Chapter 5
Major Findings and Policy Implications

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5.1 Introduction

The ambiguousness among the individuals is very significant in the health care sector, especially in the case of vaccination. Before the emergence of behavioral economics, it was considered that individuals make rational choices by weighing costs and benefits. But there is a serious problem in the line of thinking, individuals are often misguidedand do not always act in their own best interest. The decisions of individuals are often affected by various biases, beliefs and perceptions which divert individuals to take a rational decision.

The present thesis entitled 'Attitude and Acceptability towards COVID-19 Vaccine in India: Insight from Behavioral Economics' is sincerely carried out to meet two major objectives. They were-

i) To identify the underlying factors that determine the attitude of individuals towards COVID-19 vaccine uptake in India.

ii) To study the extent to which factors such as demographic, perception towards immunization, and behavioral variables can affect individual decision to vaccinate.

To meet the above objectives of the study, the following five propositions were built to verify empirically-

i) Demographic characteristics have a significant impact on thevaccination decision of an individual.

ii) Attitude, beliefs and opinions play a significant role in the vaccination decision of an individual.

iii) Confidence in the government and healthcare sector has a significant impact on the vaccination decision of an individual.

iv) Geographical barriers have a significant impact on the vaccination decision of an individual.

v) Behavioral biases have a significant impact on the vaccination decision of an individual.

To meet the set objectives and to verify the propositions, a descriptive analysis is conducted for various variables used in the study. This was followed by a multicollinearity check using a correlation matrix. The first group of variables used for detecting multicollinearity was the attitude and beliefs of individuals towards the COVID-19 vaccine. Secondly, a multicollinearity check was performed on variables related to an individual's confidence in the government and health care sector. Lastly, a multicollinearity check was performed on the behavioral factors.

After determining the absence of multicollinearity, logistic regression analysis was performed for establishing the association of demographic variables, attitude related variables, distance-related variables, confidence in government and behavioral variables individually on dependent variable i.e. vaccinated (yes/no).

5.2 Findings of Descriptive Analysis (Identification of the factors)

To meet the first objective of the study, various factors related to demographic characteristics, perception towards vaccines, confidence in the government and health care sector, geographical barriers and behavioral factors were identified using the theoretical research framework.

The questionnaire design included a variety of questions. Some questions were asked directly, some were designed on a 5-point Likert scale and some questions were related to yes/no responses. Mixed responses were obtained and descriptive analysis was done.

Various responses were received related to the perception of individuals towards a vaccine, it

was found that around 44% of respondents were not interested to take the vaccine against COVID-19 disease which is quite strange. When it was asked whether you feel the vaccine protects against the COVID-19, 14.9% of respondents showed theirdisagreement. Around 34% of respondents felt that the COVID-19 vaccine has serious side effects. From all these responses received related to the perception of individuals towards the vaccine, it is quite clear that people have misbelieve in the vaccine.

Among the questions related to individuals' confidence in the government and health care sector, around 33% of individuals feel that information provided by the government is not true regarding the vaccines whereas 35% of individuals believed that vaccine producers are interested in the health of the public. Around 48% of individuals feel that the vaccines produced by pharmaceutical companies are safe enough. From the responses received, it was analysed that most of the individuals lack confidence in the government and healthcare sector but many respondents are confident in the government regarding vaccines and management of the pandemic.

When respondents were asked if the distance, time and cost prevent them to get vaccinated and if they feel it is not worth receiving vaccines, 20% of respondents responded that distance factor prevents them to take the vaccine while around 18% of respondents felt that cost and distance associated with taking the vaccine is not worth. Around 63% of respondents showed their disagreement with the distance factor and others were neutral. Hence it shows that distance also acts as a barrier but up to some extent.

While categorisation of individuals based on risk aversion behavior, loss aversion behavior, impatient behavior and present biased behavior, it was found that around 67.85% of individuals show risk-averse behavior i.e. preferring certainty overuncertainty. While in 44.6% of individuals, loss aversion bias was depicted. Around 52.9% of respondents show impatient

behavior whereas 49.6% of individuals' present biased behavior was depicted. Hence, it is clear that an individual's decision making is affected by behavioral biases but in the case of vaccination decision, only risk aversion behavior showed the significant impact.

