

Prevalence of Covid-19 Vaccine Hesitancy among Adult Females

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Abstract

Though immunization has been one of the biggest public health success stories, vaccine hesitancy has become a problem in many parts of the world. This has onerous implications on the spread of various infectious diseases. We evaluated the prevalence of Covid-19 vaccine hesitancy in women in the state of Maharashtra, India. We sent a questionnaire on google forms to 110 women in Maharashtra. All of them filled the forms after consenting to take part in the study. After analysis, data from 100 women was found eligible for the study. Most of the women were graduates/post-graduates, married, and working. All the women, including those less educated and with a lower income, had taken a Covid-19 vaccine, mostly due to the belief that the vaccine was necessary for protection. Most of them had taken the decision on their own. The study shows that the acceptance of Covid-19 vaccines was very high in Indian women.

Keywords: Covid-19 vaccine, hesitancy, women

Introduction

Vaccination has improved global health significantly over last few decades. As per the World Health Organization (WHO), vaccines currently prevent 2-3 million deaths a year, and a further 1.5 million could be avoided if global coverage of vaccinations is improved.¹ Because of large scale vaccinations, a major infection like smallpox has been eradicated and one more infection, polio is on the verge of eradication. This has had a profound effect especially on the health of the population in the developing world.²

The ongoing COVID-19 pandemic has also highlighted the importance of vaccination as a valuable tool in fighting infections and protecting global health. Although, the benefits and value of vaccination are well documented, vaccine hesitancy continues to remain a major challenge.

Vaccine hesitancy has been listed as among the top ten threats to global health as of 2019 by the WHO. Defined as a “delay in acceptance or refusal of vaccines despite availability of vaccination services”¹, vaccine hesitancy has a multi-factorial origin which is a mixture of cultural, political, cognitive and psychosocial factors.³ Parents can be classified as vaccine refusers or vaccine hesitant. In a study in Canada, while 3% of parents were vaccine refusers, 19% were vaccine hesitant.³ In 1982, a documentary “DPT: Vaccine Roulette” was aired which was the first attack on the growing acceptance of vaccination.⁴ This documentary claimed that febrile seizures following DPT vaccination might lead to permanent brain damage in children. This led to the creation of the National Vaccine Information Center, the most influential anti-vaccine organization in the United States.

Andrew Wakefield, a British gastroenterologist published a study on 12 autistic children in the Lancet 1998, in which he suggested that MMR vaccine caused autism. However subsequently more than 25 studies demonstrated that there was no causal link between MMR vaccine and autism. Furthermore, because of his conflict of interest and research fraud, the article was retracted by the Lancet in 2010 and he was also permanently barred from practicing medicine in the United Kingdom (UK).⁵ But the damage was done. Due to the widespread media attention the study received, MMR vaccination rates started dropping,⁶ that led to resurgence of measles.⁵

As a result of falling vaccine uptake, there was a global surge in measles, with more than 140,000 deaths worldwide in 2018, majority of them in children less than 5 years of age. The surge has been attributed to the fact that vaccination rates globally have been stagnated for almost a decade.⁷

In fact, vaccine hesitancy has become one of the major barriers against the fight in dealing with the COVID-19 pandemic. Numerous factors can cause vaccine hesitancy like low confidence in the COVID-19 vaccine, political beliefs, safety concerns, mistrust of health authorities etc. ^(4,5)

Additionally, other factors would include age, ethnicity, religious beliefs, education level, and working status. ⁽⁸⁾ Surprisingly, a great proportion of health care workers are still hesitant to receive a COVID-19 vaccine. ⁽⁹⁾

The individual decision-making regarding vaccination is complex and involves a cocktail of emotional, cultural, social, spiritual and political factors as much as cognitive factors. ⁽¹⁰⁾ Concerns related to the safety of vaccines is one of the most three commonly cited reason for vaccine hesitancy. A study by Wheeler et al suggested that communications from physicians is critical in addressing safety concerns. ⁽¹¹⁾ Access to credible sources of information are important. Facebook announced that groups and pages which share anti-vaccine misinformation would be deleted from its recommendation algorithm. ⁽¹²⁾

This topic has been extensively studied in the developed world. Against this background, we want to study the prevalence of vaccine hesitancy among adult women in Maharashtra, India and the psychological reasons behind the same.

