

TO STUDY THE PERCEIVED BARRIERS AND MOTIVATORS FOR DELAYED ACCEPTANCE OF FIRST DOSE OF COVID-19 VACCINATION: A SINGLE CENTRE STUDY

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ABSTRACT

Objectives: COVID-19 pandemic has triggered an unprecedented global scientific collaboration to develop COVID-19 vaccines which is the most effective way to defeat COVID-19 pandemic. The WHO has identified vaccine hesitancy as a grave global health threat and even after 7 months of free vaccination program, India is lagging behind to achieve the targets essential for herd immunity. Hence, we initiated this survey to study the perceived barriers and motivators for delayed acceptance of first dose of COVID-19 vaccination.

Methods: A survey was conducted during free COVID-19 vaccination camps using a pretested, validated, and anonymous pro forma including eight questions regarding perceived barriers and six regarding perceived motivators for acceptance of the first dose of COVID-19 vaccination and valid responses were analyzed according to age groups and gender.

Results: During our survey, 1144 valid responses were received and analyzed. Results showed fear of side effects as the most sighted barrier among study population, gender, and age groups. Compulsory requirement of vaccination for joining job/college was the most sighted motivator among study population, gender, and 18–30 years age group whereas fear of 3rd wave was most sighted motivator among 31–44 years, 45–59 years, and >60 years age group.

Conclusion: In spite of free COVID-19 vaccine and intensive campaigns, it seems that adequate vaccination targets might not be achieved and results of our survey suggest needs for increased focus on the perceived barriers as well as the perceived motivators to increase vaccination acceptance.

Keywords: Vaccination, COVID-19, Hesitancy, Perceived barriers, Perceived motivators.

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INTRODUCTION

Coronavirus disease 2019 (COVID-19) is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and since discovery of first known case in December 2019 in Wuhan, China, the disease has proven to be the worst pandemic encountered by humankind. On January 30, 2020, India reported first cases of COVID-19 among Wuhan returned three Indian medical students from Kerala. On the day India reported its first COVID-19 case, the WHO announced COVID-19 as a Public Health Emergency of International Concern under the International Health Regulation and subsequently declared a global pandemic on March 11, 2020 [1]. On March 25, 2020, India announced complete lockdown subsequently confronted the 1st and more deadly 2nd wave of COVID-19 pandemic. At present, with availability of supportive management and absence of specific anti-viral treatment of COVID-19 disease, scientific community agrees on adoption of COVID appropriate behavior and mass vaccination as the most effective way to defeat the COVID-19 pandemic. COVID-19 pandemic has triggered an unprecedented global scientific collaborative efforts among various stakeholders, a powerful demonstration of remarkable and unthinkable levels of scientific innovation, and efforts in successfully developing several COVID-19 vaccines in a very short time [2]. Indian government constituted a National Expert Group on Vaccine Administration for COVID-19 for vaccine-related guidance and initiated world's largest National COVID-19 vaccination program on January 16, 2021, for frontline workers including health care workers with AstraZeneca vaccine (CoviShield), the indigenous Covaxin [3]. Mass vaccination against COVID-19 has emerged as a key preventive strategy so India extended vaccination to population ≥60 years of age and 45–59 years of age with comorbidities from

March 1, 2021, subsequently, vaccination was extended to all individuals aged 45–59 from April 1, 2021, and to all in 18–44 years age group from May 1, 2021 [2]. At present, all people above the age of 18 years, pregnant women and breastfeeding mothers are eligible for free COVID-19 vaccination program. Government of India set an ambitious targeted to vaccinate all eligible population by end of this year, but till August 22, 581,489,377 vaccination were done including 450,755,650 1st dose and 130,733,727 2nd dose. Whereas in Punjab, 12,306,900 total vaccinations were done including 9,427,904 1st dose and 2,878,996 2nd dose. There are no specific data of vaccination according age of the population, but 59.4 crore people are in 18–44 years age group, 20.7 crore in 45–59 years, and 13.7 crore in ≥60 years age group together constitute 93.8 crore eligible population to be vaccinated. It is estimated the roughly 80% of population needs to be vaccinated for achieving herd immunity that is about 85.2 crore population needs to be vaccinated so by these estimates till August 22, about 53% 1st dose and 15% second dose have been given after about 7 months of vaccination program [4,5]. Not only in India but also vaccine hesitancy is becoming a grave problem worldwide so much so that vaccine hesitancy has been identified by the WHO as a leading global health threat [6].