5.3 Findings of Logistic Regression Analysis (Contribution of the factors)

To meet the second objective of the study, logistic regression analysis was performed, to determine up to what extent can factor related to demographic characteristics, attitude towards a vaccine, confidence in the government sector, distance-related factors and behavioral factors can affect the individual decision to vaccinate.

5.3.1 Findings of Demographic Variables on Vaccination Decision

A logistic regression model was made to analyse the impact of age, gender, area of dwelling, qualification and occupation on vaccination decision. Logistic regression was used to determine which demographic variable is influencing the dependent variable i.e.vaccinated (yes/no). From the results obtained, it was determined that only gender and qualification were significant and were showing association with the dependent variable. According to Hosmer and Lemeshow test also, the model was quite a good fit as the test statistic value obtained was 0.665.

5.3.2 Findings of Perception towards Vaccine Related Variables on Vaccination Decision

A logistic regression analysis was performed to understand which factors related to individual decisions to vaccinate are significant enough to impact the dependent variable. The variables used were individual perception related to vaccine protection from Covid -19, side effects of the vaccine, interest in vaccine and trust in the vaccine. From all the independent variables taken into consideration, it was found that fear of side effects

from vaccines has a close association with an individual decision to vaccinate. The Hosmer and Lemeshow test statistic obtained also showed that the model is a good fit and adequately describes the data. The value of the Hosmer test obtained was 0.195 confirming the goodness of fit of the model.

5.3.3 Findings of Variables Related to Individual's Confidence in Government and Healthcare Sector on Vaccination Decision

It is quite important to consider individuals' confidence in government and the healthcare sector regarding COVID-19 vaccines. Hence, these variables were also analysed to find if there exists any association with the dependent variable. When the logistic regression analysis was carried out, it was found that the effectiveness of the vaccine has a close association with the dependent variable i.e. respondents' decision to vaccinate depends upon the perception of the effectiveness of vaccines made by the pharmaceutical companies. When the model was analysed with the help of the Hosmer and Lemeshow test, it was confirmed that the model adequately describes the data as thevalue of the test was 0.613.

5.3.4 Findings of Distance Related Factors on Vaccination Decision

This study also took into account geographical factors to understand if it has anyassociation with the dependent variable. Logistic regression analysis was carried outand it was found that distance to reach the healthcare sector prevents individuals to take the vaccine i.e. distance factor has a close association with the dependent variable. The fitness of the model was checked with the help of the Hosmer and Lemeshow test and the model was found a very good fit with the value obtained was 0.256.

5.3.5 Findings of Behavioral Factors on Vaccination Decision

In this study, four behavioral factors were taken into consideration that are risk aversion, loss aversion, impatience and present biased. Through proper analysis i.e. using logistic regression analysis, it was found that from all the behavioral variables, risk aversion behavior among individuals shows a close association with the decision to vaccinate. If an individual is a risk-averse person, then the willingness of the individual to take the vaccine decreases. The fitness of the model was checked through Hosmer and Lemeshow test and the value obtained was 0.836 confirming that the modeladequately describes the data.

Hence, with the help of logit analysis, it can be confirmed that the gender, qualification, fear of side effects from the vaccine, effectiveness of vaccines made by companies, distance factor and risk aversion behavior among individuals affect the decision to vaccinate i.e. has a close association with the willingness to take the vaccine. It can be confirmed by accepting the propositions of the study that not only the demographic variables but perception and attitude of individuals regarding the COVID-19 vaccine and behavioral factor i.e. risk aversion behavior plays a major role in vaccination decision.

5.4 Policy Implications

Vaccination is a matter of concern that is closely related to the behavioral aspects of the individual. Looking at the recent COVID-19 pandemic wherein vaccination was realized as the only fast and effective remedy. But various behavioral issues inherent or adopted created a lot of resistance to the vaccination drive of the government of India. The present study attempted to identify and extract the behavioral variables and their association with demographic characteristics.

Through this study, it can be seen that the decision to vaccinate is typically influenced by the attitudes and behaviors of individuals. The spread of anti-vaccine is quite common nowadays

leading to vaccine-fear sentiments among people. Although many research body argues that such sentiments are multidimensional and nuanced. Many instances have been obtained that even if the public policies related to vaccinationare consistent and go well with the sentiments of individuals, still empirical data shows conflicting results. This is true because the individual's actual behavior differs fromthe behavior towards vaccination which therefore generates astonishing results.

