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COVID-19 Vaccine and Accessibility Issues Faced by People in Greater Mumbai

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ABSTRACT

In India, the citizens who received vaccination had to travel a long way to get vaccinated due to uneven distribution. The present paper aims to analyse the accessibility of vaccination centres in the study area, to overcome any shortcomings for future emergencies in the study area and to analyse how prompt the medical system in the study area is during the times of emergencies. The study is based on a systematic research methodology which includes secondary data for compiling review of literature from various sources and primary data which is collected with the help of a close ended questionnaire prepared in Google Forms using survey method. The total sample size is 993 randomly selected respondents across the city of Greater Mumbai. The data has been processed using MS Excel and analysed using IBM SPSS software. The maps have been prepared using QGIS for spatial analysis. The findings point out that 49.76% of the respondents have had difficulty in accessing a vaccination centre due to unavailability of slots while booking it digitally, whereas only 85.92% of them have been able to access the slots booked in time while others could not and struggled again to book new slots. 39.08% of the respondents found it difficult to reach the vaccination centres owing to the distance, cost and lack of navigation skills. It is therefore recommended that healthcare infrastructure be strengthened and disparity be reduced with geospatial planning. The study concludes by stating that with the changing climate, diseases are also changing and increasing, hence it is important to be prepared for the worst of the situations in future.

Keywords: *Covid-19, Vaccination, Disparity, Inaccessibility, Preparedness*

INTRODUCTION

COVID-19 was one of the major highlights in the year 2020 with sudden lockdown and news of deaths everywhere. However, India successfully carried out a large-scale COVID-19 vaccination campaign just within 1 year, setting an example for other low- and middle-income countries. Despite early vaccine development, challenges in vaccine distribution were faced. Geospatial analysis revealed disparities in vaccine distribution among states and Union territories. Three vaccines were administered to various groups, but vaccine hesitancy due to safety and efficacy concerns remains a challenge. Factors like vaccine scepticism, socioeconomic status, and poverty impact vaccination rates, with men having higher rates due to better internet access. The government aims to prioritize certain populations, but efforts to combat hesitancy and address the digital divide are crucial for successful vaccination efforts. The citizens who received vaccination during the peak time were not

always privileged to get a centre that were accessible to them easily. They had to travel a long way to get vaccinated. Hence, along with all the reasons, accessibility was the major reason of disparity in vaccination. The present paper aims at understanding how accessible were the vaccination centre during the covid period.

REVIEW OF LITERATURE

Without a global, coordinated effort to ensure that everyone who needs a vaccine has access to it, there is a risk that priority access will be based on factors like the ability to pay, nationality, or country of residence, rather than on a fair, evidence-based assessment of need. Access to the vaccine at an affordable and non-discriminatory rate is a fundamental human right. Ensuring this access is not only morally imperative but also crucial for the safety of everyone, as no one is safe until everyone is safe (UNHR, 2020) Participants highlighted the scarcity of vaccination sites in rural areas and challenges related to technology as the most common and significant structural and logistical obstacles in U.S. communities. They viewed concerns about COVID-19 vaccine safety and politically driven skepticism as the leading and most severe attitudinal and informational barriers. Participants noted that expanding mobile vaccination clinics and promoting vaccine endorsements through local community messaging were the most effective strategies for addressing these key structural and attitudinal challenges. They anticipated that politically driven skepticism would remain the most substantial and enduring barrier to wider vaccine adoption in the U.S. (Kuehn, 2023) India has executed the world's most extensive COVID-19 vaccination campaign, which can serve as a model for other low- and middle-income nations for epidemic preparedness. A study was conducted to examine the factors influencing COVID-19 vaccination coverage at the district level in India. Analysis of vaccination data and administrative data identified several factors affecting vaccination rates, including previous infections, deaths, population burden per health centre, rural vs urban areas, literacy rates, children's vaccination rates, proportion of children lost, pregnant and lactating women, and hypertension rates. The study provides valuable insights for improving vaccination coverage in India and other LMIC countries (and Naha, 2023).

India faced challenges in distributing vaccines despite developing them early in 2021. Geospatial tools were used to analyse vaccine distribution across states, showing higher rates in densely populated states compared to Union territories. The country administered three approved vaccines to healthcare workers, frontline workers, the elderly, and eventually to adults over 18 years old. However, vaccine hesitancy due to safety and efficacy concerns posed a challenge to the vaccination campaign. Addressing these concerns is crucial for the success of India's vaccination efforts in preventing the spread of the virus (Kaur, 2023).

