against vaccination while a small percent of 3.8 confirm that certain religious beliefs are against vaccination. A majority (75.1%) of them are willing to get their child vaccinated if the school advices them in this regard. 122 of them trust the doctors on information regarding vaccines, while 70 of them trust government health care departments, media (82.2%) is the least trusted platform regarding information on vaccination. 56.3% feel that they are not getting enough information on COVID vaccine safety. 5.2% have been reluctant or hesitated to get vaccination because they considered it as useless or dangerous but majority of them were not hesitant. Past experiences or pain related to vaccination did not prevent the participants or their children from getting immunized apart from a small percent of 3.3%. Past events from the past have diminished trust on vaccination 0f 8.5 percent of the respondents while the rest had no such bitter experiences as depicted in Table 2.

18.8% of the respondents had received negative information regarding vaccines, while majority of them did not receive such information.

Majority agreed that government vaccines are beneficial while only a few percent disagreed to it. 16.4% strongly agree that information received about vaccines from the vaccine programs were reliable and trustworthy, 59.6% agreed to this statement while only 1.45 disagreed to this statement. 80.8% did not share information related to vaccination in social media, while 19.2% did share the information. 21.1% believed in the information shared on social media regarding vaccines when 78.9% disbelieved this information. 64.3% relied on official government websites for the information on vaccines while 19.7% believes the television and news channels. Domestic vaccines are preferred by 164 respondents and foreign vaccines are preferred by 49 respondents as in Table 3.

The perceived benefits and barriers of COVID-19 vaccine are depicted in the Table 4. One hundred and ten respondents believe that vaccination is a good idea because they feel less worried about catching COVID-19. One thirty respondents are opined that there is a decreased chance of getting COVID if vaccinated. Among the respondents, 72 respondents are worried about the side effects of COVID-19 vaccine while seventy-nine are concerned about the efficacy of the vaccine and 85 respondents are concerned with the safety of the vaccine. 54% are concerned about faulty fake vaccine.

Eighty percent of the respondents are willing to accept free vaccine and 46.9% are willing to pay for COVID vaccine and 53.1% of them are not willing to pay for vaccine. Sixty-two respondents strongly believes that non-vaccinators will put them at risk and majority of the respondents opined that they will consider others' action in order to get vaccinated by themselves, that is, they will wait and observe what others are doing in terms of vaccination. Majority (59.6%) of them preferred to get vaccinated from the health centre. Two hundred and two responded that they will study about new vaccine available to them and one hundred and twenty of them responded that they will be vaccinated only if they got adequate information about the vaccine. There were eighty-two respondents who opined that they will get vaccinated only if it is taken by many.

Table 1: Demographic characteristics and acceptance of free vaccine.

Variables	Acceptance free vaccine		
	Yes (%)	No (%)	Total
Age (in years)			
15-30	81 (47.40)	17 (40.50)	98
30-45	72 (42. 10)	20 (47.60)	92
45-60	11 (6.40)	4 (9.50)	15
60-75	7 (4.10)	1 (2.40)	8
Religion			
Not applicable	29 (17)	8 (19)	37
Hindu	93 (54.40)	22 (52.40)	115
Christian	47 (27.50)	12 (28.60)	59
Muslim	2 (1.20)	0	2
Occupation			
Organised	81 (47.40)	17 (40.50)	98
Unorganised	31 (18.10)	8 (19)	39
Unemployed	14 (8.20)	4 (9.50)	18
Students	45 (26.30)	13 (31)	58
Education			
High school	8 (88.9)	1 (11.1)	9
Secondary school	8 (88.9)	1 (11.1)	9
University and above	156 (80)	39 (20)	195

Continued.

Variables	Acceptance free vaccine		
	Yes (%)	No (%)	Total
Marital status			
Married	98 (80.30)	24 (19.7)	122
Single	73 (80.20)	18 (19.80)	91
Gender			
Female	96 (56.10)	24 (54.10)	120
Male	75 (43. 90)	18 (42.90)	93

Table 2: Contextual influences.

Contextual influences	Responses	Frequency	Percent
Are you or your children vaccinated	Yes	168	78.9
	No	45	21.1
Is your religion against vaccine	Yes	8	3.8
	No	205	96.2
Have you received enough information on COVID vaccine safety	Yes	93	43.7
	No	120	56.3
Overall health rating	Very good	46 (26.90%)	7 (16.70%)
	Good	89 (52%)	23 (54.80%)
	Fair	34 (19.90%)	9 (21.40%)
	Poor	2 (1.20%)	3 (7.10%)
Hesitancy to take vaccine	Yes	11	5.2
	No	202	95.8
Government vaccine is beneficial	Strongly agree	64	30
	Agree	104	48.8
	Neither agree nor disagree	40	18.8
	Disagree	4	1.9
	Strongly disagree	1	0.5

Table 3: Vaccine communication and preference of COVID-19 vaccine.