COVID-19 vaccination is the most important public health tools for controlling COVID-19 pandemic but in spite of evidence showing safety of vaccine, there has been growing scepticism toward vaccination and increasing hesitancy that has led to a decline in vaccinations even after 7 months of initiation of free vaccination program in India. Hence, we initiated this study to identify the perceived barriers and motivators for delayed acceptance of first dose COVID-19 vaccination.

METHODS

A survey was conducted at our center organizing regular free COVID-19 vaccination camps in association with an NGO under the aegis of district immunization officer to document the perceived barriers and motivators for delayed acceptance of first dose of COVID-19 vaccination in our district. This study was under taken from July 15, 2021, to August 15, 2021, after the ethical approval from Institutional Ethical Committee. All people coming for free vaccination camp were registered and those coming for 1st dose of COVID-19 vaccination were asked to fill a pretested, validated, and anonymous survey pro forma containing eight questions regarding perceived barriers for delayed acceptance of first dose of COVID-19 vaccination and six questions regarding perceived motivators for acceptance of first dose of COVID-19 vaccination. Verbal informed consent was taken after explaining the purpose of the survey from all the subjects and those who did not consent were excluded from the study. The survey pro forma was printed in three languages, English, Hindi, and Punjabi for convenience of local population and those who were not able to understand the pro forma, pro forma was filled after personal interview. The survey questionnaire was designed by the researchers after an extensive literature review in Indian context. The questionnaire pro forma was pretested on 30 people who were excluded for the study and its internal consistency was assessed by calculating the Cronbach's alpha which was 0.929 (95% CI: 0.907–0.946) showing highly significant ($p < 0.001$) internal consistency. Respondents were asked to choose only one most appropriate answer to avoid confusion by choice of multiple options and the responses were analyzed according to age groups and gender.

Statistical analysis

Data were extracted from the form to Excel sheet and statistically analyzed using "IBM SPSS Statistics for Windows, version 23.0 (IBM Corp., Armonk, N.Y., USA)." Qualitative data were presented as frequencies and percentages, and a Chi-square test was used for analysis. The adopted significance level is $p < 0.05$.

RESULTS

A total of 2238 vaccinations were done at our center from July 15, 2021, to August 15, 2021, including 1321 (59.0%) 1st dose and 917 (41.0%) 2nd dose. A total of 1144 (86.6%) individuals consented and completed the pretested, validated, and anonymous survey pro forma and 177 (13.4%) did not consent to participate in the survey. A total of 1144 valid responses received were analyzed to study perceived barriers for delayed 1st dose of vaccination and perceived motivators for delayed acceptance of first dose of COVID-19 vaccination. Study population of 1144 included 655 (57.3%) males and 489 (42.7%) females. Among age groups, 442 (38.6%) belonged to 18–30 years age group, 441 (38.5%) 31–44 years, 186 (16.3%) 45–59 years, and 75 (6.6%) belonged to ≥ 60 years age group.

Table 1 shows responses of study population and gender groups for perceived barriers regarding delayed first dose of COVID-19 vaccination. Results show that fear of side effects was the most sighted barrier among study population as well as gender groups and the difference was statistically highly significant. Statistically highly significant difference was also observed among responses of the study population as well as the gender groups to all the eight questions regarding the perceived barriers for delayed first dose of COVID-19 vaccination mentioned in survey pro forma.

Table 2 shows responses of different age groups to questions related to perceived barriers regarding delayed first dose of COVID-19 vaccination. Results show that fear of side effects was the most sighted barrier among all age groups and the difference was statistically highly significant. Statistically highly significant difference was also observed among responses of the age groups to all the eight questions regarding the perceived barriers for delayed first dose COVID-19 vaccination mentioned in survey pro forma.

Table 3 shows responses of study population and gender groups to questions related to perceived motivators for delayed acceptance of first dose of COVID-19 vaccination. Results show that compulsory requirement of vaccination for joining job/college was the most sighted motivator among study population and the difference was statistically not significant. Statistically not significant difference was also observed among responses of gender groups to all the six questions regarding the perceived motivators for delayed acceptance of first dose of COVID-19 vaccination mentioned in survey pro forma, but compulsory requirement of vaccination for joining job/college was the most sighted motivator among males as well as females.