Variables such as vaccine skepticism, socioeconomic status, and multidimensional poverty impact the rate of COVID-19 vaccination in India. Greater skepticism and poverty are linked to lower vaccination rates, while men have higher vaccination percentages due to better internet access. The country faces a gender disparity in vaccination coverage, with over 100 million women not fully vaccinated. The government aims to prioritize 300 million individuals, especially rural residents, but internet access remains a challenge, leading to a digital divide that disadvantages women and minorities. Efforts to combat vaccine hesitancy include communication strategies involving influencers and frontline workers (Choudhary, Choudhary and Pervez, 2023).

RESEARCH OBJECTIVES

- To analyse the accessibility of vaccination centres in the study area
- To overcome any shortcomings for future emergencies in the study area
- To analyse how prompt the medical system in the study area is during the time of emergencies.

RESEARCH HYPOTHESIS

H1= all have received the vaccination in time
H1o= not all have received vaccination in time
H2= there is a relationship between number of doses and the type of vaccine
H2o= there is no relationship between number of doses and the type of vaccine

RESEARCH METHODOLOGY

Coverage

The study focuses on Greater Mumbai. The area is bordered by the Ulhas River to the north, Thane Creek to the east, and the Arabian Sea to the south and west. Greater Mumbai, the state capital of Maharashtra and India's financial hub, is a key industrial centre for the country. Geographically, it stretches approximately from 18° to 19° East in latitude and from 72.82° to 73.00° North in longitude. Managed by the Municipal Corporation of Greater Mumbai, it is one of India's largest municipal corporations by administrative area, covering 437.71 square kilometres. The city's elongated shape results in primary transportation routes running north-south, with limited east-west connectivity.
Source: Prepared by researcher

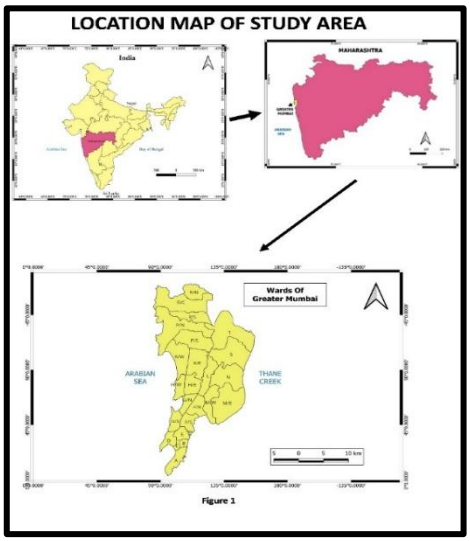

Figure 1
Location of the Study Area

METHODOLOGY

Pre-Field: Data was first collected by literature review from different articles available online. On the basis of the literature review the objectives were made and then the Google forms were created to collect the responses.

On-Field: The primary data was collected by Google forms by the questionnaire method and on the basis of that the data were collected from the respondents. The questionnaire was multiple choice questionnaire with close ended questions to get on point answers for better analysation. The method used for the responses was survey method and with the help of those 993 responses of the people living in the study area were collected.

Post-Field: Data analysis was done on the data collected in the form of responses from the respondents. The methodology adopted for this is the primary data collection with the help of both closed ended questions to get on point answers and to understand the situation with ease through Google Forms.

DATA ANALYSIS

It is observed in Figure 2 that a significant number of respondents are younger falling between the age group of 20 to 30 years which is nearly 65.38% while least respondents fall under 40-50 and above 50 category which is just a random occurrence as the data is collected randomly.

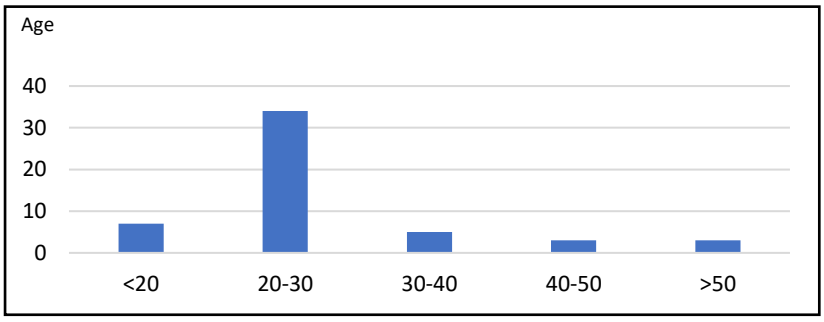

Figure 2
Source: Primary data

It is observed from Figure 3 that most of the respondents have received Covishied followed by Covaxine. This explains that Covishied was more available during that time and was most trusted by the common people.

