

# Determinants of COVID -19 Vaccine Acceptancy: Scoping Review of Literature

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## Abstract

**Background:** The coronavirus disease 2019 (COVID-19) pandemic is still occurring, infecting many people and killing lakhs worldwide. Vaccination is the most effective strategy to control the spread of COVID-19. Several studies report the efficacy of the COVID-19 vaccines. India started its vaccination program on 16th January 2021. Few studies from India explore vaccine acceptancy, hesitancy, and risk perception among the Indian population. The present review is conducted at the decisive time when the Indian health system and people have some experience with the vaccination process to understand the social and health system-related drivers for COVID-19 vaccine acceptance.

**Methods:** Scoping review was conducted to identify the different factors affecting acceptance of COVID-19 vaccination. Searched the databases using relevant keywords, checked the study list for duplication, and remove duplicate studies. After reviewing the literature, studies were excluded based on the title and abstract, followed by the full text and methodology. The main body of the literature review was formed by information extracted from the literature.

**Results:** The review paper synthesizes the results of 46 studies conducted among the general population. Determinants of COVID-19 vaccination were categorized into three major categories Sociodemographic factors, Health system-related factors, and Personal factors. It was identified that Knowledge, attitude, and vaccine-related beliefs play a significant role in the decision-making process of vaccine acceptancy.

**Conclusion:** review suggested that strategic planning to increase vaccine acceptance among the general population by various stakeholders like Government agencies, NGOs, and Healthcare institutions is necessary. Knowledge, attitude, and vaccine-related beliefs help design the customized health communication module to create awareness and feel the knowledge gaps in the population about acceptancy of the COVID-19 vaccine.

**Keywords:** COVID-19 Vaccines

## 1. Introduction

The coronavirus disease 2019 (COVID-19) pandemic is still occurring, infecting crores of people and killing lakhs worldwide. (Dong& Gardner, 2020) Many countries worldwide have implemented different precautionary measures like social distancing and the use of face masks. (Alfano & Ercolano,

2020; Al-Hanwai et al., 2020) Eventually, it has been realized that these precautionary measures are have limited value. Vaccination is the most effective strategy to control the spread of COVID-19. (Sherman et al., 2020) India was second globally, only behind the USA, with over 30 million cases and over 3,93000deaths. (As of June 26th, 2021) (Dong& Gardner, 2020)

Several studies report the efficacy of the COVID-19 vaccines; most of them show excellent efficacy compare to U.S. Food and Drug Administration standards. (Polack, Thomas & Kitchin, 2020, Baden et al., 2021, Logunov et al., 2021, Voysey et al., 2021, Food and Drug Administration, 2020) India started its vaccination program on 16th January 2021. India has been following a dynamic mapping model; in this model, availability of vaccines & coverage of vulnerable priority groups are the primary determinants to decide when vaccination should be started for which age groups. (MOHFW,2021)

This review lands at a critical time for India as it is undertaken during the COVID-19 pandemic, following the vaccination drive in India. Immunization programs are only successful when there are high rates of acceptance and coverage. The meta-analysis conducted by Wang et al., 2020 showed that willingness to undergo COVID-19 vaccination was 68.4%. (Wang 2020) Previous experience from various countries is already showed that vaccine hesitancy is one of the major obstacles for achieving a high coverage rate and control epidemic. (Vander ende 2018, WHO, 2011) Several studies have identified the relationship between factors like personal perception about vaccine, Knowledge, and attitude about vaccine and vaccine efficacy with acceptance of COVID-19 vaccine. (Reiter, Pennell, and Katz, 2020, WHO 2020, Malik 2020)It is essential for stakeholders involved in the vaccination efforts to address the vaccine hesitancy and low vaccine acceptancy. (Lazarus 2021) Indian public health officials plan an effective vaccination policy to increase vaccine coverage. Understanding the Indian population's risk perceptions about COVID-19, acceptance of a COVID-19 vaccine, social and health system determinants of vaccine acceptance is crucial. The finding of this review is expected to provide insight into underlying personal and health system-related drivers of vaccine-related decision-making among the Indian population. Findings from this review will help to formulate the effective strategies to enhance COVID-19 vaccine uptake.

