

“Covid-19 Booster Vaccine in India: A Review of Public Attitudes and Hesitancy Trends”

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ABSTRACT:

Booster vaccination doses are becoming an essential part of public health initiatives as the world struggles with the COVID-19 pandemic's persistent challenges. This study examines the factors that contribute to the population's reluctance to receive the COVID-19 booster vaccine, with a particular focus on India. Important aspects such as socioeconomic status, cultural beliefs, false information, and various levels of faith in the healthcare system are identified by the study. By exploring these aspects, the study seeks to provide insight into the complex processes affecting people's choices to accept or reject booster shots in the Indian setting.

The study also looks at how media narratives affect public perceptions and the function of public health communication tactics. It evaluates the success of the present messaging efforts and suggests focused interventions to deal with the factors that have been identified as causing reluctance. It additionally examines the ethical issues surrounding booster dose distribution in a nation with possible inequalities in access and suggests tactics for distributing vaccines fairly, in order to provide evidence-based policy recommendations.

The study's conclusions add to the growing body of knowledge on vaccination hesitancy worldwide and provide insights particularly relevant to India's distinct sociocultural context. Public health professionals and legislators can improve the effectiveness of vaccination efforts and ultimately aid in the nation's overall control of the COVID-19 epidemic by recognizing and managing booster vaccine hesitation.

Keywords: Booster dose, COVID-19, Vaccine hesitancy

I. INTRODUCTION:

In late 2019, COVID-19 pandemic first appeared, and its rapid continent-to-continent spread and unparalleled morbidity and mortality marked a turning point in global public health. India, a country with a sizable and varied population, has led the way in these initiatives;

especially since the country's largest-ever immunization campaign was initiated. Notwithstanding noteworthy advancements in vaccination, the advent of novel strains and persistent difficulties in attaining herd immunity has prompted conversations over the necessity of COVID-19 booster doses. Since then, governments and healthcare organizations around the world have worked to contain the epidemic using a variety of strategies, most notably the creation and distribution of vaccinations. An extensive vaccination program that aimed to safeguard the enormous and diversified population of India has been the hallmark of the fight against the new corona virus^[1].

The booster dosage administration in India began in January 2022, and it is necessary to investigate the acceptability levels of the booster dose and the variables linked to reluctance^[2]. Vaccines have a phenomenal record of lowering potentially fatal illnesses. Widespread COVID-19 immunization campaigns brought an end to the extraordinary pandemic^[3], but due to low uptake and inadequate supply, they were unable to reach their full potential. The high rate of vaccination hesitation or refusal considerably reduced herd immunity^[4]. Most people are still hesitant to get vaccinated despite ample proof of the COVID-19 vaccines efficacy and safety^[5].

The choice to administer COVID-19 booster dose in India would be based on a number of variables, including the emerging nature of the pandemic, whether vaccinations are readily available, and advice from medical authorities such as the Indian Council of Medical Research and the Ministry of Health and Family Welfare. Public health professionals and government representatives would consider variable like the efficiency of the vaccination, the occurrence of novel variations, and the requirement to safeguard vulnerable groups.

FACTORS EFFECTING COVID-19 BOOSTER VACCINE HESITANCY

Likewise with many other nations, India's reluctance to receive the COVID-19 booster vaccination might be attributed to a number of issues. When addressing vaccine hesitancy, it is important to take into account the complex and diverse composition of the Indian population. The following are some of the possible causes of India's reluctance to receive booster shots:

1. Lack of knowledge and misinformation:

Hesitancy resulted from rumours and widely disseminated false information regarding COVID-19 vaccinations, including booster shots. Over 350 million people use social media and mass media in India and a significant percentage of these users rely on unreliable sources.

Mass media and social media (including Twitter, Facebook, and Instagram as well as search engines, health websites, blogs, and forums) are the most reputable sources for infodemiology

Misconceptions and false information on the spread and management of SARS-CoV-2 have proliferated in non-peer reviewed social media and mass media outlets as a result of the inadequate scientific data and ongoing research. The public's sentiments toward vaccination are currently being impacted and sparked by sensationalized, unfavourable news about vaccines.

There is proof that myths in India have a psychological influence as well. The first suicide case connected to misinformation involved a 50-year-old man in A. P. who committed suicide after getting COVID-19. The family said that he became infected with COVID-19 because of his sense of shame and remorse about inadvertently infecting family members, as well as his perception of how society would respond to it^[6].