Materials and methods

The study objectives were to assess the prevalence of vaccine hesitancy among adult women, the reasons for acceptance or refusals of Covid-19 vaccines and also to check whether factors like age, education, income levels, employment had any impact on vaccine hesitancy.

This study was conducted in around 100 adult women ≥ 18 years of age in Maharashtra, India. The participants were invited by word of mouth to take part in the study. For those who were willing, a structured questionnaire was sent to them on Google form. The link for the google form was sent on WhatsApp.

The questionnaire first asked the participants whether they were willing to take part in the study. After they checked the yes option, they were asked further questions. Demographic information was collected including education, annual income, marital status, employment and whether any of their family members / relatives / friends / acquaintances were hospitalized/died due to Covid-19.

Medical history was asked for any existing medical conditions, any past medical conditions, any medical conditions in the blood relatives, history of Covid-19. History of Covid-19 vaccination was asked including the person who took the vaccine decision, the reasons for taking the vaccine in those who took the vaccine and the reasons for not taking the vaccine in those who did not take the vaccine.

For those who took the vaccine, the following options were asked: I took the Covid-19 vaccine because – Covid-19 is a deadly disease, Government made it compulsory, My spouse / father / mother / elder in the family asked me to take the vaccine, I really believe that the vaccine is necessary for my protection and for others protection, I was fed up of wearing the mask or any other.

For those who did not take the vaccine, the following options were asked : I did not take the vaccine because – Covid-19 vaccine is not necessary because the Covid-19 is not a serious disease, I have allergy to the Covid-19 vaccine, I have medical conditions like diabetes, blood pressure, heart disease, liver disease, menstrual problem, etc. , I am scared of the side effects of the Covid-19 vaccine, I do not have enough information on the safety of the Covid-19 vaccine, I was already infected with Covid-19 and therefore vaccine is not necessary, The vaccine is a money making exercise of the Pharma Companies, My spouse / father / mother / elder in the family asked me not to take the vaccine, The vaccine can make bad effect on my mental health, The vaccine can cause permanent damage to my body, I did not know where to take the vaccine, I did not have money to go to vaccine centre to take the vaccine, There were too much crowds at the vaccination centres, I do not think that I will get Covid-19, Covid-19 is a conspiracy of big organizations, I did not take the vaccine because of my relative's spiritual / religious beliefs, or I believe that we should not interfere with the nature.

Data collection and analysis

A google form was filled by each individual participant who was contacted and who was willing to give the data. After collection of the data, all the answers were reviewed and quality checks were done to detect any data errors / discrepancies / illogical data. If any such data was found, the participant was removed from the analysis.

After all the data was cleaned and found correct, the data available in an excel sheet was used for statistical analysis. For age and income, range, mean, median, for gender and employment, percentages and for education level, the proportion of participants with school education, high-school education, graduate and post-graduate were calculated.

The proportion of participants who took Covid-19 vaccine, and who did not take the vaccine were calculated. In both the categories, the reasons for acceptance / refusal of vaccines were presented in terms of numbers and percentages. The proportion of participants with current / pre-existing medical conditions / family history, history of allergy was calculated in terms of percentages. Effect of education and income level was assessed on the vaccine acceptance / refusal decision.

Ethical aspects

Only those participants who gave a consent were included in the study. The participant's rights and confidentiality were protected. The study report and publication of the results contain only anonymized data.

Results

Around 105 individuals were sent the link for the google form on WhatsApp on their own mobile phones or their friend/relative's phone. Those who received the link on their phones, filled the forms themselves. Those who received on a friend/relative's phone, answered the questions to their friend/relative who in turn filled the forms.

Out of the 110 forms received, seven were of males and three had no legible data. These ten forms were excluded from the analysis, giving data on 100 eligible participants. Most of the participants were from Pune while the rest were from other cities in Maharashtra.