Few studies from India explore vaccine acceptancy, hesitancy, and risk perception among the Indian population. The present review is conducted at the decisive time when the Indian health system and people have some experience with the vaccination process to understand the social and health system-related drivers for COVID-19 vaccine acceptance. The review will help to give policy prescriptions to smoothen the delivery of COVID-19 vaccines at the mass level in India.

## **2. Methodology**

### **Databases for Search**

Following databases, PubMed, Medline, Cochrane, Psych-info, and Google Scholar were used to identify the different factors affecting acceptance of COVID-19 vaccination. The only peer-reviewed papers were included in the review.

### **Research papers were searched on these databases using the following term**

Acceptance, Barriers, COVID-19 Vaccine, Novel Coronavirus, Corona Virus, Coronavirus Disease 2019, Severe Acute Respiratory Syndrome Coronavirus 2, Adult, Vaccine Hesitancy, Perception, Intention, Vaccine Acceptance, Vaccine Safety, Trust On Vaccine, Perceived Risk, Public Health, Knowledge and Attitude Towards COVID-19 Vaccine, Vaccine Acceptability, Anti-vaccine. These terms were used distinctly and together. Collected research papers were reviewed for their applicability to the aim and objective of the review. The irrelevant and recurring material was deleted from the review.

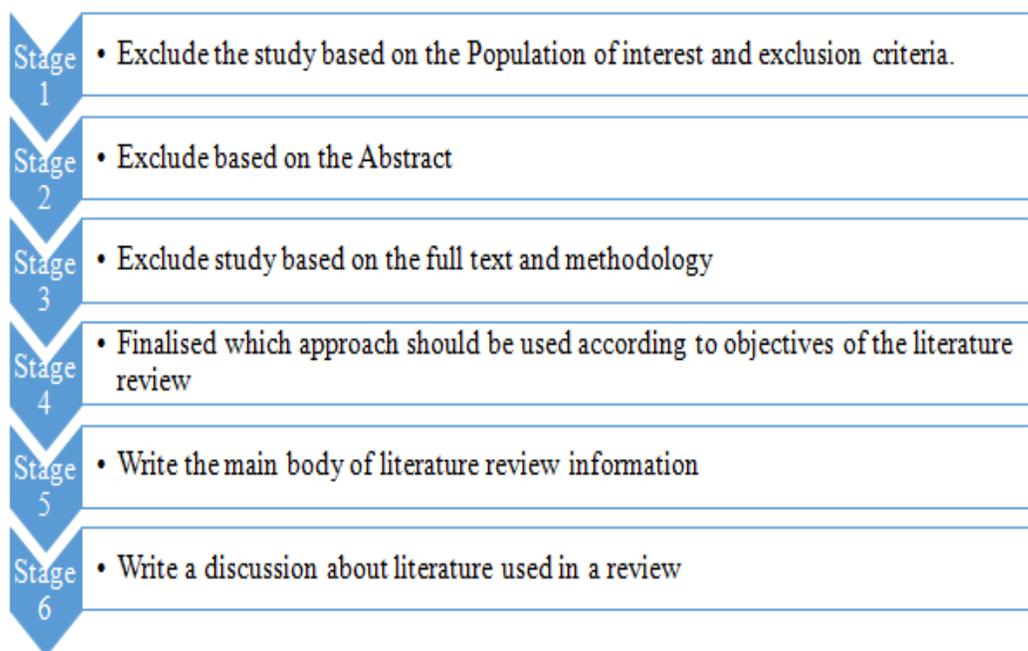
### **Inclusion and Exclusion Criteria**

- **Inclusion criteria:** - Studies
  - 1) Published only in peer-reviewed journals were included in the review
  - 2) Conducted on the adult population, i.e., age above 18 years
  - 3) In any geographical regions
  - 4) Identifying different factors affecting acceptance of COVID-19 vaccine
  - 5) Community based studies
- **Exclusion criteria:** - Studies
  - 1) Studies conducted on people age below 18 years of age
  - 2) Conducted in particular occupational or demographic group ex. Caretakers or healthcare workers
  - 3) Published in non-peer-reviewed journals, grey literature, and white papers, institutional guidelines, etc.

