



COVID-19 VACCINATION HESITANCY AMONG NON-VACCINATED SUBJECTS: A CROSS-SECTIONAL STUDY

Clinical Research

Dr. Balaji More*

Associate Professor and Head, Clinical Trial and Training Centre, I-Block, Ground floor, Mahatma Gandhi Medical College and Research Institute, Pondicherry - Cuddalore Rd, ECR, Pillayarkuppam, Puducherry 607402. *Corresponding Author

Dr. R. Subashri

Clinical Trial and Training Centre, Mahatma Gandhi Medical College and Research Institute, Pondicherry.

Ms. R. Jayanthi

Clinical Trial and Training Centre, Mahatma Gandhi Medical College and Research Institute, Pondicherry.

ABSTRACT

Aim: To understand the prevalence and reasons for vaccination hesitancy among the unvaccinated individuals with COVID-19 vaccines. **Methods:** This was interview-based study conducted with patients and their relatives attending the outpatient department of Mahatma Gandhi Medical College and Research Institute, Puducherry. A questionnaire has been developed to assess the attitudes and behaviors of participants about COVID-19 vaccination. The survey assessed general attitudes and perception of vaccines; current knowledge/interest about COVID-19 vaccine and perceived likelihood of COVID-19 infection. **Results:** In the sample, studied 83% of subjects had received at least one dose of COVID-19 and 33.67 % unvaccinated subjects showed vaccination hesitancy for COVID-19. Unawareness, perceived low risk of disease, concerns about effectiveness and safety of COVID-19 vaccines, low education level and self-employed or unemployed were major reasons for vaccination hesitancy to receive COVID-19 vaccine. **Conclusion:** Vaccine hesitancy was mainly due to safety concerns and lack of awareness. Health education and communication strategies are required to increase large-scale COVID-19 vaccination coverage to achieve herd immunity.

KEYWORDS

Vaccine hesitancy, COVID-19, Vaccination, safety, adverse effects

INTRODUCTION

Vaccination is one of the most critical public health intervention and a strategy for the prevention of communicable infectious diseases. In spite of progress in the field of vaccination, the general public acceptance is essential to maintain herd immunity and prevent outbreaks of vaccine preventable infectious disease.(1)

Unfortunately, vaccination is suboptimal and there is continued rise of vaccine-preventable diseases. For this reason, World Health Organization (WHO) has categorized vaccine hesitancy as one of the top ten risks to global health in 2019. Vaccine hesitancy, defined as patient-level reluctance to receive vaccines, may be fueled by a spectrum of held views regarding vaccination spanning from cautious acceptors to outright deniers.(1), (2), (3) The common reason for vaccine hesitancy are misinformation about the advantages, medicinal composition, and adverse effects. These reasons affect the patient understanding and overall acceptance.(4)

Internet and peer networks sources are the most common sources of misinformation.(5),(6),(7) Moreover, there is also substantial potential for harmful misinformation to spread across networks which may be propagated via the contemporary anti-vaccination movement, fueling vaccine hesitancy.(6, 8)

These concerns perhaps are amplified in the view of the ongoing COVID-19 pandemic, as the vaccination plays a critical role in downstream global control efforts.(2, 9) Wrong information and unsubstantiated rumors regarding COVID-19 vaccination against SARS-CoV-2 on social media platforms has frightened a fraction of population from being vaccinated. By understanding the reasons of the vaccine hesitancy, the regulators and administration may be able to design strategies to cover the vaccination of the unvaccinated population to prevent further spread and emergence of new waves of COVID-19. There are large number of studies carried out in health care worker and medical students but relatively few in general population in this regard.(10),(11),(12, 13) Moreover the perception and acceptability of vaccination may vary from region to region. Despite all efforts being made by Government agencies for COVID-19 vaccine coverage, vaccine hesitancy is still prevalent in general population. Hence, this study was carried out to understand vaccination hesitancy among the unvaccinated individuals.