Table 4 shows responses of age groups to questions related to perceived motivators for delayed acceptance of first dose of COVID-19 vaccination. Results show that compulsory requirement of vaccination for joining job/college was the most sighted motivator among 18–30 years age group and fear of 3rd wave was most sighted motivator among 31–44 years, 45–59 years, and ≥ 60 years age group and the difference was statistically highly significant. Statistically highly significant difference was also observed among responses of age groups to all the six questions regarding the perceived motivators for delayed acceptance of first dose of COVID-19 vaccination mentioned in survey pro forma.

DISCUSSION

The adverse health and socioeconomic consequences of COVID-19 pandemic are immense, devastating country after country and vaccine hesitancy or delay in acceptance of vaccination has been perceived as a major global threat in controlling the current pandemic. Since there is absence of any specific treatment for COVID-19 infection, vaccines are considered as the only protection for people and the community. Hence, understanding the attitude, perceived barriers, and motivators for acceptance of the COVID-19 vaccines are very important in planning an appropriate vaccination strategy, especially when in spite of free vaccination program, India is facing grave threat of vaccine hesitancy in addition to several other potential problems of availability and distribution of vaccines. Hence, our survey was an effort to explore the perceived barriers for delay in 1st dose and perceived motivators for acceptance of 1st dose of COVID-19 vaccination. In our survey, 30.4% of the study population observed fear of side effects as most important perceived barrier for COVID-19 vaccination, 15.6% low-risk perception from COVID-19, 14.0% rumors of infertility/impotency, 11.4% perceived vaccine is of no use, 9.1% doubted safety and efficacy of the vaccines, 7.6% observed inconvenience of availability or registration for vaccination, 7.3% delayed because of COVID-19 infection/diseases/pregnancy/breastfeeding, and 4.6% felt fear of death after taking the vaccine. In a study, 64.4% of study population were concerned about COVID-19 vaccine side effects, 20.2% lacked confidence in vaccination while 25.4% believed in other reasons for not taking vaccine [7]. Results of this study were comparable to results of our survey if we consider side effects as well as rumors for impotency/infertility together.

Analysis of the results of our survey observed 27.9% of males responded to fear of side effects of vaccines as the most important perceived barrier for COVID-19 vaccination, whereas 17.3% believed rumors of infertility/impotency, 14.8% low-risk perception from COVID-19, 12.5% perceived vaccine is of no use, 7.8% observed inconvenience of availability or registration for vaccination, 7.3% delayed because of COVID-19 infection/diseases/pregnancy/breastfeeding, 6.9% doubted safety and efficacy of the vaccines, and 5.5% felt fear of death after taking the vaccine as perceived barrier for 1st dose of COVID-19 vaccination. Similarly, among females, 33.7% observed fear of side effects as most important perceived barrier for COVID-19 vaccination, 16.8% low-risk perception from COVID-19, 12.1% doubted safety and efficacy of the vaccines, 9.8% perceived vaccine is of no use, 9.6% rumors of infertility/impotency, 7.4% observed inconvenience of availability or registration for vaccination, 7.1% delayed because of COVID-19 infection/diseases/pregnancy/breastfeeding, and 3.5% felt fear of death after taking the vaccine as perceived barrier for 1st dose of COVID-19 vaccination. On review of literature and internet search, we could not come across the

Table 1: Perceived barriers for delayed first dose of COVID-19 vaccination among study population and gender groups (% [N])

S. No.	Questions	Total	Males	Females
	% (N)	100.0 (1144)	57.3 (655)	42.7 (489)
1.	Vaccine is of no use.	11.4 (130)	12.5 (82)	9.8 (48)
2.	Doubtful safety and efficacy of vaccines.	9.1 (104)	6.9 (45)	12.1 (59)
3.	Fear of side effects of vaccines.	30.4 (348)	27.9 (183)	33.7 (165)
4.	Rumors of infertility/impotency.	14.0 (160)	17.3 (113)	9.6 (47)
5.	Fear of death after taking the vaccine.	4.6 (53)	5.5 (36)	3.5 (17)
6.	Inconvenience of availability/registration of vaccine.	7.6 (87)	7.8 (51)	7.4 (36)
7.	Low-risk perception from COVID-19 infection.	15.6 (179)	14.8 (97)	16.8 (82)
8.	Delay because of COVID-19 infection/diseases/pregnancy/breastfeeding.	7.3 (83)	7.3 (48)	7.1 (35)

