

Vaccination and Non Pharmaceutical Public Health Interventions

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Introduction

Covid-19 disease caused by SARS-CoV-2 is an ongoing pandemic that began in December 2019[1]. The World Health Organisation declared the coronavirus disease as pandemic in March 2020. In India the first case of covid-19 was reported on 30 January 2020[2]. Since then there has been a gradual increase in the spread of the virus. While vaccines for treating the disease remained underdeveloped during the initial phase of the pandemic, many countries implemented non-pharmaceutical interventions such as nation-wide lockdown, closure of the public places, to control the spread of disease. But certain NPI's had several social and economical consequences that made them unsuitable in the long term. The effectiveness of Non-Pharmaceutical Interventions against Coronavirus disease (SARS-CoV-2) during the period when vaccines were unavailable is highly significant. The covid-19 disease has created a huge loss in the lives of people either financially or by turning people sick and killing their lives. The NPI's implemented can be for self protection such as mandatory wearing of masks, washing hands frequently and sanitising the vital household items. It can be of environmental well being like Social distancing, frequent sanitisation of public spaces and vulnerable contraction areas. Social distancing includes closure of schools and other educational institutions, recreational centres like malls, restaurants, gyms, swimming pools and cinema theatres. Time restricted operation of shops and vegetable markets provided space for buying the essential items whereas the medical stores were open all day. Social distancing also includes night curfew, other travel restrictions and isolation- the separation of ill individuals for fourteen days from those who are susceptible

for contraction and quarantine- the separation of individuals who have been assumed to be exposed to the virus. All these measures reduced the spread of virus among the community but the effect of disease on the patients who contracted it was severe especially during the second wave. During the second wave India reported around 4 lakh cases per day. Altogether in around 27 days, daily new cases rose from 1 lakh to 4 lakh in the country. But this was not the case during the third wave. It is believed that the situation was under control due to the prevalence of vaccines. In India, 94% of the eligible population has received at least one shot, and 74% of the eligible population is fully vaccinated. This undoubtedly created a huge impact on the number of confirmed cases during the third wave. Now the major question is: Was it NPI's or the vaccines which played a major role in controlling the spread since the start of the pandemic in the country? It is obvious that NPI's were the only support system when the attempts for finding vaccines were made and the morphology of the virus was under study, during the first wave. It came to rescue when the public and the government had a meagre idea on Covid-19, not just in India but in all parts of the world. But to compare it with the role of vaccines, the latter played a major role in building the immunity of the public, acting as a shield. Vaccines were an evident reason for lower mortality rate during the third wave. The individual role of NPI's and vaccines in a country with a population of 1.38 billion is still unspecific. The extensive study of the role of NPI's is essential for the understanding of the Covid-19 disease and this knowledge can be applied to control other seasonal communicable diseases as well.

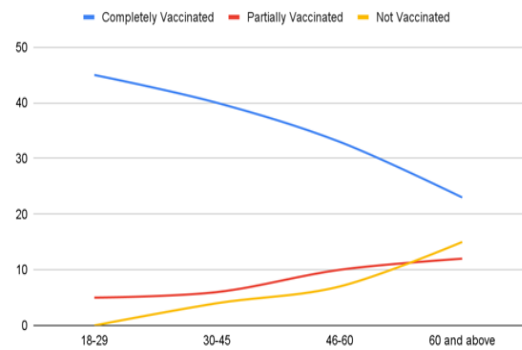
Methods

To analyse the role of vaccination in minimising the spread of the disease an offline survey was conducted in the locality which covered a wide range of people from different age groups and various sections of the society. Questions were asked regarding the status of vaccination, chronic health ailments, status of contraction of disease, symptoms and recovery period. Table 1 shows the details of responses obtained from the survey. The ultimate goal of the survey was to analyse the status of health, if the contraction happened before and after complete or partial vaccination. To analyse the consequences of NPIs several authorised data sources were examined.

| | 18-29 | 30-45 | 46-60 | 60 and above |
|-------------------------------|-------|-------|-------|--------------|
| Completely Vaccinated | 45 | 40 | 33 | 23 |
| Partially Vaccinated | 5 | 6 | 10 | 12 |
| Not Vaccinated | 0 | 4 | 7 | 15 |
| Contracted Virus | 35 | 43 | 42 | 40 |
| Contracted before Vaccination | 16 | 15 | 30 | 18 |
| Contracted after Vaccination | 19 | 23 | 12 | 22 |

Results:

Figure-1: Vaccination Status



The survey conducted among the public revealed that 90% of the people over the age of 18- 21 years are completely vaccinated. Similarly 80% of the people over the age of 30-45 years, 66% of the people over the age of 46-60 years and 46% of the people over the age of 60+ years are completely vaccinated. Figure 1 shows the vaccination status of people over different age groups. It is obvious that 90% of the people in the age groups 18-29 years are students and young adults

who are engaged in a regular pattern of worklife. Since all the educational institutions, private and government organisations have made vaccination mandatory, 90% vaccination status is achieved in this category. People falling under age groups 46 and above years show more hesitancy towards vaccination unless they are committed to an organisation. This was carefully observed during the survey and people who lack awareness on vaccination claim that vaccination would cause death and other life-threatening complications. But utmost efforts were taken to explain the reality to the people who show hesitancy towards vaccination and encourage the people to get vaccinated during the survey.