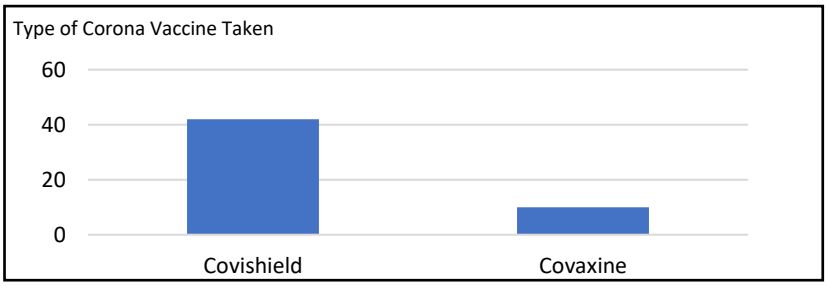

Figure 3
Source: Primary data

It is observed from Figure 4 that most of the respondents have received 2 doses while only a few respondents have received 3 doses and only 1 respondent has received 1 dose. This explains that last vaccine that is booster dose was not available or popularised as much as second dose for everyone to mandatorily receive it.

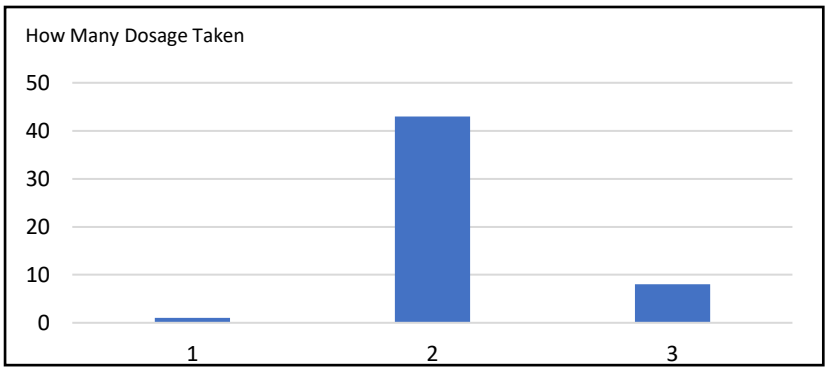

Figure 4
Source: Primary data

It is observed from Figure 5 that only 34.6% found their vaccination centre to be highly accessible, whereas just 7.7% found it least accessible. This explains that there was a scarcity in the availability of vaccination centres in the study area making is difficult for the citizen to access their nearby centres. Only a few places were devoid of this convenience.

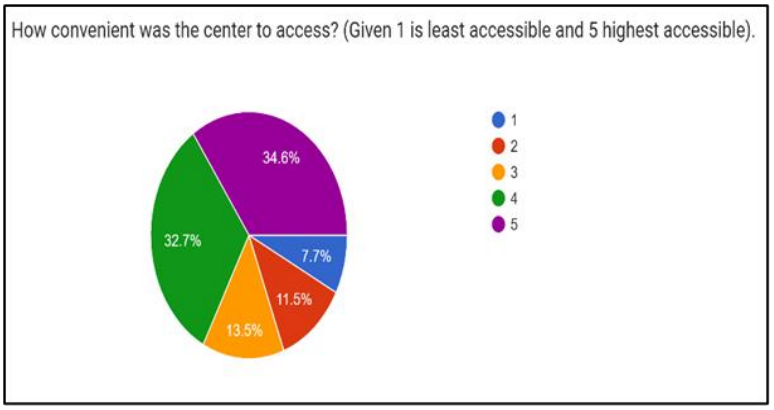

Figure 5
Source: Primary data

It is observed from Figure 6 that most of the respondents used public transport as their mode of transport while walking and private transport is used by few respondents. This explains that the cost of vaccination was so high that not all could afford to travel with private cars and the travel time was also high due to unavailability of centres or vaccines nearby. Hence, maximum resorted to public transportation. At the same time, those who wished to go to government hospitals also, preferred to walk.

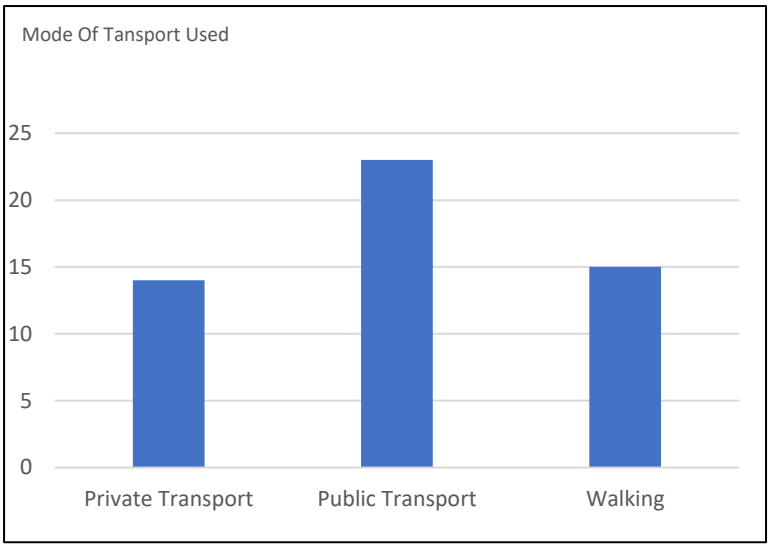

Figure 6
Source: Primary data

It is observed from Figure 7 that 86.5% respondents have spent less than 500 rupees to reach to their vaccination centres, only 13.5% have spent between the range of 500-1000 rupees and none above 1000 rupees. This explains that the accessibility of the vaccination centres was very high therefore much fair was not needed. However, further discussion revealed that it was not always necessary that even after reaching the centre, people could successfully get vaccinated as sometimes there may be a shortage of vaccines due to very long que. Some people also faced issues due to lack technological skills as all the procedures were through the AarogyaSetu App and every individual didn't have financial, social or technological access to the application.