Around 75% of the participants were either graduates/post-graduates/professionals, 56% of them worked. While 60% of the participants earned less than Rs. 500,000 per year and 97% of them were married.

Table 1. Demographic data

| | |
|----------------------------------|---|
| Total forms received | 110 |
| Eligible participants | 100 |
| Mean age (Range) | 19-67 years |
| Employed | 61.5% |
| Education | Class X or less – 20 (20.4%) Class XII or less – 5 (5.1%) Graduate – 24 (24.5%) Post-graduate – 30 (30.6%) Professional – 17 (17.3%) Others – 2 (2%) |
| Annual income (in Indian rupees) | < 500,000 – 55 (63.2%) 500,000 – 1,500,000 – 21 (24.1%) 1,500,000 -3,000,000 – 6 (6.1%) 3,000,000 – 5,000,000 – 1 (1%) >5,000,000 – 4 (4.6%) |
| Marital status | Married – 93 (94.9%) Unmarried –3 (3.1%) Single -2 (2%) |

Almost all the participants were aware of Covid-19. 68.4% had relatives/friends who were infected with the virus. Almost 43% of the participants were infected with the virus.

All the participants had taken a Covid-19 vaccine. The decision to take the vaccine was their own in the majority of cases (95%). The biggest reason to take the vaccine was the belief that the vaccine is necessary for own protection and for others' protection.

Table 2. Covid-19 related history

| | |
|--|---|
| Awareness of Covid-19 | Yes – 98% No – 2% |
| Covid-19 disease/hospitalization in any of relatives / friends | Yes – 68.4% No -31% |
| Death due to Covid-19 in any of relatives / friends | Yes – 28.6% No -71% |
| Past infection with Covid-19 | Yes – 42.9% No – 57.1% |
| History of Covid-19 vaccination | Yes – 100% |
| Who took the decision to take the vaccine? | Myself – 95 (95%) Spouse – 3 (3.1%) Father – 1 (1%) Brother – 1 (1%) |
| Reason for taking the Covid-19 vaccine | I really believe that the vaccine is necessary for my protection and for others protection – 72.2% Covid-19 is deadly disease – 17.5% Government made it compulsory – 8.2% My spouse / father / mother / elder in the family asked me to take the vaccine – 1% |

Table 3. Medical history

| | |
|---|---------------------------|
| Any existing / past medical conditions | Yes – 13.3% No – 86.7% |
| Any medical conditions in the blood relatives | Yes – 24.5% No -75.5% |
| Any ongoing medications or past medications | Yes – 15.6% No -84.4% |
| History of any allergy | Yes – 11.2% No – 88.8% |

Discussion

The present study assessed the acceptance of Covid-19 vaccine among women in the state of Maharashtra. All the women had taken the vaccine because most of them felt that the vaccine was necessary for their own and for others' protection. Importantly most of them had taken the decision to take the vaccine on their own.

In a study in 1779 adults in Germany a few days after the beginning of vaccinations, around 11% stated that they would not get vaccinated. [14] In Turkey, among the general population, 23.3% did not want to take the vaccine while 42.1% were unsure. Even among hospital workers 20.9% did not want and 26.6% were unsure, with the main concerns being probable side effects, unknown scientific results and having no trust. [15] In a large online survey in 36,220 in Arabic individuals from different countries, the study showed a significant rate of vaccine hesitancy among Arabs in and outside the Arab region (83% and 81%, respectively), again with the similar reasons: side effects and distrust in health care policies, vaccine expedited production. [16] Of course all these studies were done before the vaccines were available.

Around December 2020, the first few vaccines got approved and became available in some countries. Over a period, they were introduced in all the countries. However, the vaccine coverage has been highly variable. Countries like China, Singapore, Chile, Portugal and Cuba have more than 90% of their eligible population vaccinated with at least one dose. In Cuba, almost 89% of the population is fully vaccinated. On the other hand, Only 19.6% of people in low-income countries have received at least one dose. Countries like Nigeria, Niger, Malawi and Mali have a coverage of less than 20%, with Mali having only 6.5% of the population fully vaccinated. [17] This despite the fact that vaccines are abundantly available.