$\chi^2=28.128$; $df=7$; $P=0.000208$ (<0.001) highly significant

Table 2: Perceived barriers for delayed first dose of COVID-19 vaccination among age groups (% [N])

S. No.	Questions	18-30 years	31-44 years	45-59 years	≥ 60 years
	N (1144)	38.6 (442)	38.5 (441)	16.3 (186)	6.6 (75)
1.	Vaccine is of no use.	16.1 (71)	8.6 (38)	8.1 (15)	8.0 (6)
2.	Doubtful safety and efficacy of vaccines.	5.7 (25)	11.6 (51)	11.3 (21)	9.3 (7)
3.	Fear of side effects of vaccines.	24.2 (107)	34.7 (153)	32.8 (61)	36.0 (27)
4.	Rumors of infertility/impotency.	22.9 (101)	8.8 (39)	8.6 (16)	5.3 (4)
5.	Fear of death after taking the vaccine.	3.1 (14)	5.2 (23)	4.3 (8)	10.6 (8)
6.	Inconvenience of availability/registration of vaccine,	3.8 (17)	10.0 (44)	11.8 (22)	5.3 (4)
7.	Low-risk perception from COVID-19 infection	19.7 (87)	12.9 (57)	14.0 (26)	12.0 (9)
8.	Delay because of COVID-19 infection/diseases/pregnancy/Breastfeeding.	4.5 (20)	8.2 (36)	9.1 (17)	13.3 (10)

$\chi^2=116.243$; $df=21$; $P=0.00000$ (<0.001) highly significant

Table 3: Perceived motivators for delayed acceptance of first dose of COVID-19 vaccination among study population and gender groups (% [N])

S. No.	Questions	Total	Males	Females
	N	1144	655	489
1.	Awareness campaigns by the government.	8.2 (94)	8.2 (54)	8.2 (40)
2.	Awareness campaigns by the NGOs.	14.8 (169)	13.9 (91)	16.0 (78)
3.	Self-realization.	17.7 (203)	16.5 (108)	19.4 (95)
4.	Fear of 3 rd wave of COVID-19 pandemic.	26.5 (303)	27.9 (183)	24.5 (120)
5.	Compulsory vaccination requirement for joining job/college.	28.0 (320)	28.7 (188)	27.0 (132)
6.	Uncertain reasons.	4.8 (55)	4.8 (31)	4.9 (24)

$\chi^2=3.698$; $df=5$; $P=0.594$ (>0.05) not significant

Table 4: Perceived motivators for delayed acceptance of first dose COVID-19 Vaccination among age groups (% [N])

S. No.	Questions	18-30 years	31-44 years	45-59 years	>60 years
	N	442	441	186	75
1.	Awareness campaigns by the government.	6.1 (27)	10.4 (46)	8.6 (16)	6.7 (5)
2.	Awareness campaigns by the NGOs.	11.5 (51)	14.7 (65)	22.0 (41)	16.0 (12)
3.	Self-realization.	14.3 (63)	19.5 (86)	18.8 (35)	25.3 (19)
4.	Fear of 3 rd wave of COVID-19 pandemic.	18.1 (80)	30.2 (133)	33.3 (62)	37.3 (28)
5.	Compulsory vaccination requirement for joining job/college.	44.6 (197)	21.1 (93)	14.0 (26)	5.3 (4)
6.	Uncertain reasons.	5.4 (24)	4.1 (18)	3.3 (6)	9.4 (7)

$\chi^2 = 124.870$; $df = 15$; $P = 0.000000$ (<0.001) highly significant

studies exploring the perceived barriers and motivators for delayed acceptance of first dose of COVID-19 vaccination in India, especially among gender and age groups, probably making our study the first study in this regard. Respondents among all age groups observed fear of side effects as most important perceived barrier for 1st dose of COVID-19 vaccination. Analysis of response to other perceived barriers among the age group of 18-30 years observed 22.9% believed rumors of infertility/impotency as perceived barrier for 1st dose of vaccination, 19.7% low-risk perception from COVID-19 infection, 16.1% vaccine is of no use, 5.7% doubtful safety and efficacy of vaccines, 4.5% delay because of COVID-19 infection/diseases/pregnancy/breastfeeding, 3.8% inconvenience of availability/registration, and 3.1% fear of death after taking the vaccine. Among the age group of 31-44 years, 12.9%