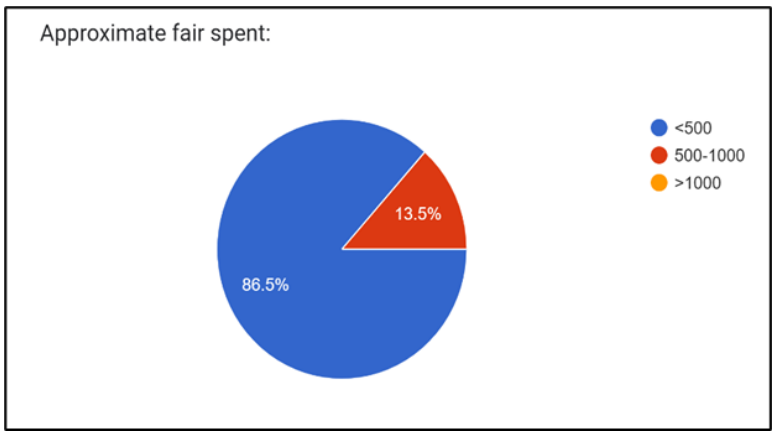

Figure 7
Source: Primary data

H1= all have received the vaccination in time
H1o= not all have received vaccination in time

The calculated value of r=0.23 and p value at 6 degree of freedom is 0.85. This implies that p is greater than r, therefore the null hypothesis is accepted with 99% confidence. This indicates that not all have received vaccination in time.

H2= there is a relationship between the number of doses and the type of vaccine
H2o= there is no relationship between the number of doses and the type of vaccine

The calculated value of chi-square is 0.75 and p value at 4 degree of freedom is 0.62. This implies that p is smaller than r, therefore the null hypothesis is rejected with 99% confidence. This indicates that there is no relationship between the number of doses and the type of vaccine

CONCLUSION

By conducting this research, valuable insights can be generated to inform public health strategies and policies aimed at ensuring equitable access to COVID-19 vaccination services across Mumbai. The study helps in understanding the accessibility of the vaccination centre during an emergency in the study area. The study helps us to find the shortcoming during that period and learn how to overcome them if something similar or worse happens in the future. As COVID-19 affected India with a huge vigour, people chose to take the vaccine no matter how far the centres were. According to the study majority of people took Covishield as its availability was maximum. Taking the Second dose was made mandatory by the government to ensure full protection by the Government, however, the third dose was not given much focus therefore only a handful of people took the third dose while the maximum stopped at the second dose. There is also the reason that people were not aware of the third dose and mainly people of the backward area were affected more. Not only were false rumours about the vaccine being used as a bug in humans also the reason. Despite all these problems, the government of the study area tried their best to give as many vaccination centres as they could as the maximum number of people found their centres to be quite accessible and had to spend money less than rupees 500 to reach their centres.

RECOMMENDATIONS

- Governments and health authorities should continue to ensure the equitable distribution of vaccines.
- The government should take into account the shortcomings that took place and try to improve them for future emergencies.
- The government should provide an effective door-to-door vaccination service to help the elderly.
- Availability of the vaccine for everyone should be ensured and to spread awareness equally to everyone.
- Any kind of rumour against the medicine that saves the lives of people should be stopped through proper proof and explanation about its importance.

LIMITATIONS AND IMPLICATIONS

The limitations of the study are as follows:

- Limited access to certain populations, like migrant workers or marginalized communities, has led to gaps in data.
- Focusing solely on Greater Mumbai has limited the generalizability of the findings to other urban or rural areas, where accessibility issues could differ

significantly due to varying infrastructure, healthcare systems, and socio-economic conditions.

The Implications of the Study are as Follows:

- The findings could inform local government and health authorities in Greater Mumbai about the barriers to vaccine accessibility, leading to targeted interventions aimed at improving access for underserved communities.
- The research could highlight the importance of public awareness campaigns and community engagement in addressing vaccine hesitancy and misinformation, which are critical for improving vaccine uptake.
- The study might reveal gaps in the healthcare infrastructure, such as insufficient vaccination centres in certain areas or inadequate technology for online registrations, prompting investments to strengthen these systems.

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