

Summer Training

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Presenting Report

**A study on Attitudes and Perception towards COVID-19 vaccination drive
in India**

By

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Acronyms/ Abbreviations

DG: Discussion Guide

EUL: Emergency Use Listing

KOL: Key Opinion Leader

OE: Open ended

PI: Primary Intelligence

PMR: Primary Market Research

QC: Quality Check

SDR: Secondary Desk Research

VOC: Variant of Concern

VOI: Variant of Interest

VOC: Variant of Concern

WHO: World Health Organization

SECTION A

ORGANIZATIONAL LEARNING

At the end of 1st year MBA in health and hospital management at IIHMR University, the students are supposed to join an organization for Summer Training for two months period with certain objectives. The objectives are as follows:

- To understand and learn day to day micro-level operations management of a hospital/ health care/pharma/rural organizations.
- To identify issues/problems associated with some specific operational area/programmes.
- To provide some solution to the identified problem(s).

The intern joined in the Primary Market Research Department, and was assigned the various responsibilities, such as,

- Secondary Desk Research for project initiation
- Profiling for the Key Opinion Leader
- Survey link testing
- Translation of responses
- Open Ended responses coding
- Capture Sheet preparation
- Designing template for Qualitative projects
- Charting for Quantitative survey
- Transcripts analysis for Qualitative survey
- Writing Executive Summary

However, it was Work from Home (WFH) summer training.

About The Organisation

"At IQVIA, we use our expertise to support our customers with innovations to help deliver clinical development, measure the effectiveness of drugs in the real-world, deploy technology to improve drug success, and automate regulatory, safety and quality operations. Underlying our mission is a passion to enhance patient outcomes. The patient is at the center of everything we do, patients connect us to our work, our clients and each other."

-Ari Bousbib, Chairman and CEO

IQVIA is the Human Data Science Company. It have the advanced data, advanced analytics, transformative technology and domain expertise necessary for Human Data Science. And it brings it together every day to help customers find new ways to develop treatments and bring them to market. To measure and communicate value. To improve how care is delivered in the real world.

[<https://www.iqvia.com/insights/human-data-science>]

"Human Data Science is what we do, the IQVIA CORETM is how we do it."

Individually, IMS Health and Quintiles were both industry leaders with great brand equity. Starting November 6, 2017 QuintilesIMS became IQVIA. It came together as industry leaders to form something distinctive. Something relevant and timely. Something worthy of their clients trust and business.

IQVIA starts with an I and a Q. It shows that we are building off a solid foundation. The I in IMS and Q in Quintiles are more meaningful when they come together as IQ, speaking to the intelligence that our two companies and employees bring to our clients.

The icon suggests forward motion and is a subtle hand that invokes an idea of support and connects to the human element. The lines of the hand also convey the unique combination of data and technology."

Vision

"IQVIA is helping to create a world where people are empowered to know that every healthcare decision they make is precisely the right one for them. Where connections are not just created between data sets, but between people and ideas. Where creativity meets analytic rigor and thrives. Where privacy is never sacrificed for progress. And we believe Human Data Science will get us there. All of us.

Our vision is to deploy disruptive technology and scientific innovation to help customers and key stakeholders advance healthcare and improve patient outcomes. We bring the future to clients through Human Data Science. We provide solutions that help our clients innovate with confidence, maximize opportunities and, ultimately, drive healthcare forward."

About Primary Market Research Department

Primary Intelligence

“Primary Intelligence bridges the gap between traditional PMR and secondary data with trusted quicker and targeted results.

The Primary Intelligence Difference

- *Precise methodology* - targeted approach surveying only the appropriate market segments.
- *Expert knowledge* - deep expertise in healthcare paired with proprietary data and methodologies with local presence globally.
- *Actionable insights* - trusted results portrayed in a sharp, easy to understand format that empower you to make strategic decisions imminently.

IQVIA Primary Market Research (PMR) is well-positioned to provide market insights that will help drive your key business decisions.

In-Depth Expertise: As a healthcare focused organisation, the experts offer the most in-depth expertise, technology and information.

- *Awareness of Products:* Spontaneous awareness of current treatments.
- *Promotional Activity Recall:* Recall of face-to-face meetings with pharma reps, comparing effectiveness of different companies and activities.
- *Product Perception:* Rating by stakeholders of the importance of product attributes, against these criteria.
- *Product Adoption:* Analysis of brand adoption by clinical stakeholders from considered use to use on a trial basis, regular usage and adoption as drug of first choice.
- *Product Usage:* Evaluation of prescribing practice including brand prescription by line of therapy and the rationale for treatment choice.
- *Patient Diaries:* Evaluation of patient profiles from patient record files. Age, sex, co-morbidities, treatment length and type, are all analysed.
- *Pharmacy Research:* A key contact point with your patients, pharmacists can offer valuable insights into the origin of prescriptions, indications and treatment pathways.”