MATERIALS AND METHODS

The study was conducted with patients and their relatives attending the Outpatient Department at Mahatma Gandhi Medical College and Research Institute, Pondicherry. A questionnaire has been developed

to assess the attitudes and behaviors of participants about COVID-19 vaccination. The survey assessed (i) previous immunization behavior; (ii) general attitudes and perception of vaccines; (iii) current knowledge/interest about COVID-19 vaccine and perceived likelihood of COVID-19 infection. The study was conducted after Institutional Human Ethics Committee approved the protocol. Data management and analysis were performed using Microsoft Excel. We interviewed 1500 subjects who included patients and their relatives. The case record forms and data used for analysis is available and archived. There is no conflict of interest. Authors have not received any honorarium, grants, membership, employment or ownership of stock from any agencies.

RESULTS

Out of 1500 subjects interviewed, 1203 (83%) has received at least one dose of Covid-19. Out of 297 unvaccinated subjects, 197 were willing to get vaccinated and 100 were unwilling to get vaccinated. The 100 subject's vaccination hesitancy was asked questions to find out the reasons for their unwillingness with the help of a pre-validated questionnaire. Out of the 100 subjects hesitant to receive COVID-19 vaccine 51 were males and 49 females. The education status and the occupation of subjects have been depicted in figure 1 and 2 respectively.

In this study almost 79% subjects with vaccination hesitancy had education below the level of graduation. Moreover, all the subjects were self-employed or unemployed were unwilling to receive COVID-9 vaccine.

In this study 15%, 9% and 37 had income less than ₹ 50000, ₹ 51000 to 100000 or above ₹ 100000 respectively. Thirty-seven percent subjects had no income at all, of which 29 were homemakers, 5 were unemployed, and 3 were students.

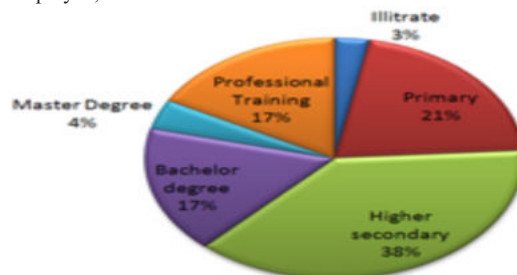


Figure 1: Educational Status Of Subjects

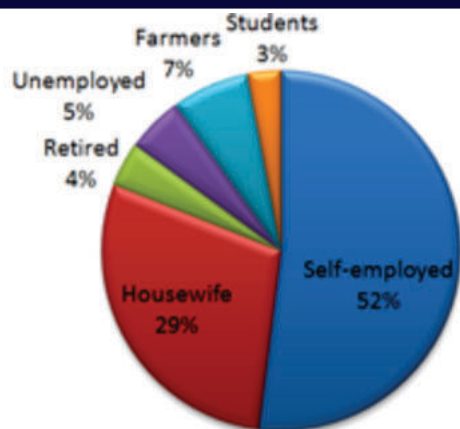


Figure 2: Occupation Status Of Subjects

The main reasons for vaccination hesitancy were lack of interest 54% and afraid of side effects 38%. Other reasons were planning for pregnancy 3%; taking Siddha medication 2%, taking homeopathy drug 1% and Health issue 2%. In 85% of cases, their family members had taken COVID-19 vaccine. The family members of remaining 15% of case did not take vaccination because of lack of interest 10% and afraid of side effects 5%. All subjects were aware that Government provides COVID-19 vaccine free of any cost. About 76% believed that COVID-19 vaccination would give them any protection. All of the subjects were aware about the side effects of COVID-19 vaccine. Only in 7% of the cases the health care workers had approached them regarding awareness of vaccination. The family member of only 5% subjects had Covid-19 illness. None of the subjects had family history of death due to Covid-19.

Nearly 76 % of the subjects were aware that vaccination may prevent COVID-19 infection and even one get COVID-19 illness, vaccinated person will have milder symptoms and less mortality.

DISCUSSION

Vaccination has been established as a proventool of high benefits. It is a cost-effective method for disease prevention in humans and domesticated animals.(14)To control the current pandemic, vaccines for COVID-19 have been developed very rapidly with the tremendous efforts of the scientific community and Government.(15) Over 100 COVID-19 vaccine candidates are in the development pipeline.(16) However, the success of a COVID-19 vaccine in controlling the spread of disease is based on the coverage or uptake level of the vaccine across a population. A sufficiently high coverage of an effective vaccine can lead to generation of herd immunity.(17) This should confer protection to all those who are still susceptible to the virus.