### **Literature Review Strategy**

Searched all the databases mentioned above using listed keywords, checked the study list for duplication, and remove duplicate studies. The studies were excluded based on the inclusion and exclusion criteria. After reviewing the literature, studies were excluded based on the title and abstract, followed by the full text and methodology. The main body of the literature review was formed by information extracted from the literature. Different categories were for factors affecting acceptance of the COVID-19 vaccination. The discussion section discussed how different factors influence the acceptance and decision of vaccine taking and address it.

Figure 1. A Flowchart Explaining the Strategy of Literature Review



## Results

The determinants of the COVID-19 vaccine were examined through the literature survey. These determinants are then further classified into three major factors which suppose to influence the vaccine acceptancy among the surveyed population. The significant factors identified by the literature review are Socio demographical factors like age and sex of the participants, followed by health system-related factors, and Third personal factors like Knowledge, attitude, and Vaccine related beliefs of the participants. Detailed information about factors and their determinants is given in Table 1. The scoping literature review generalized the relationship between most of these factors with COVID-19 vaccine acceptancy. There was no clear evidence, or contradictory evidence observed its mention in the respective result section.

Table 1. Determinants of Vaccine Acceptancy

Sr. No.	Factors	Determinants identified from the literature
1.	Socio-demographical	<ul style="list-style-type: none"> <li>a. Age</li> <li>b. Sex</li> <li>c. Race</li> <li>d. Socio economic status</li> </ul>
2.	Health System	<ul style="list-style-type: none"> <li>a. Trust in the health care system.</li> <li>b. Previous experience with (vaccination) health system</li> <li>c. Accessibility and availability of vaccine</li> </ul>
3.	Personal factors	<ul style="list-style-type: none"> <li>a. Knowledge and source of information</li> <li>b. Perceived risk of COVID-19</li> <li>c. Vaccine efficacy</li> <li>d. Concern and misbeliefs about vaccine</li> </ul>

**Socio Demographical Determinants of Vaccine Acceptancy**

Age, Sex, Race, Socioeconomic status like income, and education are significant determinants of vaccine acceptance in the literature review.

As far as age is concerned, results are inconsistent over the geographical regions. However, generalization can be drawn based on the US-based studies where adults over age 60 are more willing to take vaccination than other groups. (Reiter, Pennell, and Katz, 2020, Fisher et al., 2020, Malik 2020) Whereas European studies showed age group 18-24 are least willing to get vaccinated. (Neumann-Bohme et al.,2020)

Though there is significant interplay between age and sex is observed all over the literature, studies from the U.S., Europe, Uganda, and China showed that male participants have more vaccine acceptancy than female participants. (Reiter, Pennell, and Katz, 2020, Ali KF 2020, Fisher et al.,2020,Kanyike et al., 2021, Wang 2020 )

Among the socioeconomic factors, it was observed that having more education and lower household income; participants were more likely to accept the COVID-19 vaccine. (Reiter, Pennell, and Katz, 2020, Dodd et al., 2020, Fisher et al., 2020).

## **Personal Factors Determining the Vaccine Acceptancy**

### **Knowledge and Attitude**

Knowledge, Attitude, and Practices of the local population are essential for vaccine acceptance by them. It also plays an essential role in understanding the epidemiological dynamics of disease control and the vaccination program's effectiveness, compliance, and success (Bhartiya 2021). Higher Knowledge of vaccination predicts increased intention for vaccination.(Mannan and Farhana, 2020) Factors such as higher levels of education, holding nuclear families and having a previous history of essential vaccines uptake are associated with higher Knowledge (Islam 2021).