Learnings

Weeks	Tasks	Objectives	Learnings
1st week May 10-14	Secondary Desk Research (SDR)	To find total number of clinical/diagnostic laboratories, number of laboratories conducting clinical chemistry and immunoassay testing and number/proportion of diagnostic labs using mass spectrometry in 16 given countries.	SDR is essential to form the base for primary research understanding. It should be done using advanced google search, key filters, correct words to use in authentic sites like google scholar, PubMed, research gate and other search engines. Use of multiple relevant keywords are very essential for reaching the depth of information. Basic idea of using authentic/official websites is recommended.
2 nd Week May 17-21	Survey link testing for logic-response errors (Ad hoc task)	The NEUROCRINE TELESCOPE Study 2021_OT: finding the survey link and test- ids. To analyze and understand the user testing survey. Since it was automated, there was logic written behind these.	The questionnaire prepared for the primary survey had various sub parts which is asked only when the respondents fulfill certain criteria of the survey. This automated survey contains various logics for the same. So, I was supposed to check those logics to identify if there are any logic-response errors and give rectification to the concerned teams.
	SDR	Research on diabetes related welfare programs run by WHO, Red cross and other NGOs in Europe, Middle East, and Africa region (EMEA). The information areas may include but not limited to name and type of support programs, annual budget for the region, how supplies are purchased i.e., blood glucose monitoring devices and their lancets etc.	So, instead of searching on country level, searching on regional level gives more varied information.
	Read some good research report to enhance knowledge on	1. Global Medicine Spending and Usage	I read 2 reports on their website explaining the trends of medicine post pandemic and the impact of COVID-19 on cancer and its increasing numbers. It

	key industry trends	Trends OUTLOOK TO 2025 2. Cancers Won't Wait	gives an idea of market trends and where scope of primary and secondary research plays significant role.
	SDR (Ad hoc task)	To find EU5 countries 1 st covid lockdown data (EU5_lockdown date)	Finding the authentic information from official websites are inevitable for data credibility.
	Primary survey analysis and translation	Study Topic: COVID vaccination impact in Spain	Primary survey analysis and translation in Spanish for Spain population. putting the translations of paragraph and questions from excel to the attached word document. English version of paragraph/question followed by Spanish version.
3 rd Week May 24-28	Survey Response testing	Study Topic: The NEUROCRINE TELESCOPE Study 2021_OT: To check in the primary survey if the respondents have correctly filled in the response.	Analyzing the requirements of the survey and checking if the needed response is correctly filled in. Cross checking the logics of the survey to find any errors, if any. Jotting down any unusual response is projected. Correlating the asked questions and submitted response for the same. Yes/No questions in excel are represented as '0' or '1'.
	Capture sheet preparation (RESEARCH TOPIC)	Study Topic: This study aims to understand COVID-19 patients' diagnosis and treatment pathways in Malaysia and Singapore.	Captures views on a potential treatment option for COVID-19 patients. 1 st step: Understanding the Discussion Guide (DG) and screener to prepare the capture sheet like the reference capture sheet shared. It is representation of the questionnaire in MS Excel to capture the responses of the different health professionals at once. It makes data analysis easier. Since the project is qualitative and the questions asked are open ended,

			multiple answers are expected with various keywords.
	Creating Survey Report template, Data visualization & representation	Study Topic: COVID-19 impact on new product launch in EU4 & UK.	The primary survey conducted for the above topic will present various data. After data segregation and analysis, it is essential to represent that data/information clear and precise to the stakeholders. Data is of no use unless the people we are presenting to understand its importance. Therefore, it is important to understand what we are expected to convey. Data visualization is a creative process to present those numbers to convey the entire story. Correct and deep knowledge of using tools (MS PowerPoint) is inevitable to make the report interesting and rich.
	SDR	Research on PREVENA product class from 3M (segment, competition, trends, product knowledge) - from China perspective.	To understand the market of 3M products to prepare the primary market survey for the stakeholders.
	SDR	Check and confirm the GSK pharma launched and in pipeline for phase II and above products.	To know about the ongoing projects which are expected to come in near future for all different categories.
4 th Week May 31- June 4	SDR	To find about General Practitioners (GP) in public hospitals in Malaysia.	To know about the healthcare system with respect to public and private and find out about GPs status in the public sector.
	Finalizing Survey Report template, Data visualization & representation	Study Topic: COVID-19 impact on new product launch in EU4 & UK. QC of the prepared template for all needed corrections.	Analyzing the representation of collected data for better understanding, using design thinking, for better and clear understanding of the information which the data conveys.
	SDR	Study Topic: PREVENA; an incision management system. To understand:	To deep dive into the articles, published papers, research journals are inevitable to get to the desired