A review of a total of 71 studies from different countries in Africa found that the vaccine acceptance rate ranged from 6.9 to 97.9%. The major reasons for vaccine hesitancy were concerns with vaccine safety and side effects, lack of trust in pharmaceutical industries and misinformation or conflicting information from the media. Factors associated with positive attitudes towards the vaccine included being male, having a higher level of education, and fear of contracting the virus. [18]

In our study in women, there was a 100% uptake of the vaccine which is much better than in African countries. This is corroborated by the fact that as of 25 July, 2022, India's COVID-19 vaccination coverage has exceeded 2 billion doses. [19] 98% of adults have received at least one dose of the vaccine, while 90% have been fully vaccinated. [20] Thus, Covid-19 vaccine hesitancy has not been a big problem in India.

This is the first study on vaccine hesitancy in women in India. In a review and meta-analysis to assess gender differences in the intention to get vaccinated against COVID-19, sixty studies were included in the review and 46 studies were included in the meta-analysis. A majority (58%) of papers reported men to have higher intentions to get vaccinated against COVID-19. Meta-analysis showed that significantly fewer women stated that they would get vaccinated than men. This effect was evident in several countries. [21] The problem became more acute in pregnant women in whom the hesitancy was even higher than non-pregnant women. [22-25]

Though our study did not look at gender differences or pregnant women, all the women participants in the study had taken the vaccine voluntarily, thus showing a high acceptance rate.

A study in India found that acceptance for the COVID-19 vaccine was higher among males, individuals aged 18-24 years, those with higher education, higher income, and employment. Individuals with no education, and low income were significant predictors of vaccine hesitancy. [26] Hesitancy has been reported in a study in the USA in people with low income and low education. [27] In our sample, women from different income and education levels participated and yet the acceptance was complete, indicating that these factors did not matter.

Most of the participants took the vaccine because they really believed that the vaccine is necessary for protection or because they knew that Covid-19 is a deadly disease. Moreover, almost all the participants themselves took the decision to take the vaccine, and not their family members.

To conclude, our study has shown a high Covid-19 vaccine acceptance rate in women in Maharashtra. Importantly the uptake of the vaccine was completely voluntary and based on scientific rationale. Vaccine hesitancy was not a problem in this population.

References:

- Ten threats to global health in 2019. <https://www.who.int/news-room/spotlight/ten-threats-to-global-health-in-2019>. Accessed 08 June 2022.
- Greenwood B. The contribution of vaccination to global health: past, present and future. *Philos Trans R Soc Lond B Biol Sci*. 2014 May 12;369(1645):20130433.
- Shen SC, Dubey V. Addressing vaccine hesitancy: Clinical guidance for primary care physicians working with parents. *Can Fam Physician*. 2019;65(3):175-181.
- T. Burki. The online anti-vaccination movement in the age of COVID-19. *The Lancet Digital Health*. Vo. 2, October 1, 2020, p. E405
<https://www.immunize.org/catg.d/p4026.pdf>. Accessed 7 February 2021
- DeStefano F, Chen RT. Negative association between MMR and autism. *Lancet*. 1999;353:1987-8
<https://www.who.int/news/item/05-12-2019-more-than-140-000-die-from-measles-as-cases-surge-worldwide>. Accessed 08 June 2022.
- Soares P, Rocha JV, Moniz M, et al. Factors Associated with COVID-19 Vaccine Hesitancy. *Vaccines (Basel)*. 2021;9(3):300. Published 2021 Mar 22
- Troiano G, Nardi A. Vaccine hesitancy in the era of COVID-19. *Public Health*. 2021 May;194:245-251
- Toth-Manikowski SM, Swirsky ES, Gandhi R, Piscitello G. COVID-19 vaccination hesitancy among health care workers, communication, and policy-making. *Am J Infect Control*. 2022 Jan;50(1):20-25
- Dubé E, Laberge C, Guay M, Bramadat P, Roy R, Bettinger J. Vaccine hesitancy: an overview. *Hum Vaccin Immunother*. 2013;9(8):1763-1773
- Wheeler M, Bутtenheim AM. Parental vaccine concerns, information source, and choice of alternative immunization schedules. *Hum Vaccin Immunother*. 2013;9(8):1782-1789
- The Lancet Child Adolescent Health. Vaccine hesitancy: a generation at risk. *Lancet Child Adolesc Health*. 2019 May;3(5):281