Figure-2: Contracted Virus

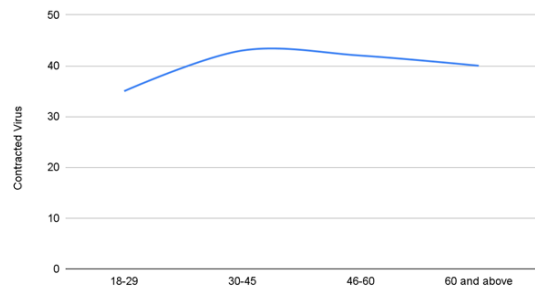
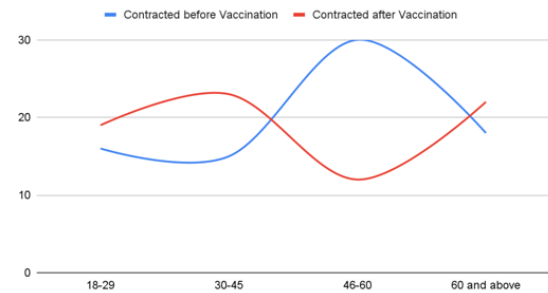


Figure-3: Contraction Status



The second factor which is to be observed is 70% of the people falling under the age group 18-29 years have been affected by the virus, out of which 45.7 % of the people were infected before getting vaccinated and 54.7 % of the people were infected after getting vaccinated. Under the age group of 30-45 years, 86% have been infected, out of which 13.8% have contracted the virus before getting vaccinated and 65.1 % have contacted the virus after getting vaccinated. In people falling under the age group 46-60 years, 84% have already contracted the virus, out of which 71.4 % have contracted the virus before getting vaccinated and 28.5% of the people have

contracted the virus after getting vaccinated. In people who are 60 and above, 80% have been infected by the virus, out of that 45% have contacted before fascination and 55% have contracted after getting vaccinated. Figure 2 clearly explains the data about contraction. From the above deduction, it is obvious that people falling under any age category may contract the virus irrespective of getting vaccinated. But those who have contracted the virus after getting vaccination have experienced less negative effects and were retained from being taken to the hospital. Similarly vaccinated people experience symptoms for less than a week and their recovery was much faster than those who are not vaccinated. Figure 3 shows the number of cases per day since the start of the covid.

Figure-4: Timeline of Covid Spread

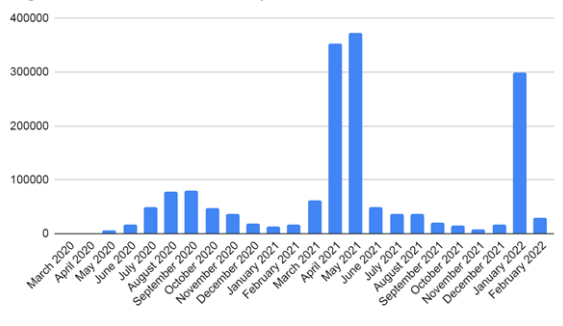
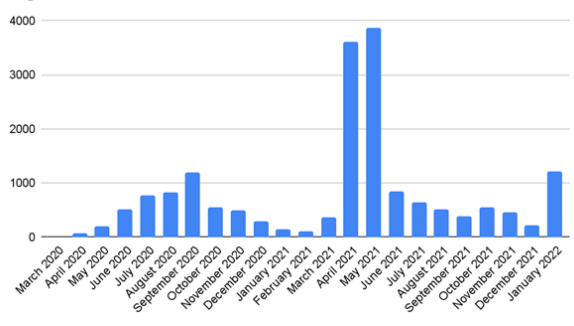


Figure-5: Timeline of Death Rates



This scenario was certainly the case of the country during the second and the third wave. In India the second wave reached its peak during the month of May 2021 with the highest number of recorded cases per day as 409300 on 8th May 2021. During the third wave the highest number of recorded cases per day was 333533 on January 22, 2022. The difference in number may not seem to be gratifying to compare the effects of vaccination. But the actual results lie in the daily deaths. During the second wave May 23, 2021 recorded the highest as 5041 deaths per day but during the third wave February 1,

2022 recorded the highest as 1728 deaths per day. Also, people who contracted the virus before getting vaccinated experienced symptoms like breathlessness, persistent cough, fever, fatigue, lack of smell and taste and headache. This was because the variant that hit during the second wave was highly contagious and caused more harm to the biological system. Thus people who were not vaccinated during the course of that time were unable to fight the disease without the boost of immunity. But in the case of the third wave, the majority of people have taken the vaccination and the variant being less harmful left with fewer deaths and the symptoms were less shown.

Conclusion:

From the above analysis, it is evident that vaccination plays a major role in preventing the system from getting critical. Non pharmaceutical interventions act as a first defence barrier when the knowledge about the disease is under study. Hence nationwide vaccination rollout is a major step taken to prevent large scale spread of the disease. People who show hesitancy about vaccines should be taught about its significance and encouraged to get vaccinated.

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