2. Vaccine Efficacy and Duration of Protection:

The campaign made use of two vaccines that were produced domestically: Covishield (AZD-1222 Oxford, AstraZeneca by Serum Institute of India) and Covaxin (BBV152 by Bharat Biotech International Limited). Furthermore, a limited supply of the Russian vaccine Sputnik-V, which is marketed by Dr. Reddy Laboratory in India, was made available to

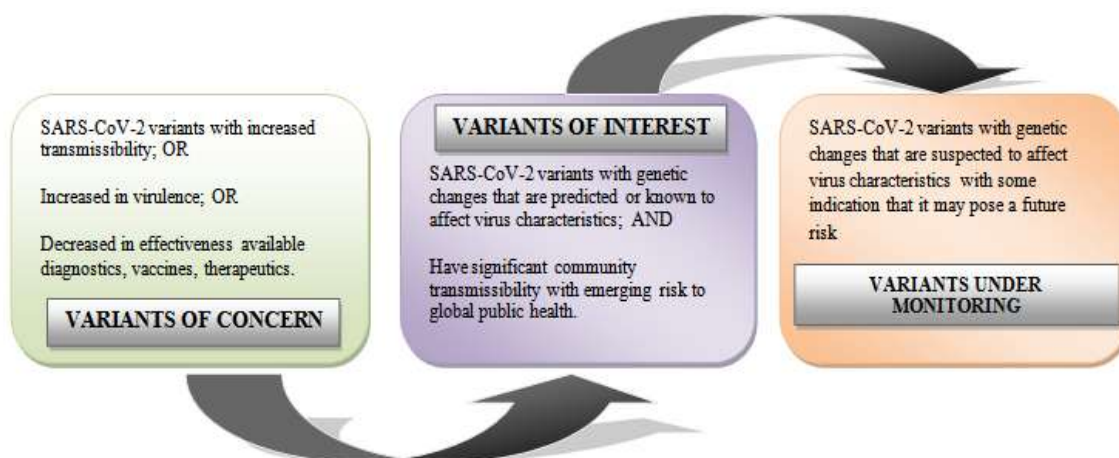
the private sector with an emergency use permit^[7]. For HCWs who had finished the two-dose schedule, a homologous precautionary (booster) dose was made available on January 10, 2022, with preference given to those who had taken the second dose more than nine months earlier^[8].

A June 2022 study published in The Lancet Journal also found that booster mRNA vaccine-doses were moderately effective in preventing infection with the omicron variant for over a month after administration.

3. Variations and Developing Science:

Naturally, the coronavirus mutates throughout time, giving rise to new types. Certain strains have a higher contagiousness and destructive power than others. Certain variations can also be used as a therapeutic escape. The transmissibility of the Delta and Omicron variants is higher than that of the Alpha, Beta, and Gamma versions. Furthermore, not many strains can be neutralized. As a result, there is a potential for reinfection among those who have received vaccinations. It is yet unknown if the newly discovered Omicron strain is transmissible or resistant. Due to its high rate of transmission, severe illness, and high death rate, the Delta variation is the most hazardous of all^[9].

The coronavirus is a global disease that constantly mutates and alters its characteristics. According to research, the COVID-19 virus carries the greatest number of mutations on the targets of several nucleocapsid gene primers and probes^[10]. The characteristics of the virus might be impacted by these modifications. The novel variations may intensify the disease and have a quick rate of dissemination. Additionally, novel variants may affect how well therapeutic medications, diagnostic equipment, vaccinations, and other preventive measures work^[11]. WHO classified SARS-CoV-2 variations as variants of interest (VOIs) and variants of concern (VOCs) based on their features, denoting them with Greek alphabet letters. Based on viral genetic alterations, transmissibility, neutralizing strength, harmful consequences, clinical presentation, and developing health risks for humans, the WHO classified VOCs and VOIs.



4. Vaccine Accessibility: the challenge of vaccine hesitancy was reported to be more prevalent in rural area due to various factors compared with urban population also the largest contributors to lower vaccination rates^[12]

When the vaccination program was first implemented, the alleged "digital divide" was a major point of contention against India's vaccination program. It was claimed that since the IT platform could only benefit educated, urban residents, it would exclude people living in rural areas^[13].

The fact that COVID-19 death rates were higher in rural than in urban regions lends greater significance to this concern. This was linked to a number of issues, including the population's socioeconomic disadvantage combined with the unequal distribution of the healthcare infrastructure, a shortage of personnel, and equipment^[13, 14].