		1. what are the current need gaps in using such system? 2. how are companies supporting for such products? 3. majorly in which surgeries are these used? 4. mention of such systems in Guidelines or protocols.	information. Correct choice of keywords, trying multiple of them gives needed information in bits and pieces which must be analyzed and recorded.
	Charting; Populating the charts into the prepared templates	Study Topic: GE; VOC Research. The task here was to read, analyze and reciprocate the data in the report template.	This is the interim step of market research wherein the collected information from the respondents is fed into the prepared template and analyzed for the insights and presented to the stakeholders. The raw data first must cleanse and rearranged for generating valuable inputs. There are 2 types of questions asked to respondents: 1. closed ended- where options are given to choose 2. open ended- spontaneous answers are captured These open-ended questions need coding before populating on charts. Here, I got to learn how coding is done for those and understanding what data convey.
5th week June 7-11	Drawing deep insights form data	Study Topic: GE; VOC To know about repair contract services.	The data is presented in raw form which is then cleaned and processed for insights. There is various information revealed from it but it is important to club together all related information for better and wider perspective and understanding.
	Creating Survey Report template, Data visualization & representation	Study Topic: This study aims to understand COVID-19 patients' diagnosis and treatment pathways in Malaysia and Singapore.	This is a Qualitative project. The responses given by the respondents on the OE questions would be captured. Understanding the types of questions and anticipated answers are important to prepare template for data

			representation and drawing insights. Creating a storyline is good way of representing the story that we wish to convey via our survey.
	OE coding	Study topic: 3M PREVENA, Understanding pricing dynamics for Closed Incision Negative Pressure Therapy (ciNPT)	The questionnaire had both closed ended and open-ended questions to capture their complete feedback. The OE questions need coding to count and analyze all answers by different respondents. Therefore, every keyword is given a code and all responses are completely coded, without missing any details, and based on most responses, the priority of choice is analyzed.
	KOL Profiling	Study topic: KOL profiling for MEDTRONICS DBS therapy	This is the SDR task where doctors profiling is done for the medical equipment manufacturing stakeholder. To search specific information, it is important to understand the topic and accordingly looking for the information in relevant contexts.
6 th Week June 14-18	Charting; Populating the charts into the prepared templates	Study Topic: GE Healthcare-LCS-Voice of customers	This is the interim step of market research wherein the collected information from the respondents is fed into the prepared template and analyzed for the insights and presented to the stakeholders.
	Quality Check (QC) of the data	Study Topic: GE Healthcare-LCS-Voice of customers	To re-check the data populated on the templates and analyze if it is updated correctly. In quantitative projects, there are numerous data as numbers, which must be correctly analyzed and enter in the prepared template. Even minor error could make big chaos in the outcomes. Therefore, this needs precision and clear focus to check for errors.
7 th Week June 21-25	OE coding	Study Topic: GE Healthcare-LCS-Voice of customers	The survey had both closed ended and open-ended questions to capture their complete feedback. The OE questions

			need coding to count and analyze all answers by different respondents.
	Charting, QC, preparing executive summary	Study Topic: GE Healthcare-LCS-Voice of customers	Preparing executive summary is the last stage of analyzing survey. To do this it needs clear understanding of entire data and the story it conveys. There are 2 parts in preparing exec. Summary. 1st is understanding how to build story around the insights which could be useful for the stakeholder and 2 nd part is writing it into correct language which clearly communicated what data reveals.
8 th Week June 28-July 2	Analyzing transcripts	Study Topic: This study aims to understand COVID-19 patients' diagnosis and treatment pathways in Malaysia and Singapore.	This is qualitative survey where respondents answer question one on one with the moderator. They do not give precise answers but a whole lot of expressions and emotions along with their answers. It becomes important to understand what they want to convey and what are the reason of them saying so. After analyzing, then the responses are put on templates in crisp and clear manner by which the stakeholders can get their insights.
	Feedback from stakeholder “Meeting for discussion”	Study Topic: GE Healthcare-LCS-Voice of customers	The meeting was arranged by the consultant, Harshit. Other members included Manager Shilpa, Consultant Sushant, Associate consultant Rajanya and me. This was about the feedback form GE stakeholder which suggested different data representation for 2 questions as it was not clear to them. 2 attributes had to merged to draw clear insights, since the data set was large, representation was not clear. Therefore, understanding the concern of the stakeholder is important to give them needed insight for correct market understanding.

