Perception on Covid-19 Vaccination –A Study

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Abstract:

COVID-19 vaccines have been developed to help prevent infection from the SARS-CoV-2 virus that causes COVID-19. They have been shown to be highly effective in clinical trials and are widely available in many countries. Getting vaccinated is an important step in ending the COVID-19 pandemic and protecting public health. However, like all medical products, vaccines can have side effects, but the benefits of vaccination far outweigh the risks. Any disease that spreads from one human to another can be stopped through vaccination. The world has seen several deadly pandemics time to time. Covid-19 has become disastrous in recent times. People have to rely on measures such as Quarantine, social distancing, use of anti-viral medications to get the disease under control. And the effective way of controlling the spread of disease is through vaccination. Hence throughout the world many countries started producing vaccines. But the acceptance of a vaccination programme in a country depends on several behavioural and cultural factors such as perception of disease, perception of vaccines and perception of authority. Vaccination is a cost-effective way of preparedness for outbreaks and enables people to be proactive rather than reactive. Hence this article made an attempt to study the perception and major problems associated with COVID- 19 vaccination. The study is exploratory and descriptive in nature. Pearson's Chi Squared test was done to understand the association between different variables.

Keywords: Vaccination, Covid-19, perception, diseases, people, visualization

INTRODUCTION

Vaccination is a process of inducing a vaccine to help human beings develop an immune system for a disease. Vaccines work with body's natural defenses and helps build immunity (WHO). Any disease that spreads from one human to another can be stopped through vaccination. In other words, if high percentages of people are vaccinated, there wouldn't be many people infected and the spread of the disease can be stopped (Oxford vaccine group). This is called 'Herd immunity' or 'Herd protection'. The foundation of 'immunology' can be drawn from the works of Edward Jenner, who is known for discovering the world's first vaccine for smallpox in 1976 (Stefan Riedel, 2005). The smallpox is said to have existed for more than 3000 years. Only in the year 1980, the WHO declared the eradication of the disease. The world has seen several deadly pandemics other than small pox such as: Plague (Plague of Athens 430- BC, Black death- 14th century and Third pandemic- 19th century), Cholera (1816 till 1966), Influenza (Russian flu, Spanish flu, Asian flu etc., from 1899 to H1N1 2009), HIV/ AIDS (1981) (JanmejayaSamal 2014). The pandemics have had negative impacts on economies, health, and lives of millions of people (W. Qiu 2017). However, with the introduction of vaccines it's been possible to develop immunity to fight against them. Administering vaccines to large number of people at a short period of time is known as 'Mass immunization'(J D Grabenstein 2006).

Pandemics and vaccinations:

The deadliest pandemics of the world which swept through human population have been brought under control through effective vaccines. The top ten diseases which have preventable vaccines are: Measles, Pertussis, Flu, Polio, Pneumococcal Disease, Tetanus, Meningococcal Disease, Hepatitis B, Mumps and Hib (WebMD). During a pandemic situation it is important to know that it takes lot of research and trails to find and get a vaccine approved. Especially in case of influenza virus, there is always a chance that new strain of virus can arise though mutation for which existing vaccination may be not effective. So, people have to rely on measures such as Quarantine, social distancing, use of anti-viral medications (History of vaccines). However, a vaccination introduced for the first time may take some time to get accepted by the society. The acceptance of a vaccination programme in a country depends on several behavioral and cultural factors such as perception of disease, perception of vaccines, perception of authority, perception of incentives

given to citizens etc. (Bonita 2004). According to a survey conducted at Nepal, certain socio-cultural factors adversely affect the acceptance of vaccination and they are: a) General perception- vaccination benefits, perceived side- effects b) Religion and ethnicity c) Gender – Gender norms, maternal education, birth order and d) Socio-economic status- Family and community support, health education (JetriRegmi 2014). The reason behind lower immunization coverage is 'vaccination hesitancy' found among some people in the society (Catalina 2020). The World Health Organization defines 'Vaccination hesitancy' as "delay in acceptance or refusal of vaccines despite availability of vaccine services". Another study conducted at Australia proves that 'vaccination rejection' is related to psychological factors which are termed as "negative vaccination attitudes (Matthew 2015). However, the citizens of the country must consider the impact of vaccinations in reducing morbidity and bringing the infection under control. Not only these two, but vaccination's impact also is in-fact far-reaching. Vaccination is a cost-effective way of preparedness for outbreaks (Charlene 2020). Therefore, taking vaccinations on time enables people to be proactive than reactive.