The acceptance and uptake of the COVID-19 vaccine is undoubtedly a challenge in itself. Making vaccines reach masses and achieving desired and targeted uptake of vaccination in India requires tailored strategies. Even proper management of expectations is essential. The vaccination successful programme does not depend upon just the behaviors of individuals but also depend upon the behavior of other "actors" in the system i.e. those who are offering the vaccination. They are the policymakers who are part of the administration. They are actors who plan how and where to offer thevaccination with properly planned strategies.

The findings of the present study highlight various policy initiatives that must be taken into consideration by policymakers who are responsible for ensuring maximum possible vaccination uptake. The following are the policy implications suggested through this research work-

i) **Use of Nudges as Interventions**- Nudge based interventions (Thaler, 2009) can be one of the prominent strategies to improve perceived vaccine efficacy and can tackle all the findings of the present study related to vaccine hesitancy. The nudge-based interventions include reminder interventions, default options, emotional primes, providing incentives etc. All the mentioned strategies can be designed to provide a meaningful framework within which new knowledge can be considered to shape the forthcoming policies in a better way.

ii) **Engagement of Local Communities**- It is essential to make the most use of existing scientific knowledge but also it is most important to understand what works in real-time and what does not. To ensure proper learning and information regarding vaccines, it is essential to engage target populations in local communities to listen and understand their perspectives, concerns as well as expectations related to vaccination. These types of actions will build target population trust in the government and healthcare sector since it was found that individuals are not confident in the government and healthcare sector. This will also ensure the proper delivery of policies and services which are responsive and are available for the local needs.

iii) **Enabling Conducive Environment**- It was found that individuals are worried about side effects related to vaccines and thus show risk aversion behavior. So, to tackle this part of vaccine hesitancy, there is a need for a well enabled positive environment. There are three categories of drivers of vaccine demand and uptake. The people must have proper knowledge and information regarding the vaccines. Other than that, there is a need for a) the enabling environment; b) social influences, and c) interventions. The policymakers can ensure that an enabling environment is there for individuals that include location, time, cost, quality, proper information as well as a proper health regulation. The negative social influences also sometimes act as a barrier to vaccination uptake. Social influences here means that people are often influenced by beliefs in what others do, for example, if people receive anti-vaccine sentiments from the vocal groups then they may change their beliefs from the favour of vaccination to against the vaccination. Hence, for a successful vaccination drive, social influences can be used to promote favorable behaviors of health professionals as well as the general public. This includes making social norms in favor of vaccination or highlighting emerging norms in the favor of vaccination.

iv) **Ensuring Appropriate Channel of Correct Information**- The reasons for low acceptance of vaccination are highly varied and can be encompassed into one term i.e. vaccine hesitancy. The use of interventions can help mitigate fear and misinformation related to vaccine side effects. The information relatedto vaccination can be spread through social and print media and by also providing doctors with a credible platform to bust myths. This can also act as a motivation for an individual to get vaccinated as discussed in section 4.9 in the present study.

Hence, to conclude it is indeed important to have an effective strategy for behavior change to address the COVID-19 vaccines uptakes. There is a need for a well-designed framework and national plans for promoting COVID-19 vaccination. National plans should address the behavioral determinants and all the barriers to vaccinating which are found in this study.

5.6 Limitations and Further Scope of the Study

Though the present study entitled "Attitude and Acceptability towards COVID-19 Vaccine in India: Insight from Behavioral Economics" meets all its set objectives successfully, there are some issues that may be included in the further studies and; are the limitations of this study-

i) There is a scope to expand the area of the study as the presentresearch is limited to the area of Delhi NCR.

ii) It was also observed that some people who got vaccinated have accepted the vaccine under pressure but were quite hesitant; this aspect of vaccine hesitancy was not captured in this study. Thus, this aspect can be included in future studies.

iii) The present analysis is limited to the logit model. Further studies may be conducted applying other suitable models for the generalization of the studies.

iv) Social desirability bias created complexities as they are dynamic. This dynamism can be included in future studies to showcase a better picture of behavioral mapping.