During the COVID-19 pandemic, people used multiple information resources to gain Knowledge and health information about the disease and vaccine. However, In India, limited Knowledge of vaccination was reported as the reason for vaccine hesitancy, indicating the need to provide vaccine-related information. (Gurnani 2018). Additionally, information freely available through the internet and various social media may not always be accurate and lead to misbeliefs among the general population. Therefore, policymakers should take steps to ensure adequate Knowledge, positive attitudes, and perceptions towards COVID-19 vaccinations to reduce the vaccine hesitancy facilitated and encouraged by misinformation in the media. (Islam2021)

Though all welcome vaccines, a small percentage of the population is still cynical about using them. In Jordan, the acceptance was low; males and those with seasonal influenza were more likely to accept the COVID-19 immunizations (El-Element et al.), 2020. In Bangladesh, more than 50% agreed to take the vaccine immediately. At the same time, the remaining reported that they would prefer to wait until the efficacy and safety of the vaccination were determined or until COVID-19 became more dangerous in Bangladesh (Mahmud et al., 2021).

Meanwhile, another study examining Jordanians' readiness to be vaccinated discovered that many answered NO or were Unsure when asked about their willingness to receive the vaccination. Concerns about the use of vaccines and a lack of trust in them may be a significant cause. (Al-Qerem and Jarab, 2021). In a separate study conducted in the United States, higher vaccination uptake was linked to greater reluctance, while lower vaccination uptake was linked to greater trust. In the United Arab Emirates, a study of parent views on newborn vaccines indicated that only 12% of parents were hesitant to vaccinate their children. According to the study, vaccine safety, side effects, and too many injections are significant in vaccine trepidation. (Padhiand Al-Mohaithef, 2020).

A cross-sectional study was done in an urban slum in Mumbai, India, to understand the Knowledge and attitude towards the COVID-19 vaccine showed that two-thirds of young adults were uninformed of the COVID-19 vaccine's availability, followed by more than 50% by the elderly. Post availability 80 % surveyed said they would take it, with only 2% saying they would not. More than two-thirds of those who said they would accept the COVID-19 vaccine are from the lowest socioeconomic group. The most common reason for vaccine aversion is the occurrence of minor or substantial side effects after inoculation. (Bhartiya et al., 2021). In the United States, the majority of participants were willing to take the vaccination. Participants were more likely to get vaccinated if they thought their

doctor would recommend it or if their political views were moderate. Participants who had a higher risk of developing COVID-19 infection in the future, higher perceived effectiveness of a COVID-19 vaccine were also more likely to get vaccinated. Non-Latin black participants who reported higher perceived vaccination risks were less eager to get vaccinated (Reiter, Pennell, and Katz, 2020). Respondents who had a more elevated level of confidence in government data were more disposed to get immunization and follow their manager's idea (Mannan and Farhana, 2020). According to a previous study of Ugandan clinical understudies, females have more unpleasant assumptions about Coronavirus, which supports this discovery. (Kanyike et al., 2021).

Another investigation utilized an online overview appropriated in December 2020, with things surveying tricks regarding Coronavirus's starting point and immunization. Mentalities towards Coronavirus antibodies were surveyed utilizing the Immunization Intrigue Conviction Scale (VCBS), with higher scores showing a more noteworthy faith in the immunization scheme. The recognition rates for Coronavirus and influenza antibodies were 29.4% and 30.9 percent, respectively. Guys exhibited higher rates of Coronavirus immunization acknowledgment, as did those with higher instructional levels and those with reports of prolonged infection.