Unfortunately, attaining herd immunity by vaccination is a challenge. A huge segment of population is unwilling or hesitant to get vaccinated.(18) This hesitancy is observed worldwide. (19), (20)In US, seasonal influenza vaccination numbers has declined, perhaps because of vaccination hesitancy.(21) Last measles outbreaks in the USA and other counties highlighted the significance of vaccine hesitancy to public health. Measles vaccination has successfully extinguished measles in the USA, but unfortunately the under and non-vaccinated communities led to its reappearance. (22), (23)

Risk assessment is a key to vaccine decisions and effective risk communication is acknowledged as the pillar of a coordinated response to infectious disease outbreaks.(24), (25)The risk information spread in the beginning of the COVID-19 outbreak in the USA affected people's health behavior in response to the pandemic. The perceptions about health risk are affected by *who* communicates the risk message.(26), (27), (28)Several socio-demographic characteristics determine COVID-19 vaccination hesitance in the general population.

In our institute, 83% of subjects visiting the hospital have been vaccinated with at least one dose of Covid-19. This demonstrated high acceptability of covid-19 vaccine in the region of Pondicherry. This is in concurrence to results of several surveys worldwide. In fact it was better than the National Covid-19 vaccine acceptance rate of 75%.(29)

The highest vaccine acceptance rates of (91%) and 93% were observed in China and Indonesia respectively.(30), (31) Whereas the lowest vaccine acceptance rate of 50% was found in Turkey.(32) In this study, 33.67% subjects were not willing to be vaccinated with no gender variation. The most studies also found that males, elderly population, and highly educated were more likely to accept COVID-19 vaccines.(10) Generally, it has been observed that females have more vaccination hesitancy to COVID-19 vaccine, which could be because of concerns about adverse effects such as infertility, serious side effects making them unable to take care of families, or greater susceptibility to myths and misinformation from media. (12, 33, 34)

Some studies also found higher COVID-19 vaccine acceptance in Whites and Asians, whereas higher vaccination hesitancy was significant among some racial and ethnic minorities. The reasons could be mistrust on healthcare system, underrepresentation, discrimination and mistreatment during research.(35-37)

Studies show that occupation and employment also determine the vaccination hesitancy. In this study, almost 79% subjects with vaccination hesitancy had education below the level of graduation. Even medical students expressed vaccination hesitancy up to 23% in a study conducted in USA.(11) We found that subjects who were self-employed or unemployed were unwilling to receive Covid-19 vaccine indicating that better willingness among employed. It could be because of compulsion made by the employer. The hesitancy to vaccination may also be due to fear of loss of daily wages.

Healthcare worker involved in the care of COVID-19 positive patients, and those at risk of disease, are more willing to receive vaccination as compared to those who are not directly involved.(38) Therefore chances of getting infected with SARS-CoV-2 also determine the vaccination hesitancy. Generally elderly subjects may have higher education, more health care knowledge but are also at a higher risk of susceptibility to COVID-19 infection.(12),(10) In line with our findings lower education is important element associated with COVID-19 vaccination hesitancy in both health care workers (HCWs) and the general population. Subjects with lower education may not read the recent medical news, may have lower awareness or apparent seriousness of illness from COVID-19, non-compliance with vaccinations. The subjects with vaccination hesitancy may have a higher likelihood to believe in social myths and conspiracy theories such as injection of microchips, genetic mutation or infection due to the vaccine, etc.(11, 12, 31, 39)

Most low-and middle-income countries (LMICs) have to face challenges to make the vaccine available to their population.(40) In India, despite Covid-19 vaccine was provided free of cost, the vaccination hesitancy was found in the subjects with lower income. In fact, most subjects with vaccination hesitancy were aware that Government provides COVID-19 vaccine free of cost. So LMICs should add strategies to increase the awareness about benefits of vaccination to improve the vaccination coverage.