Contextual influences	Responses	Frequency	Percent
Negative information about vaccine	Yes	40	18.8
	No	173	81.2
Information on vaccination that I have received is reliable	Strongly agree	35	16.4
	Agree	127	59.6
	Neither agree nor disagree	46	21.6
	Disagree	2	0.9
	Strongly disagree	3	1.4
Media preferred for information on COVID	Journals	17	8
	Official govt. websites	137	64.3
	Social media	17	8
	Television and news channels	42	19.7

Table 4: Perceived benefits and barriers of COVID-19 vaccine.

Contextual influences	Responses	Frequency	Percent
Vaccination is a good idea so that you are less worried about COVID vaccine	Strongly agree	30	14.1
	Agree	110	51.6
	Neither agree nor disagree	50	23.5
	Disagree	22	10.3
	Strongly disagree	1	0.5
Worried about side effects	Strongly agree	16	7.5
	Agree	72	33.8

Continued.

Contextual influences	Responses	Frequency	Percent
	Neither agree nor disagree	55	25.8
	Disagree	63	29.6
	Strongly disagree	7	3.3
Concern on faulty fake vaccine	Strongly agree	50	23.5
	Agree	115	54
	Neither agree nor disagree	24	11.3
	Disagree	23	10.8
	Strongly disagree	1	0.5
Accept free vaccine	Yes	171	80.3
	No	42	19.7
Willing to take vaccine	In first stage	77	36.2
	Not willing to get vaccinated	12	5.6
	Wait and see what other people does	124	58.2

DISCUSSION

Government of India has developed a COVID-19 communication strategy which emphasises on Information related to the new COVID-19 vaccine, vaccine hesitancy, vaccine eagerness and COVID appropriate behaviors by using an integrated advocacy, communication and social mobilization strategy nationwide.[12] This study will be discussed in relation to the strategies suggested by the Indian government in the context of the state of Kerala. Out of the 213 respondents' women accounted for 43.7% of respondents. 171 of the respondents were willing to get vaccinated while 42 of them were not willing to get vaccinated of which the majority fall in the age category of 30-45 years.

While coming to the influence of religion majority states that their religious beliefs are not against vaccination while a small percent of 3.8 confirm that certain religious beliefs are against vaccination which can be discussed in the light of 2021 NHFS report which states that religion had only a small impact and not much difference was found in vaccination coverage in terms of other background characteristics which is also substantiated by this study.

Considering the contextual Influences arising due to historic factors related to vaccination this study reveals that 78.9% of the respondents have taken previous vaccinations issued by the government which is a notable as in the state of Kerala, but still respondents with a previous history of not taking the previous vaccines that is 21.1% poses a threat to the COVID-19 vaccine acceptance. 72.3% stated that they receive support from community leaders which indicates that the state has credible influencers from local communities to build their trust and acceptance which is an indicator in the COVID-19 communication strategy 2020.

The study reveals that there is strong contextual Influence arising due to institutions such as schools where majority (75.1%) of them are willing to get their child vaccinated if the school advices them in this regard, which is a major advocacy strategy suggested by the Indian government. While coming to the health systems of the state 22 of them trust the doctors on information regarding vaccines, while 70 of them trust government health care departments and media (82.2%) is the least trusted platform regarding information on vaccination, which is a good indicator of health behavior which falls in accordance with the COVID-19 communication strategy.

56.3% feel that they are not getting enough information on COVID vaccine safety which is a major concern depicted in COVID-19 communication strategy which can be addressed with prompt, simple and focused communication on vaccine safety. Past experiences or pain related to vaccination did not prevent the participants or their children from getting immunized apart from a small percent of 3.3%. Past events from the past have diminished trust on vaccination of 8.5 percent of the respondents while the rest had no such bitter experiences.

Majority of the respondents did not receive any negative information about the vaccine while only 18% received negative information. 16.4% strongly agreed that information received about vaccines from the vaccine programs were reliable and trustworthy, 59.6% agreed to this statement while only 1.45 disagreed to this statement. This points out to the strategy of providing prompt focused and simple information's on vaccines have been achieved at the state of Kerala according to the COVID-19 communication strategy 2020.

The COVID-19 communication strategy 2020 emphasizes that for the success of the COVID-19 vaccination, media need to be an ally and they must engage in providing needed information, allay fears and must be able to establish public confidence so as to increase vaccine confidence Now considering the influence of media in this study 21.1% believed in the information shared on social media regarding vaccines when 78.9% disbelieved this information. A majority of them (64.3%) relied on official government websites for the information which indicates that a majority of them are depending on the right track for gaining information. 80.8% did not share information related to vaccination in social media which points out that they do not rely on social media but on other official medias for pertaining vaccine related information. Also, it

is notable that domestic vaccines are preferred by 164 respondents than 49 respondents who preferred foreign vaccines.