5. Vaccine Safety: Experience with Prior Vaccinations; A person's desire to have a booster dose may be influenced by their prior vaccination experiences, particularly any negative reactions.

The COVID-19 pandemic has significantly reduced in duration and severity due to the COVID-19 vaccinations, which offered effective treatment and decreased hospitalizations and illnesses caused by COVID-19 infection. Studies have noted typical adverse reactions to vaccinations, including injection site pain, fever, myalgia, exhaustion, and headache.

Fearing both short- and long-term side effects which although it's normal to be afraid of these symptoms. Instead, it is an indication that the immune system is strengthening its defences against COVID-19 and reacting to the booster dose.

Researchers have discovered that the COVID-19 immunization can have a few extremely rare but serious side effects. Thrombosis with thrombocytopenia syndrome is one of them^[15].

It is very unlikely that receiving any immunization, including the COVID-19 vaccine, would result in serious adverse effects that could pose a long-term health risk. The COVID-19 vaccine has been administered to millions of individuals, and no long-term adverse effects have been found.

6. Public Trust in Health institutions:

a. Vaccine Development and Approval Process: Some people expressed doubts about the comprehensiveness of the testing process due to the rapidity with which COVID-19 vaccines were developed and authorized. To guarantee safety and effectiveness, however, a number of rigorous clinical experiments and regulatory inspections were carried out.

b. Communication and Transparency: Pharmaceutical companies and health authorities communicate transparently about the covid vaccinations. Building confidence is facilitated by providing clear information regarding safety precautions, possible adverse effects, and the vaccine development process.

7. Cultural and Religious Beliefs: Hesitancy to vaccination might be influenced by cultural and religious considerations. The concern in vaccination hesitancy is reflected in religiosity, a study found that religious teachings prioritize prayers over medicine, thus resulting in vaccination hesitancy among devotees^[16]. This is coupled with inappropriate knowledge on vaccines, thus making accept alternative approaches to treat diseases,

fearing vaccination may lead to the death of their children.

8. Socioeconomic Factors: Age, comorbidity, education influenced vaccination, some studies revealed that > 60 year of age with co morbidities had more vaccinated may be due to mandatory of Covid Booster Dose (CBD) for these categories. Education was also a predictor of hesitation to receive covid-19 vaccine. Different researchers agreed that better educated individuals are more likely to accept covid-19 vaccination and low educational levels were linked to a significant level of vaccine reluctance^[17].

Social habits ; it is believed that consumption of alcohol is forbidden and poisonous when vaccinated supporting article says that there is no evidence indicating that alcohol is poisonous when vaccinated but similar finding from other studies shown a high level of hesitancy among alcoholics,^[18]

9. Vaccine Confidence: A major contributing factor to vaccine hesitation is peer and family pressure as well as community acceptance. Confidence in first two doses, many believe that double vaccination is enough. A sense of complacency has settled in, but booster doses are very important to keep immunized it ensures enough antibodies against infecting virus. However, the effectiveness of vaccination can go weak with time and two doses of vaccine may not provide strong protection against infection from the COVID omicron variant, and to be able to prevent hospitalization^[19].

10. Complacency: As the epidemic progresses and case counts decline in some areas, people may grow accustomed to getting vaccinated. It's critical to emphasize how important booster shots are for immunity maintenance.

11. Vaccine Cost: Some people may be discouraged by worries about the expense of booster doses. Economy influenced vaccination due to the likely impact of covid-19 on the economy and on public spending even though covid-19 vaccination effectively financing the vaccine roll-out will , but the initially (1st and 2nd dose) government partially provided free vaccination pertaining the public. Since India is a vast country with 138 crore population and first largest world population. The booster dose was not available in government establishments for free. It was for paid vaccine in private hospital. From July 15th- Sep 30th the vaccine was made free by the government as a part of Azadi ka Amrith Mahotsav.