- Bendau A, Plag J, Petzold MB, Ströhle A. COVID-19 vaccine hesitancy and related fears and anxiety. *Int Immunopharmacol*. 2021 Aug;97:107724.
- Yurttas B, Poyraz BC, Sut N et al. Willingness to get the COVID-19 vaccine among patients with rheumatic diseases, healthcare workers and general population in Turkey: a web-based survey. *Rheumatol Int*. 2021 Jun;41(6):1105-1114.
- Qunaibi EA, Helmy M, Basheti I, Sultan I. A high rate of COVID-19 vaccine hesitancy in a large-scale survey on Arabs. *Elife*. 2021 May 27;10:e68038.
- Coronavirus (COVID-19) Vaccinations. <https://ourworldindata.org/covid-vaccinations?country=GTM~GNB~HND~KEN~KIR~LAO~LBR~LSO~LBY~MWI~MLI~MOZ~NAM~NER~NGA~RWA~RUS>. Accessed on 23 July 2022.
- Ackah BBB, Woo M, Stallwood L, Fazal ZA, Okpani A, Ukah UV, Adu PA. COVID-19 vaccine hesitancy in Africa: a scoping review. *Glob Health Res Policy*. 2022 Jul 19;7(1):21. <https://pib.gov.in/newsite/pmreleases.aspx?mincode=31> Accessed on 25 July 2022.
- Covid vaccine: India becomes second country to cross two billion Covid jabs. <https://www.bbc.com/news/world-asia-india-56345591> Accessed on 25 July 2022.
- Zintel S, Flock C, Arbogast AL, Forster A, von Wagner C, Sieverding M. Gender differences in the intention to get vaccinated against COVID-19: a systematic review and meta-analysis. *Z Gesundh Wiss*. 2022 Jan 7:1-25.
- Gupta A, Christina S, Umar AY, Laishram J, Akoijam BS. COVID-19 Vaccine hesitancy among pregnant women: A facility-based cross-sectional study in Imphal, Manipur. *Indian J Public Health*. 2022 Apr-Jun;66(2):98-103.
- DesJardin M, Raff E, Baranco N, Mastrogiannis D. Cross-Sectional Survey of High-Risk Pregnant Women's Opinions on COVID-19 Vaccination. *Womens Health Rep (New Rochelle)*. 2022 Jun 29;3(1):608-616.
- Ward C, Megaw L, White S, Bradfield Z. COVID-19 vaccination rates in an antenatal population: A survey of women's perceptions, factors influencing vaccine uptake and potential contributors to vaccine hesitancy. *Aust N Z J Obstet Gynaecol*. 2022 Apr 22;10.1111/ajo.13532.
- Pairat K, Phaloprakarn C. Acceptance of COVID-19 vaccination during pregnancy among Thai pregnant women and their spouses: a prospective survey. *Reprod Health*. 2022 Mar 24;19(1):74.
- Joshi A, Surapaneni KM, Kaur M, Bhatt A, Nash D, El-Mohandes A. A cross sectional study to examine factors influencing COVID-19 vaccine acceptance, hesitancy and refusal in urban and rural settings in Tamil Nadu, India. *PLoS One*. 2022 Jun 9;17(6):e0269299.
- Osuji VC, Galante EM, Mischoulon D, Slaven JE, Maupome G. COVID-19 vaccine: A 2021 analysis of perceptions on vaccine safety and promise in a U.S. sample. *PLoS One*. 2022 May 19;17(5):e0268784.