Majority of the respondents agrees to the perceived benefits of COVID-19 as they believe that vaccination is a good idea because they feel less worried about catching COVID-19. This clearly explains that the respondents are motivated to adopting to the new treatment mode of vaccination against COVID-19. Nevertheless, there are respondents who are worried about the efficacy, side effects, safety of the new vaccine, they have also raised concern regarding faulty or fake vaccine. This concern is similar to a study by Harapan et al which identified that the acceptance of a COVID-19 vaccine was highly influenced by the baseline effectiveness of the vaccine. Information regarding the efficacy and safety of an upcoming COVID-19 vaccine should be disseminated to ensure its acceptance and coverage.

Majority of the respondents that is 29.1%, strongly agrees and 24.9% agrees that non-vaccinators will put them at risk. While researching about the external que's majority (115) of them opined that they will wait and observe what others are doing in terms of vaccination instead of taking it in the first hand which indicates a concern of safety and efficacy of the vaccine also seen in the study by Lahariya et al which points out the reluctance and slow acceptance of vaccination in the country has been observed in the past. Majority (59.6) of them preferred to get vaccinated from the health centre in the state which is an indication to the government pertaining to the vaccine distribution. 94.8% are very keen that they will study about new vaccine available to them before taking the dose.

But in spite of these barriers the study has found that 80.3% are willing to take free vaccination and 46.9% are willing to pay for COVID vaccine which shows a positive determination in accepting the vaccines. Earlier studies by Khan et al and Shrivastwa et al have stated that Kerala has been showing higher coverage of vaccination in the past years. Majority of them agreed to this which can lead us to an assumption that the population in Kerala has been actually triggered to accept COVID vaccination, while there is still a small population who show reluctance to vaccination which cannot be neglected while dealing with this pandemic.

Implications for policy and future research

As the whole world is keen to curb this pandemic these are some implications for policy pertaining to vaccine hesitancy. An indicator in the COVID-19 communication strategy 2020 is related to the support from community leaders and a majority of the participants in this study have agreed that they are receiving such support. This can be encouraged so as to increase the vaccination coverage. The study has found that there is strong contextual Influence arising due to institutions such as schools which can influence the uptake of vaccines.

Majority trust government health care departments and they rely on official government media for vaccine related information, so the communication through these medias will be quite helpful to achieve the vaccination targets. But still 56.3% feel that they are not getting enough information on COVID vaccine safety and 18% received negative information which is a major concern that must be addressed.

Nevertheless, there are respondents who are worried about the efficacy, side effects, safety of the new vaccine, they have also raised concern regarding faulty or fake vaccine. Information regarding the efficacy and safety of an upcoming COVID-19 vaccine should be disseminated to ensure its acceptance and coverage. Majority (59.6) of them preferred to get vaccinated from the health centre in the state which is an indication of preference of the public regarding the place they want to get vaccinated.

CONCLUSION

The rate of immunization is generally high in the state of Kerala, and though our study findings also lead to this fact, while regarding the current scenario of the pandemic the small population who shows vaccine hesitancy will pose a huge threat to the community. Religion, occupation, education, marital status and gender does not influence the acceptance of vaccine on a large scale in the Kerala scenario which can be attributed to the high rate of literacy which has also been proved by other studies.

Contextual influences such as influences arising due to historic, health system/institutional have a large impact on vaccine acceptance and this study leads to the findings that the context of Kerala is supportive towards getting vaccinated. Influences arising from personal perception of the vaccine or influences of the social/peer environment is equally important in vaccine acceptance and the study concludes that this population have enough social and peer support and do not have a negative history of trust towards vaccination. Certain issues pertaining to vaccine communication were receiving unreliable information through social media, but majority of them receive correct information through government official websites. Majority of the respondents agrees to the perceived benefits of COVID-19 vaccine which clearly explains that the respondents are motivated to adopting to the new treatment mode of vaccination against COVID-19. Nevertheless, there are respondents who are worried about the efficacy, side effects, safety of the new vaccine, they have also raised concern regarding faulty or fake vaccine. Eighty percent of the respondents are willing to accept free vaccine and 46.9% are willing to pay for COVID vaccine which shows a positive determination in accepting the vaccines.

The scenario in Kerala is positive towards the vaccination drive and majority of them are willing to get vaccinated. But strategies must be made effective in terms of elevating the barriers to vaccination. Efficacy, safety and

effectiveness of the vaccine highly influences the population.

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