Higher VCBS scores were found among females, respondents with lower instructive levels, and respondents depending on online media stages as the principal wellspring of data (Sallam et al., 2020). The Chinese people's positive attitude toward Coronavirus immunization reflected their strong curiosity in the antibody and their understanding of the importance of immunizations in preventing pandemics (Wang J et al., 2020). Individual and clinical qualities, past flu inoculation, general immunization convictions determined the vaccine uptake. Another survey in the United States discovered that the most commonly cited reasons members who were unsure about becoming immunized included express concerns about the vaccine (such as security or viability) or a need for more information. Antivaccine mentalities, attitudes, feelings, and a lack of trust were the most common reasons provided by members who did not want to be immunized. (Fisher et al., 2020).

An investigation done in Ireland and U.K. by Murphy et al., 2021, showed that – In Ireland, lower levels of trust in researchers, medical experts, and the state; more negative attitudes toward transients; lower levels of intellectual reflection; lower levels of selflessness; higher levels of social dominance and tyranny; higher levels of conspiratorial and strict convictions; lower levels of character quality appropriateness; and higher levels of indifference affected vaccine acceptance. (Murphy et al., 2021) Furthermore, while comparing medical services understudies to non-medical care understudies, it was discovered that there were no substantial disparities in reaction rate dispersion. (Barello et al., 2020).

### **Vaccine Related Beliefs**

Vaccine-related beliefs play an essential role in its acceptance. Various studies exploring the role of vaccine-related belief in vaccine acceptancy consider it a complex construct made up of three to four different components. In the current review, reviewers extract the most commonly used construct of vaccine belief, which includes the following three concepts.

- Perceived risk about COVID-19
- Concern about the side effects of the vaccine
- Vaccine efficacy

Perceived risk about COVID-19:

Risk perception of COVID-19 diseases was found as one of the recurring concepts in explaining vaccine belief. Our report has two components of COVID-19 related to risk perception, perceived severity, and perceived infectivity<sup>6-19</sup> vaccine, which was related to self-perceived chances of contracting the infection and its severity. The studies report higher vaccine acceptance among individuals with higher perceived severity and infectivity.

Concern about the side effect of COVID-19 vaccine:

The concern about side effects or consequences of the COVID-19 vaccine were also explored in various studies. Both men and women were found to have a fear of side effects. However, European women were reported to have higher fear than their male counterparts. Fear of side effects leads to lower vaccine acceptancy. Along with a fear of side effects, the misconceptions or misbeliefs about COVID-19 vaccination also reduce vaccine acceptancy. Lower education, lower socioeconomic class, and being part of the marginalized community (minority) were found to be correlated with lower vaccine acceptancy.

The studies in lower and middle-income countries from Africa and South Asia reported fear of getting infected due to vaccination. While studies from Jordan and Kuwait reported misbelief of infertility caused due to COVID-19 vaccination. These kinds of misbeliefs lead to lower acceptance of the COVID-19 vaccine.

Vaccine efficacy:

The safety and efficacy of the vaccine were concerns reported in the literature (Reiter, Pennell, and Katz, 2020). Perceived ease to use and usefulness of the vaccine were significant determinants of vaccine belief formation. A person with a strong belief in the effectiveness of a COVID-19 vaccine was more likely to be willing to receive a COVID-19 vaccine. It has been observed in several studies that individual who believes that natural immunity is better to get protection from COVID-19 compare to vaccination are firmly against the vaccination. However, Knowledge of vaccination being protective against infectious diseases was reported to increase acceptance of vaccination. A study from the United Kingdom found that previous vaccination against seasonal influenza was associated with being vaccinated against COVID-19. This indicates that creating awareness of vaccine efficacy can help increasing acceptance of COVID-19 vaccination.