COVID-19:

Coronavirus (Sars- Cov-2) is responsible for causing the infectious disease COVID-19. In November 2019, a different kind of pneumonia occurred in Wuhan province China, which spread across many cities and to the whole country (Yi-Chi Wu 2020). The virus causing the disease was called 'Corona' and it was found to transmit via droplets from person to person (Marco Ciotti 2020). On January 31st it was announced as a pandemic outbreak by WHO. India was one among several nations which is affected very badly by the pandemic. Nation -wide 21 days lockdown was announced from 22nd March 2020 and later the states were given a choice to continue based on the number of COVID positive cases reported. Most affected states during the first wave were Maharashtra, Tamilnadu, Delhi, Telangana, Rajasthan, Uttar Pradesh, Andra Pradesh, Kerala and so on (Rajan Gupta 2020). The government of India took several measures in controlling the disease by improving the health infrastructure, producing a greater number of testing kits and developing many testing labs (DeenDayal 2020). Though India had several mechanisms to control COVID cases, second wave was a hard hit. The second wave is said to have started on April 09, 2021; the highest number of cases(144,829) were being identified (Sujita Kumar 2021). In the month of May, 2021 India reported more than 4 lac cases per day.During the second wave the positive cases were high and so were the death rates. Though India had begun with the vaccination drive, the second wave was severe because of the mutation of SARS -Cov-2virus which was highly contagious (Rajesh Ranjan 2021).

COVID-19 Vaccination- worldwide:

The world's first COVID-19 Vaccination 'Sputnik V' was developed by Russia's Moscow's Gamaleya Research Institute in the mid of August 2020 (ET Health world). In the early November 2020, UK authorized its first vaccine for emergency use Pfizer and BioNTech'sBNT162b2 which aimed at vaccinating 20 million people for 2 doses (Pharmaceutical technology). Whereas, the first vaccination drive in the US was started on 14th December 2020, which aimed to reach 100 million people by April 2021(BBC). The vaccines which are currently available and are authorized by WHO- authorized stringent authority are: Pfizer-BioNTech, Moderna, Sputnik V, Oxford–AstraZeneca COVID-19 vaccine/ Covishield, Covaxin, Corona vac etc., According to WHO, it's not vaccines, but vaccination is the one which prevents the pandemic and their main aim is to ensure maximum number of people get vaccination including the most vulnerable population belonging to different countries.

Major Problems associated with COVID- 19 Vaccination:

Several countries of the world are trying to achieve 'mass immunization' to fight against the deadly 'Corona virus' through their vaccination programmes. Now let us look at the hurdles for achieving it:

1. Supply of vaccines: One of the major challenges faced by many countries is with respect to production and supply of vaccination. Countries with huge population are struggling to meet the domestic needs. A successful COVID -19 vaccination programme can be achieved by maintaining supply chain capacities and manufacturing enough vaccines (Rebecca Forman 2021). It is therefore, a global issue which needs immediate response. Expansion of production, a wide spread technology transfer among countries, contract manufacturing etc. could help them overcome supply chain issues (Olivier J Wouters 2021).