HEALTH AUTHORITIES CONCERN IN IMPLEMENTING COVID19 BOOSTER DOSE

When administering booster doses of the COVID-19 vaccination, Indian health authorities, like health agencies across the globe, take into account a number of important variables and concerns. Several of the main issues are as follows:

1. Vaccine Equity: One of the primary priorities for health officials is making sure booster doses are distributed equally. The necessity for booster shots must be weighed against the ongoing immunization campaigns for those who have not completed their original vaccination series. In order to provide equitable and universal access to extra doses of the COVID-19 vaccine, vaccine equity must be taken into account during the implementation of booster doses. Booster dosages are given to strengthen and extend immunity, particularly in the face of newly developing variations and the possibility of immunity diminishing with time. Addressing a number of issues, such as distribution, price, accessibility, and public health infrastructure, is necessary to achieve equity in the distribution of booster doses

2. Scientific Evidence: SARS-CoV-2, also known as the severe acute respiratory syndrome, corona virus disease 2019 (COVID-19) is still a pandemic that has resulted in over 6 million deaths and 45 million confirmed cases to date^[20]. On the other hand, the World Health Organization announced on November 24, 2021, the identification of the fifth new COVID-19 covariant, known as "Omicron," as a variant of concern (VOC) and designated as B.1.1.529^[21]. Preliminary data indicates that it has greater transmissibility and resilience to vaccine-induced immunity than earlier volatile organic compounds (VOCs)^[22]. The Omicron version, which was first identified from a specimen obtained on November 9, 2021, contains many mutations (>50), some of which are extremely worrisome; it can evade the immune system with great ease, Health officials keep a careful eye on the growing body of research on booster doses, including its effects on new variations and how long initial vaccinations offer protection. As a result of its great ability to evade the immune system and the fact that T cells, which kill disease-causing cells, are unable to detect the Omicron version, the disease's severity, hospitalizations, and fatalities are reduced.

3. Impact on Public Health: Medical authorities evaluate the possible effects of booster doses on the general public's health. This entails taking into

account the influence on transmission rates as well as the possibility of hospitalization, severe illness, and breakthrough infections. When a population's immunity and clinical protection decline over time and are no longer considered sufficient, booster doses are given to vaccinated individuals who completed their primary vaccination series (now one or two doses of the COVID-19 vaccine, depending on the product). A booster dosage is intended to bring back the effectiveness of the vaccination from the point where it was thought to be insufficient^[23].

4.Variants:The WHO states that delta variant is currently the most harmful variant. The virus's potential to evolve into new forms is a serious concern. In order to combat the possible threat posed by variations and their capacity to elude immunity, health officials assess that booster dosages are necessary.

5.Healthcare System Capacity: One important factor to take into account is the healthcare system's ability to administer booster dosages, especially in areas with a high population density. This covers elements including the availability of healthcare workers, logistics, and the supply of vaccines.

6.Age and Risk Groups: Health officials decide whether high-risk populations or certain age groups should receive booster doses first. This could include advice for those who work in healthcare, are elderly, or have underlying medical issues.

7.International Travel: Health authorities have the authority to consider travel abroad and the admission requirements of other nations. Certain countries could require passengers to have booster shots. As a result, some individuals will receive a high level of immunization against COVID-19 variations, which will indirectly protect the herd community.

8.Vaccine Supplies: The ability to produce and obtain vaccines is important. For booster shots, health officials must guarantee a sufficient supply of vaccinations. India should have a constant supply of vaccines, particularly in its rural areas. There should be an adequate supply of booster doses available in every industry.

9. Cost and Accessibility: Health officials think about how to lower the cost and increase public accessibility to booster dosages.

a. Vaccine production and distribution cost: The type of vaccine, quantity of production, and logistics all affect the amount it costs to produce and distribute booster doses. The cost of producing each vaccination varies, and

some may need to be transported and stored in a certain way, which raises the total cost.

- b. Administration cost: Expenses for vaccination locations, medical staff, and clinic setup are all included in the cost of delivering booster doses. Each region and healthcare system may have different expenses.
- c. Distribution Infrastructure: The state of the healthcare system's current distribution networks and infrastructure affect accessibility. Distributing booster dosages may be simpler in nations with developed healthcare systems than in those with less developed infrastructure.
- d. Equitable Access: It's important to make sure that booster dosages are accessible to everybody. It is important to take steps to prevent widening the gaps in healthcare access that now exist. This involves addressing concerns pertaining to vulnerable people, location, and socioeconomic position.
- e. Education and Awareness: Part of accessibility also includes educating the general population about the significance of booster dosages, where to get them, and how to resolve any issues or misunderstandings. Increased vaccination rates may be attributed to effective communication.

10.Legal and Ethical Considerations: It is crucial to make sure that the administration of booster dosages conforms with all applicable laws and ethical principles, particularly those pertaining to informed consent and patient rights. Regulatory approval from relevant health authorities, legal authorisation for administration of booster dose and international regulations abide in implementing booster dose

11.Monitoring and Surveillance: To keep tabs on vaccine efficacy, breakthrough cases, and adverse events, robust surveillance and monitoring methods are required. These data are used by health authorities to guide their judgments about booster policy.