believed low-risk perception from COVID-19 infection as perceived barrier for 1st dose of vaccination, 11.6% doubtful safety and efficacy of vaccines, 10.4% inconvenience of availability/registration, 8.8% rumors of infertility/impotency, 8.6% vaccine is of no use, 8.2% delay because of COVID-19 infection/diseases/pregnancy/breastfeeding, and 5.2% believed fear of death after taking the vaccine as perceived barrier. Among the age group of 45-59 years, 14.0% believed low-risk perception from COVID-19 infection as perceived barrier for 1st dose of vaccination, 11.8% inconvenience of availability/registration, 11.3% doubtful safety and efficacy of vaccines, 9.1% delay because of COVID-19 infection/diseases/pregnancy/breastfeeding, 8.6% rumors of infertility/impotency, 8.1% vaccine is of no use, and 4.3% fear of death after taking the vaccine. Similarly, among the age group

of >60 years, 13.3% believed delay because of COVID-19 infection/diseases/pregnancy/breastfeeding as perceived barrier for 1st dose of vaccination, 12.9% believed low-risk perception from COVID-19 infection, 10.7% fear of death after taking the vaccine, 9.3% doubtful safety and efficacy of vaccines, 8.0% vaccine is of no use, and 5.3% rumors of infertility/impotency as well as inconvenience of availability/registration as perceived barrier for 1st dose of vaccination.

Responses of study population and gender groups to all the six questions related to perceived motivators for acceptance of 1st dose of COVID-19 vaccination were almost same. Most important reason sighted was compulsory requirement of vaccination for joining job/college by 28.0% study population including 28.7% of males and 27.0% of females. About 26.5% of study population, 27.9% of males and 24.5% of females observed fear of 3rd wave of COVID-19 pandemic as second important perceived motivators. Similarly, the study population and gender groups observed self-realization as third important perceived motivators, awareness campaigns by the NGOs the fourth important, awareness campaigns by the government the fifth, and uncertain reasons were the least sighted perceived motivators. Response of subjects among age groups 18–30 years was different from all other age groups. About 44.6% of respondents among 18–30 years group observed compulsory requirement of vaccination for joining job/college as the most important perceived motivators for acceptance of 1st dose of COVID-19 vaccination followed by 18.1% fear of 3rd wave of COVID-19 pandemic, 14.3% self-realization, 11.5% awareness campaigns by the NGOs, 6.1% awareness campaigns by the government, and 5.4% were uncertain, whereas fear of 3rd wave of COVID-19 pandemic was most important perceived motivators among all the other age groups, followed by compulsory requirement of vaccination for joining job/college, self-realization, awareness campaigns by the NGOs, awareness campaigns by the government, and uncertain reasons. This difference can be because most of the subjects among the age group of 18–30 years were in jobs or in colleges whereas the rest of the age groups were predominantly had other occupations. Results of our survey substantiate the importance of understanding the perceived barriers and motivators for delayed acceptance of 1st dose of COVID-19 vaccination among population for achieving the target vaccinations essential for gaining herd immunity for the protection of Indian population. Such a data gain importance because presently India has a very efficient, robust, and vast vaccination logistic network of about 27,000 cold chain points, 76,000 cold chain equipment, 700 reefer vans, 55,000 cold chain handlers, and 2.5 million health workers under Universal Immunization Programme, especially beneficial because 95% are located in primary health centers, community health centers, and sub-centers [8].

Limitation

Our survey is a single-center survey which may not be the general representative data, but our data contribute to almost not existent data

related to the issue of perceived barriers and motivators for delayed acceptance of 1st dose of COVID-19 vaccination in India.

CONCLUSION

In spite of provision of free COVID-19 vaccine, vast immunization logistic network, and intensive vaccination campaigns by the government and the NGOs, it seems that India might not be able to achieve the targets of adequate vaccination necessary for herd immunity. Results of our survey suggest that India needs to focus on the perceived barriers for delayed of 1st dose of COVID-19 vaccination as well as the perceived motivators for acceptance of 1st dose of COVID-19 vaccination to achieve the vaccination targets by end of this year. Our survey is a small step forward to initiate large Pan-India studies involving all the stakeholders to explore ways and means to increase vaccinations and eliminating vaccination hesitance among populations addressing their concerns about perceived barriers as well as the perceived motivators for delayed in COVID-19 vaccination.

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