2. Vaccination hesitancy: According to WHO, Vaccine hesitancy is delay in taking the vaccines or mere refusal of vaccines by the people. Some of the reasons behind VH are:fear of severe side effects(Mohammad S Razai, 2021), impotency, death, religious beliefs, self-reported diseases, self-perceived risks (Patricia Soares 2021) and so on.Most of these fears are due to rumor mongering, lack of education and scientific temperament (Raymond John 2021). In few extreme cases, health workers are attacked too for advocating vaccination through door-to-door campaigns. If hesitancy ratio is

significant, it is a great cause of worry. Most of times it requires community-based interventions (Jagadish khubchnadani 2021)and also might lead to government making vaccination mandatory.

3. Other issues: Safely transporting and delivering vaccines (avoiding supply chain wastages), Fair vaccine allocation, considering the ethical dimensions (Rebecca Forman 2021), making vaccines affordable to all the citizens, building confidence in minds of people about the vaccines (Olivier J Wouters 2021) are some of the other challenges which the government might come across during the implementation of a vaccination programme.

COVID-19 vaccination in India:

The COVID-19 vaccination programme in India started on 16th January 2021with two major vaccines 'COVISHIELD' from Serum Institute of India and COVAXIN from Bharat Biotech. The phase 1 was to vaccinate the frontline workers who were either given Covishield or Covaxin (didn't have a choice to make during that time) [1]. During the same period 'Vaccine Maithri' was also started, which is exporting of vaccines to neighboring countries to achieve international cooperation in fighting against COVID-19. India has exported vaccines to 65 countries (Bangladesh, Bhutan, Maldives, Nepal, Sri Lanka and many other) under this scheme [4].In order to meet the domestic requirements, the programme was suspended in March. The second phase was meant to vaccinate residents over the age of 60+ and 45+. For 60+ age group the online registration through Arogya setu/ CoWin app began on 1st March 2021 [2]. For 45+ age group the eligibility was granted from 1st April 2021 [3]. During the initial days of vaccination drive people showed hesitancy in taking the vaccination due to several reasons: a) Cases were reducing b) Fear of side effects due to chronic illness c) negative perception about the vaccinations made in India etc. In the mid of March, the cases started increasing and the second wave was a very hard hit with highest number of cases and deaths (Sujita Kumar 2021). So that's when people realized the importance of vaccination and 'herd immunity' and decided to take it. The third phase began on 1st May 2021, which was to administer vaccines for 18+ age group [5]. But due to the less supply of vaccines, it wasn't available for free at government health care centers instead people had to struggle booking their slots at private centers through CoWin app. In order to solve the issue, the government decided to revamp the distribution strategy and announced that 75% of vaccines would be procured by government and 25% would be made available for private centers [6].

A nationwide assessment of vaccination programme reveals that, 'Perception of citizens towards vaccination' plays a very important role in its successful implementation and achievement of 'Herd immunity'. Therefore, in this paper we have tried to analyze the perception of individuals as to what influences them to take or not to take COVID 19 vaccination.

Objectives

*   To understand the opinion about people regarding taking vaccination
*   Finding association between people with their various backgrounds and their opinion about taking vaccination

Methodology

The study is exploratory and descriptive in nature. Primary data was collected by circulating questionnaire online to more than 300 people and 257 responded. The data collection was done during the period May to September 2021. The data was cleaned and organised and analysis was done using R software and Tableau. Pearson's Chi Squared test was done to understand the association between different variables and the results were inferred.

Data Analysis

Descriptive:

The respondents comprised of 57% female and rest were male. 75% of the respondents were from age group 18-44 years and 59% of the total respondents were married. 50% of the respondents were with private sector, 10% had own business, 7% were with Government sector and 36% were not working. 82% of the respondents were from Urban areas, 15% from semi urban and rest from rural area.

70% of the respondents had not been contracted with the corona virus, 28% had mild symptoms, got treated and recovered at home whereas just 4 of the respondents were infected severely and needed hospitalisation.

Very small percentage of the respondents had various types of non-communicable diseases like diabetes, blood pressure, cardio vascular issues, kidney related issues and more.

69% of the respondents were vaccinated with covishield, 12% with covaxin and the rest were not vaccinated. Amongst these 60% of them took whichever vaccine was available and the rest waited for a particular vaccine of their choice.