SECTION B

PROJECT REPORT

Study Tittle

**A Study on Attitudes and Perception on COVID-19 Vaccination Drive
in India**

Introduction

Definition of Vaccine

“VACCINE is a product that stimulates a person’s immune system to produce immunity to a specific disease, protecting the person from that disease. Vaccines are usually administered through needle injections but can also be administered by mouth or sprayed into the nose.”

History of Vaccine

‘The Father of immunology’ Edward Jenner, was an English physician born on May 17, 1749, in England.

It was the time when smallpox was a major concern, and many people were dying due to lack of known treatment for the same. He somehow observed that milkmaids in those areas were generally immune to smallpox and did not develop the disease when it was spreading massively. He then concluded that the pus in the blisters of milkmaids was responsible for protecting them from smallpox. He later decided to provide this solution to other people around as well. He then later published his findings in 1796 in his article "Inquiry into the causes and Effects of Variola Vaccinae".

Gradually, vaccination was accepted around UK. In 1840, the British government banned a standard practice of variolation, and provided free vaccination using cowpox blister pus. The success story of this discovery soon spread all around Europe. Since then, **mass vaccination** is in practice.

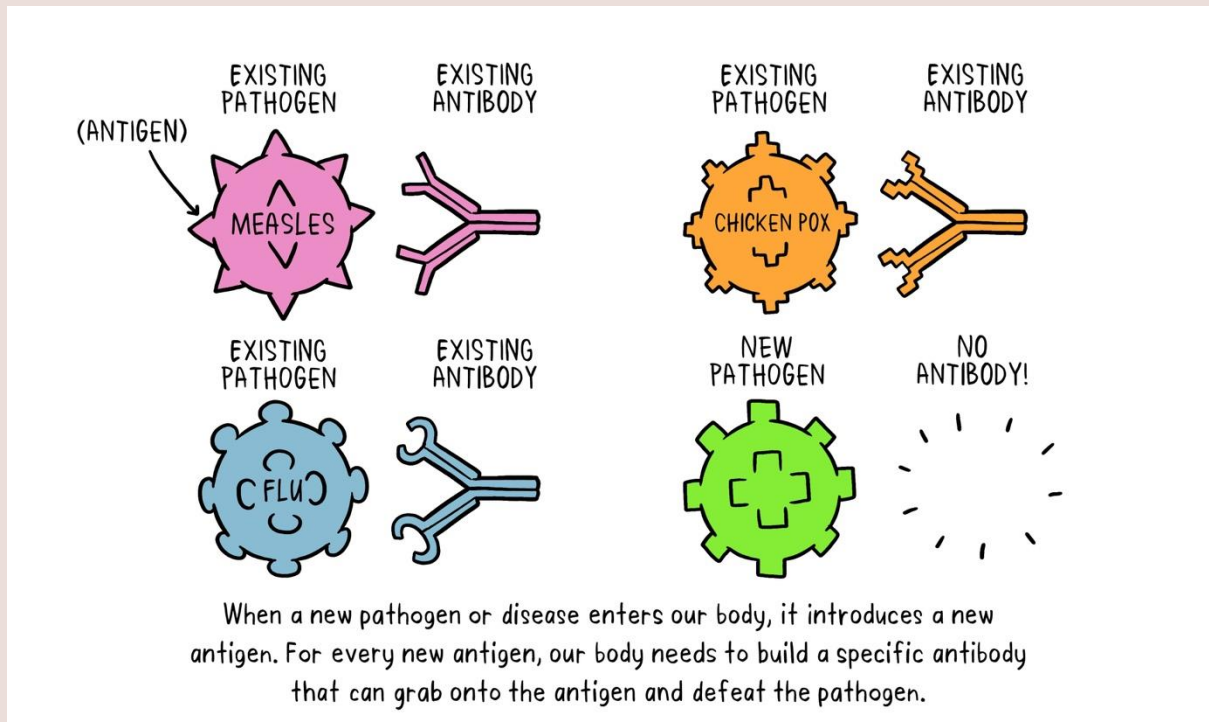
Smallpox is the only human disease that has now been eradicated. From the development of the first-ever vaccine in 1796, World Health Organization declared global eradication of smallpox in 1980.