## **Healthcare System-Related Factor Affecting COVID 19 Vaccine Acceptancy**

### **Trust in the health care system**

The health care system is an integral part of the vaccination drive as it is involved in creating awareness and delivering vaccines to the population. However, a lack of confidence in the health system and whether the vaccine is made available free of cost by the government are linked with vaccine hesitancy (Halpin 2019, Setbon & Raude 2010, Nguyen et al., 2011). In addition, studies of healthcare utilization in LMICs have highlighted factors such as negative perceptions of healthcare quality, negative historical experiences involving foreign factors, weak support from traditional leaders, and mistrust in government as barriers for COVID-19 vaccination. (Christensen 2021, Lowes & Montero, 2021, Martinez-Bravo & Stegmann 2021, Jegede 2007, Blair, Morse, & Tsai 2017). Higher trust in the healthcare system was one of the significant reasons to get a vaccination in a study conducted by Mohammed et al., 2021 in Saudi Arabia. (Mohammed, Padhi, & Ennaceur, 2021)

### **Previous experience with (vaccination) health system**

Literature also mentions that experience with the healthcare system regarding vaccination plays a significant role in vaccine acceptance. (Stefanoff et al., 2010, Handebo et al., 2021). This observation was not reported from other studies. However, prior experience with the healthcare system seems to be a more critical factor among the minority community to decide about vaccination than a general population. (WHO 2020)

## **3. Discussion**

The present review identifies the determinants of the COVID-19 vaccine acceptancy in three major domains. Sociodemographic factors like Age, Sex, and Socioeconomic status are uniformly identified in previous literature in the context of various other vaccines. The most crucial finding among these determinants was a relationship of age with vaccine acceptance. It shows a nonlinear relationship with the age of the participants, and results are not consistent enough to generalize the results across different age groups. (Reiter, Pennell, and Katz, 2020, Fisher et al., 2020, Malik 2020, Neumann-Bohme et al., 2020) People's experience with the healthcare system was also related more concerning the minority status of the participants, which underlines the need for structural and functional changes in the healthcare system, which can make them more minority friendly. A study found that limited Knowledge about the COVID-19 vaccine was one of the significant hurdles for vaccine acceptance in India. (Gurnani 2018) Limited Knowledge about vaccines can hurt disproportionately among the different subgroups of the community. For example, limited Knowledge can keep patients suffering from Rheumatoid Arthritis, Immune deficiency, or pregnant women away from the COVID-19 vaccination. This is why special efforts are needed to increase the Knowledge about vaccines among these subgroups and the general community.

Several studies were observed that people who received influenza vaccination in the previous season are more accepting of the COVID-19 vaccination. (Wang 2020, Fisher et al., 2020, Dodd et al., 2020) Reviewers view this phenomenon as an acceptance of routine adult vaccination as an accepted

and well-established social norm in such a society. The application of this finding in the context of the Indian population seems very limited as in India, we do not have any routine vaccination program for adults, but at the same time, it also underlines the need to accept routine vaccination as a habit among the adult population.

As far as limitations of the current study are a concern. The present review is the scoping review of the determinants of COVID-19 vaccines; it inherent the limitations ingrained in the scoping review methodology. The review did not evaluate the quality of methodology nor comment on study designs of included papers. Still, a current review can provide insights into determinants of COVID-19 vaccine acceptance among the general population.

#### **4. Conclusion**

Understanding the decision-making process about vaccine acceptance is very important for stakeholders involved in the vaccination effort. Findings from present studies can be utilized to form strategic planning to increase vaccine acceptance among the general population by various stakeholders like Government agencies, NGOs, and Healthcare institutions. Findings are also valuable for designing the customized health communication module to create awareness and feel the population's knowledge gaps about acceptancy of the COVID-19 vaccine. Mass communication campaigns may be more effective in building support for vaccination programs or maintaining revaccination social norms. However, at the same time, they may also prove counterproductive with a particular part of the community which is already opposing to vaccination. (Nyhan et al., 2014, Goldstein et al., 2015) The present review also found that there is a need to conduct qualitative studies to explore the interaction between these identified determinants to understand how decisions about getting COVID-19 vaccinations are made.

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