Following is the hypothesis test done to understand the association between variables.

Variable 1	Variable 2	Null Hypothesis (H0)	Alternate Hypothesis (H1)	P-value	Output	Inference
Age	Vaccination taken	There is no association between age and vaccination taken	There is an association between age and vaccination taken	0.01555	Reject: **H0** Accept: **H1**	There is an association between age of the respondent and the vaccination taken. The reasons can be diverse.
Gender	Full vaccination being made mandatory	There is no association between gender and opinion on full vaccination being mandatory requirement	There is an association between gender and opinion on full vaccination being mandatory requirement	0.4707	Accept: **H0** Reject: **H1**	There is no association between gender and opinion on full vaccination being made as a mandatory requirement.
Age	Opinion on virus Mutation	There is no association between age and opinion on that the virus may mutate again and next wave may be severe	There is an association between age and opinion on that the virus may mutate again and next wave may be severe	0.5078	Accept: **H0** Reject: **H1**	There is no association between age and opinion on that the virus may mutate again and next wave may be severe.
Age	time needed to properly vaccinate 50% of adult population	There is no association between age and opinion on the amount of time India will take to get around 50% of the adult population to be fully vaccinated	There is an association between age and opinion on the amount of time India will take to get around 50% of the adult population to be fully vaccinated	0.664	Accept: **H0** Reject: **H1**	There is no association between age and opinion on the amount of time India will take to get around 50% of the adult population to be fully vaccinated
Age	Pfizer, moderna are better vaccines when compared to covishield and covaxine	There is no association between age and opinion that Pfizer, moderna are better vaccines when compared to covishield and covaxine	There is an association between age and opinion that Pfizer, moderna are better vaccines when compared to covishield and covaxine	0.1294	Accept: **H0** Reject: **H1**	There is no association between age and opinion that Pfizer, moderna are better vaccines when compared to covishield and covaxine

To check the categorical representation of data with the variables,

1. Have you taken your Covid-19 Vaccination

Respondents	No	Yes
Rural	0.003921569	0.027450980
Semi Urban	0.050980392	0.098039216
Urban	0.149019608	0.670588235

The results which are deployed from the table contemplate that, majority of the respondents who are from urban areas having taken Covid-19 vaccination.

2. Did you get affected by corona virus.

Respondents	No, did not get affected by corona virus	Yes, mild symptoms, treatment and recovery at home	Yes, severe. Hospitalized and recovered
Rural	0.023529412	0.007843137	0.000000000
Semi Urban	0.105882353	0.039215686	0.003921569
Urban	0.572549020	0.235294118	0.011764706

The results which are deployed from the table obtain that, the people who predominantly stay in Urban areas had mild symptoms for Covid and had their treatment and recovery from their home.

3. Analyzing non communicable diseases
4.
a) Do you have Diabetes

Age	No	Yes
18 to 44	0.74117647	0.01568627
45 to 60	0.16470588	0.02745098
60+	0.03921569	0.01176471

From the results drawn from the table it is observed that, greater number of the respondents from age group between 18-44 were not prone to Diabetes and comparatively more number from age group 45 to 60 were prone to Diabetes.

b) Do you have Blood pressure

Age	No	Yes
18 to 44	0.71372549	0.04313725
45 to 60	0.16862745	0.02352941
60+	0.02745098	0.02352941

From the results drawn from the table it is observed that, greater numbers of the respondents from age group between 18-44 were not prone to Blood Pressure and more respondents from older age groups were prone to Blood Pressure.

c) Do you have Arthritis

Age	No	Yes
18 to 44	0.741176471	0.015686275
45 to 60	0.184313725	0.007843137
60+	0.047058824	0.003921569

From the results drawn from the table it is observed that, greater number of the respondents from age group between 18-44 were not prone to Arthritis and very less number of respondents were prone to Arthritis.

d) Do you have Asthma

Age	No	Yes
18 to 44	0.741176471	0.015686275
45 to 60	0.188235294	0.003921569
60+	0.050980392	0.000000000