In our study, the main reasons for vaccination hesitancy among study participants and their family members were lack of interest or ignorance and fear of side effects. In most cases, their family members had taken COVID-19 vaccine. Other reason for vaccination hesitancy could be belief that COVID-19 is not a serious disease as very few had their family members suffered or died due to Covid-19. Most of the studies observed that doubts regarding vaccine safety, effectiveness and potential side effects were the major reasons for COVID-19 vaccination hesitancy.(29),(30, 41)Although majority of subject were aware of the fact that COVID-19 vaccination will provide protection, even one get COVID-19 illness, vaccinated person will have the milder symptoms and less mortality, they also believed that vaccine had the potential to cause severe side effects. Nearly 76 % of the subjects were aware that vaccination might prevent COVID-19 infection.

Considerable vaccine hesitancy is evident; though it is not same as refusal as significant number of people who are initially vaccination hesitant do not entirely refuse vaccines. As an alternative, perhaps they may either delay vaccination or might search for alternate options among available vaccines.Those who refuse the new vaccine would prefer to opt for old one with adequate safety data.(19)

In US, a study revealed that around 10% of the population refuses most

vaccinations, including seasonal flu vaccination and those that comprise the recommended vaccination schedule for children, while around 5% refused only Covid vaccine. A significant number (40%) of those who were ready to take at least one vaccine were still hesitant and stated worry about vaccination in general. (41)

Very small percent of population in this study had been approached by healthcare workers to improve awareness about vaccination. To overcome the high rate of COVID-19 vaccine hesitancy reaching out to the targeted unvaccinated population, education, increasing awareness and trust building should be considered. Government agencies, public healthcare officials, and advocacy groups must be trained to address vaccine hesitancy. Vaccine literacy should be increased and measure to prevent misinformation spread through multiple sources should be implemented to increase vaccine acceptance rate. The unvaccinated population should be identified and intervention to improve their vaccine literacy and acceptance should be implemented. There are some community-specific concerns, misconceptions. HCWs need to be sensitive to religious or cultural beliefs which should be recognized and addressed. (42)

It is found that effective interventions for building confidence and trust can decrease vaccine hesitancy. (43) The public trust in Government can be achieved by clear, consistent and effective communication by Government officials. It should include explanation of how vaccines work and the course of their development. The explanation of the regulatory approval processes and pre-assessment of safety and efficacy of the vaccines should be provided to the public. This can be achieved by interdisciplinary and multipronged strategies such as incentives to be vaccinated, encouragement by community leaders and role models. Making vaccine accessible to public, providing time off or sick leave benefits to enable vaccination will lower the vaccination hesitancy. The misconception and miscommunication can be reduced by powerful campaigns explaining the effectiveness of vaccines, the time required for building protection post-vaccination and the importance of population-wide vaccine coverage to attain immunity across the community.

Our survey had the limitation that it was conducted after COVID-19 vaccination has already started as a nation-wide campaign. Thus, it does not provide the initial vaccine hesitancy of those who finally accepted and received vaccine. Since participation in this survey was based on non-probability sampling approach including only the population visiting the hospital. The denominator for calculation of response rate thus cannot be the representation of community at large. We also did not specifically ask about scientific journals as a source of vaccine information.

Almost 27% of participants declared that they were in favor of vaccinations. Only 26.5% of respondents declared they would receive COVID-19 vaccine. Vaccine refusal was attributed to safety concerns in 76% of parents. Specific vaccine attributes further reduced the acceptance rate. Female gender, younger age and lower education level were associated with non-adherence to vaccination. Among extrinsic factors of COVID-19 vaccination, only information from National Health Authorities was significantly associated to vaccine acceptance. The rate of potential COVID-19 vaccine acceptability was very poor in our population of parents. Though, the real life vaccination rates in children exceeded the national mean.

CONCLUSION

One of the strategies to counter vaccine hesitancy is to follow a multidisciplinary approach that involves the collaboration between various stakeholders, such as Government, private companies, religious groups, and other agencies. Their dedicated effort is needed to leverage the knowledge, expertise, and resources thereby enabling the creation of longstanding public trust of vaccines.

Acknowledgement

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Data Availability

The case record forms and data used for analysis is available and archived.

Conflict Of Interest

There is no conflict of interest. Authors have not received any

honorarium, grants, membership, employment or ownership of stock from any agencies.

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