CHALLENGES FACED ON IMPLEMENTING COVID BOOSTER DOSE

Government regulations and mandates pertaining to vaccinations have the power to shape public opinion and willingness to receive booster shots. These policies should be communicated in an understandable and thoughtful manner. The complex problem of vaccine hesitancy is caused by a multitude of reasons that can result in vaccination

refusal. The following are a few obstacles and underlying causes of vaccine hesitancy:

Supply chain Issues: It has been difficult to maintain a sufficient and steady supply of booster dosages. This covers the production, shipping, and handling of logistics to deliver the vaccinations to different places authorizing safe and effective vaccines efficiently and transparently; monitoring effectiveness during (and after) vaccine deployment; ensuring equitable vaccine access globally; manufacturing sufficient quantities and maintaining supply chain capacity; safely and securely transporting and delivering vaccines; determining fair vaccine allocation; encouraging the uptake of vaccines; ethical implications of vaccine passports and other vaccine requirements; and adapting clinical and health research systems^[24].

Public Health Messaging: It can be challenging to explain the necessity for booster dosages and to allay public fears or misunderstandings regarding the efficacy and schedule of booster shots. Public trust requires messaging that is consistent and clear.

Vaccine hesitancy: Overcoming vaccine reluctance is a recurring difficulty in the field of medicine. Some people can be reluctant to get booster shots because they don't think they're necessary or safe.

Policy and Regulatory Challenges: It can be difficult to create and modify laws and policies to account for booster doses, especially when taking various vaccination schedules and combinations into account.

Variations of Concern: Choosing between booster injections has become more difficult as a result of the virus's introduction of new variations. It is a constant struggle to modify booster methods to account for possible decreased efficiency against specific variations.

Logistical Difficulties: It can be difficult to plan large-scale immunization programs, schedule appointments, and make sure people get the right kind of booster shot.

Data Collection and Reporting: It can be difficult to precisely track and report booster doses in order to keep thorough immunization records. This is especially crucial when evaluating the overall efficacy of booster regimens.

Varying vaccination platforms: Diverse vaccinations may be used in various countries using various platforms and technologies. The process becomes more complicated when booster regimens with several immunizations are coordinated.

Ethical Considerations: Choosing which booster doses to provide first and making sure that the distribution is equitable present ethical challenges, particularly in situations where vaccine supplies are limited.

II. CONCLUSION

In order to ascertain the optimal course of action with regard to booster doses, health officials must frequently work with international health organizations and adhere to advice from advisory committees and specialists. Misinformation -The public is more inclined to believe information supplied by friends, relatives, and co-workers than an article published by an organization. This is a social behaviour issue. In order to resolve worries and misunderstandings, it's critical to provide accurate and conveniently available information. Individuals possess concerns about the effectiveness and duration of protection offered by the first vaccination doses; therefore they were reluctant to receive booster shots.

Confusion and reluctance arised from worries about novel COVID-19 variations and shifting scientific advice. Health authorities can address these concerns by providing clear communication and regular updates. Hesitancy may be exacerbated by restricted access to vaccines, particularly in underserved or rural areas. It is imperative to guarantee equal access to booster shots.

People may choose not to receive booster shots due to concerns about vaccine side effects and bad reactions. Concerns can be reduced by providing clear information regarding vaccine safety and treating side effects. By producing antibodies that guard against potential infections in the future, vaccines trigger the body's adaptive immune response. In the long run, effective vaccinations can provide herd immunity by lowering disease transmissibility, morbidity, and mortality.

Trust has been impacted by the way public health and government officials have managed the outbreak. Nations that have responded in a way that is transparent, well-coordinated, and grounded in research have typically seen an increase in public trust in their healthcare systems. It can be beneficial to interact with community and religious leaders to promote immunization.

Vaccine reluctance is influenced by socioeconomic inequalities in income, education, and access to healthcare. In order to alleviate these inequities, focused outreach and education

initiatives are required. Peer education and community involvement can increase people's trust in vaccinations. Insurance coverage or government initiatives like subsidies can assist in resolving this problem. To foster trust and promote booster uptake, effective communication and public messaging are essential. Health officials must handle any vaccine reluctance that might develop as a result of booster recommendations.

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