From the results drawn from the table it is observed that, greater number of the respondents from age group between 18-44 were not prone to Asthma and very less number of respondents were prone to Asthma.

e) Do you have Kidney related issues

Age	No	Yes
18 to 44	0.725490196	0.031372549
45 to 60	0.188235294	0.003921569
60+	0.050980392	0.000000000

From the results drawn from the table it is observed that, 3% of the respondents from age group between 18-44 were prone to Kidney related issues and very less number of respondents overall were prone to Kidney related issues.

f) Do you have Cardio vascular issues

Age	No	Yes
18 to 44	0.752941176	0.003921569
45 to 60	0.192156863	0.000000000
60+	0.039215686	0.011764706

From the results drawn from the table it is observed that, very less number of respondents were prone to Cardio Vascular issues.

g) How do you rate your Overall health of respondents

| Age	Fair	Good	Poor	Very Good
18 to 44	0.141176471	0.462745098	0.003921569	0.149019608
45 to 60	0.039215686	0.117647059	0.000000000	0.035294118
60+	0.011764706	0.035294118	0.000000000	0.003921569

From the results which are deployed from the table inferred that maximum number of the respondents from age group between 18-44 believes that their overall health is good.

**Opinion about paying and taking the vaccine if one can afford**

Age	Strongly agree	Agree	Can't say	Disagree	Strongly disagree
18 to 44	0.223529412	0.172549020	0.074509804	0.149019608	0.137254902
45 to 60	0.074509804	0.019607843	0.015686275	0.066666667	0.015686275
60+	0.019607843	0.003921569	0.007843137	0.015686275	0.003921569

The results which are deployed from the table obtain that, majority of the respondents have agreed that those who can afford must pay and take the vaccination.

Tableau Visualization-
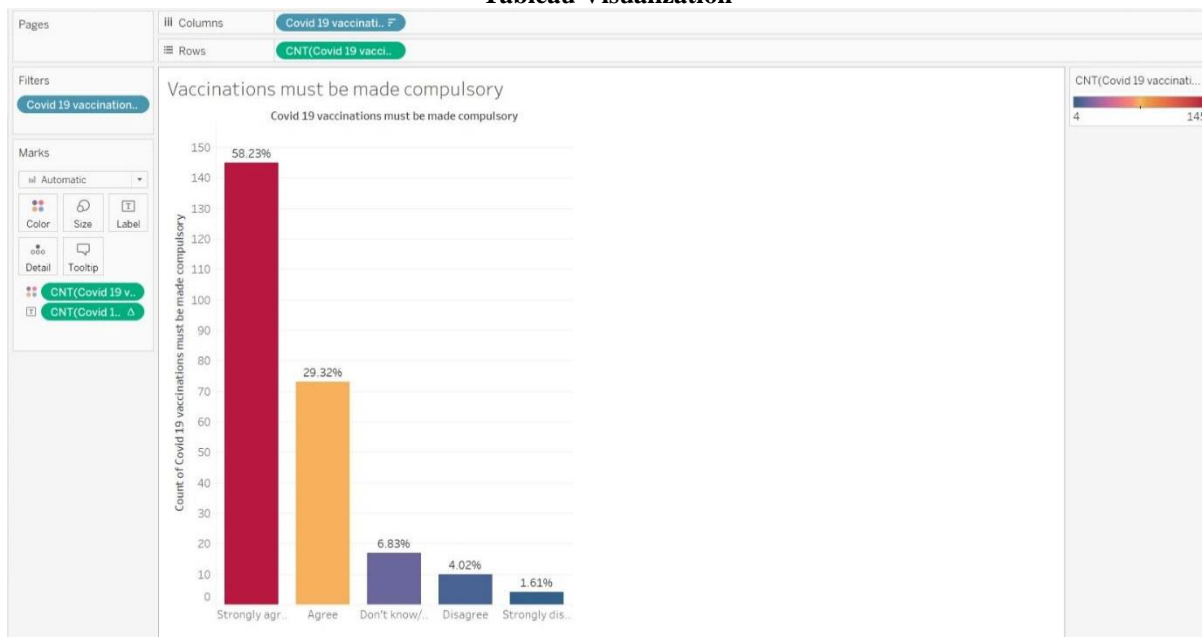
Based on the above visualization it is observed that, several numbers of respondents have strongly agreed that vaccinations must be made compulsory.
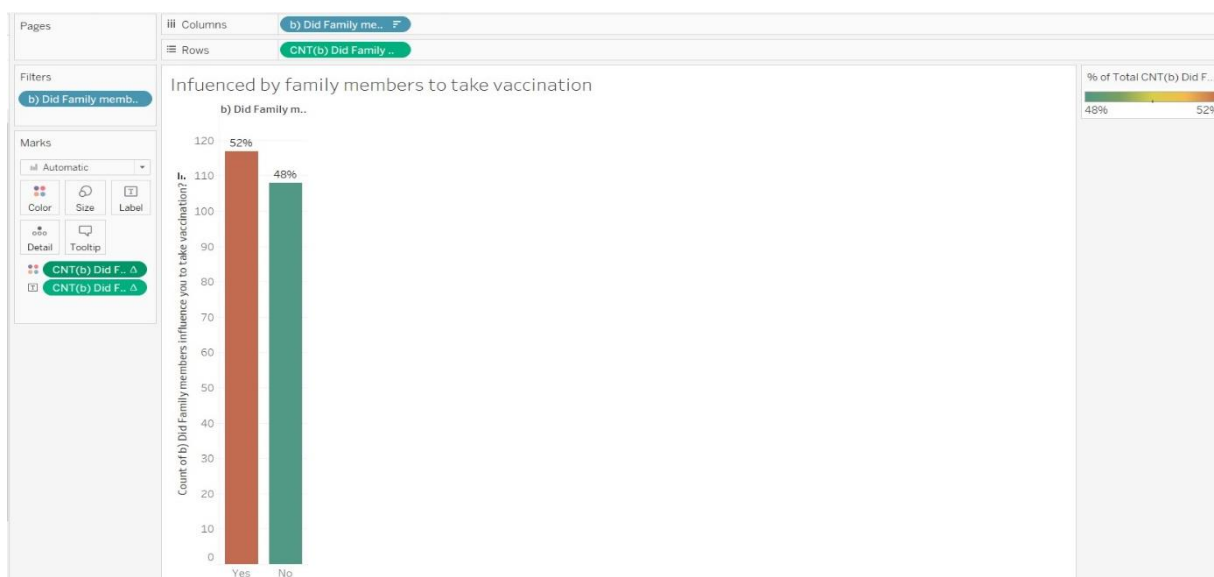
According to the result obtained from the visualization it is observed that, majority of the respondents have agreed that people are most frequently influenced by their family members to take vaccination.
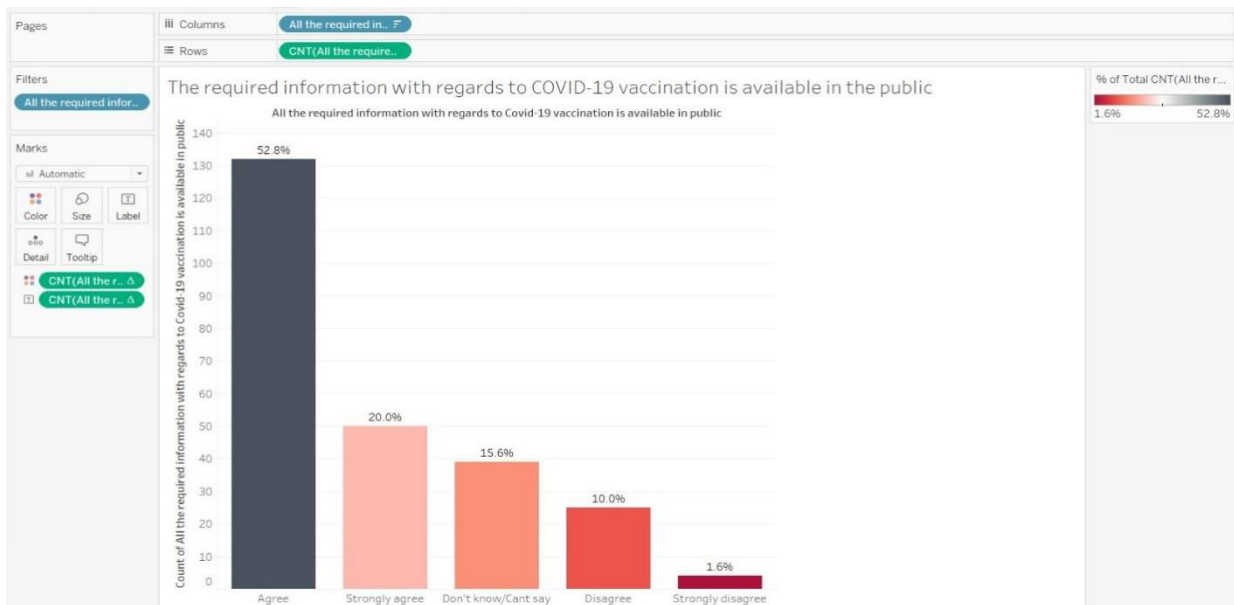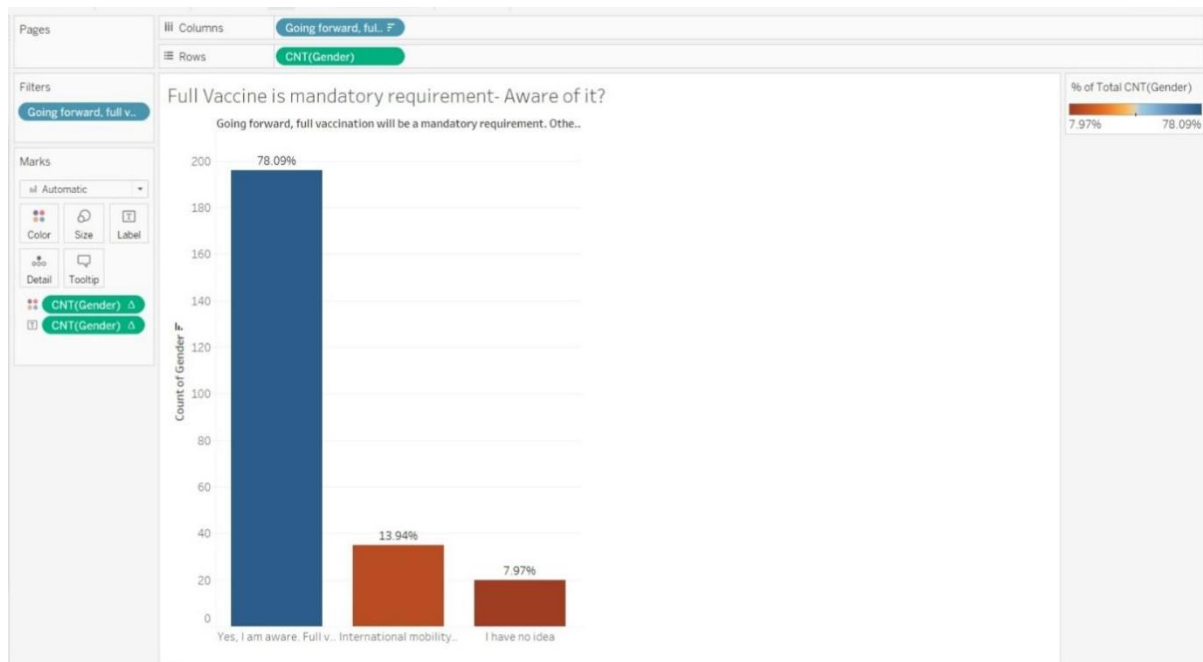
From the result obtained by the visualization, greater number of respondents agreed that with regards to information about COVID-19 vaccinations, there is required information among the public.
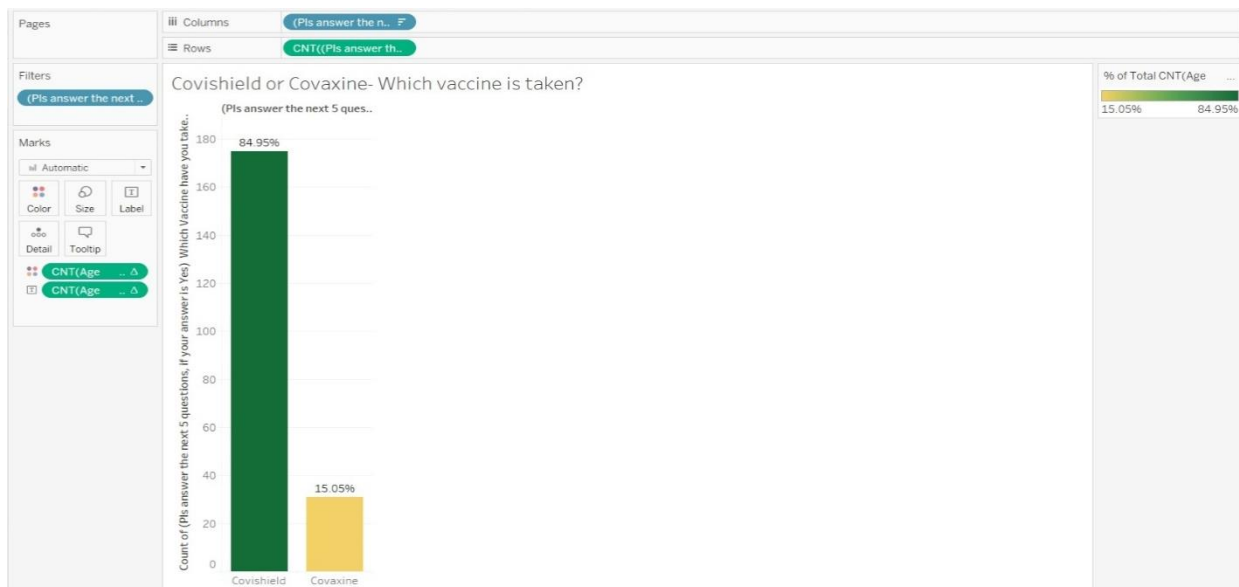
Based on the visualization it is observed that, most frequently the respondents have preferred taking Covishield vaccine.

From the result obtained by the visualization, the maximum numbers of respondents are aware that the full vaccination is a mandatory requirement for everyone.

Conclusion:

Perceptions about COVID-19 vaccination can vary widely. Some people view vaccination as a crucial step in ending the pandemic and protecting public health, while others may have concerns about vaccine safety and efficacy. Misinformation and distrust of the vaccine have been spread in some communities, leading to hesitancy in getting vaccinated. On the other hand, advocacy and education campaigns have helped increase vaccine uptake. It is important to get accurate information from trusted sources, such as public health organizations, and to consult with a healthcare provider to make informed decisions about vaccination. Ultimately, getting vaccinated can help protect not only the individual, but also the wider community, by reducing the spread of COVID-19. Over 1.7 million people have died as a result of the global pandemic. India is not far behind many modern nations in their immunization campaigns, yet little is still known about Indians' willingness to receive vaccinations. Hence this article made an attempt to study the perception and major problems associated with COVID- 19 vaccination. From the results it is observed that respondents have strongly agreed that vaccinations must be made compulsory and full vaccination is a mandatory requirement for everyone. As a result, this study can aid in informing policy makers about potential vaccine hesitancy and planning subsequent public health interventions.

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