Mechanism of Action

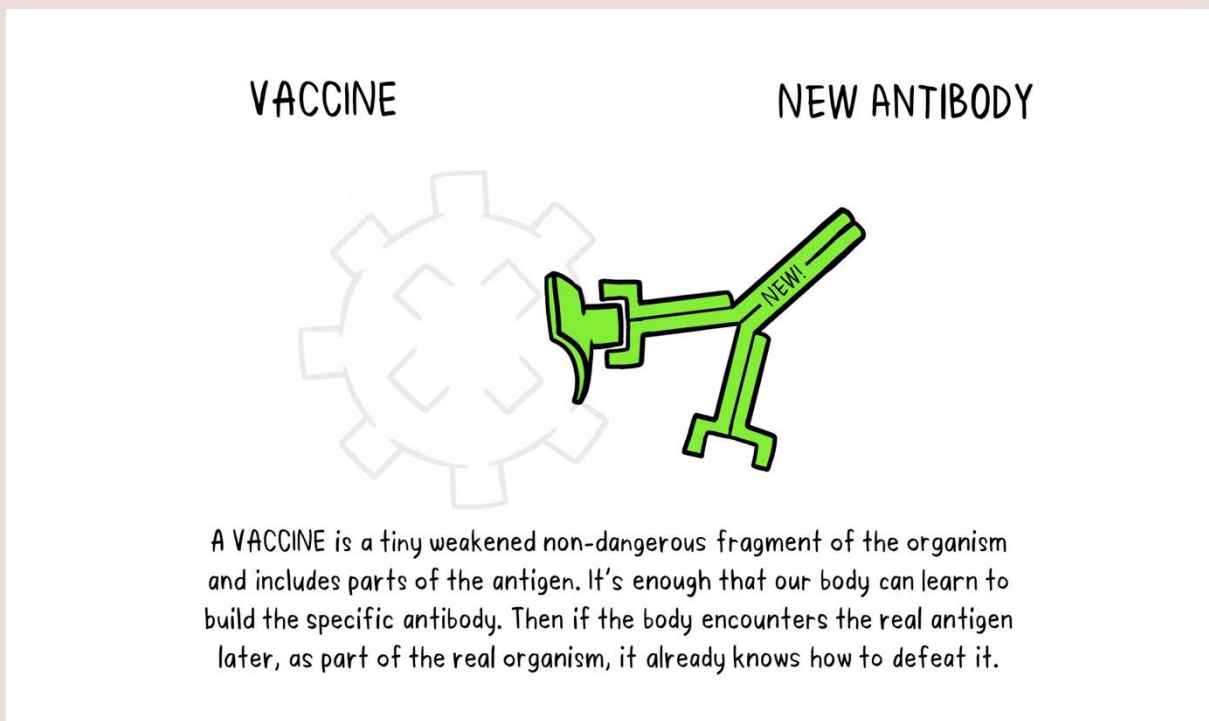
Vaccines are the weakened or inactive components of a selected organism (antigen) that triggers reaction inside the frame. The new vaccines, nowadays, include the blueprint for generating antigens in place of the antigen itself, regardless of whether or not the vaccine is fashioned of the antigen itself or the blueprint, the frame will produce the antibody, this weakened model may not purpose the sickness inside the man or woman receiving the vaccine, however it's going to set off their gadget to retort very just like it would put on its first response to the unique pathogen.

Some vaccines require a couple of doses, given in weeks or months apart. This may be occasionally had to allow for the institution of long-lived antibodies and improvement of reminiscence cells. during this way, the frame receives its education to combat the precise disease-inflicting organism, and later building up reminiscence of the pathogen, so in destiny it unexpectedly combats it if and while uncovered in the destiny.

Mechanism of Action of vaccine is explained here in Figure 1 and Figure 2.



[Figure 1: Source of image: WHO]



[Figure 2: Source of image: WHO]

Development of Vaccine

Most vaccines are in use for past many years. Every vaccine undergoes extensive testing to confirm its safety before introducing country's vaccine programme.

Each vaccine beneath improvement ought to first go through screenings and reviews to peer which antigen ought to be had to invoke a reaction. The preclinical trial is first finished without checking out on humans. An experimental vaccine is first examined in animals to choose its protection and ability to reason disease.

After vaccine triggers an immunologic response, it is then tested in humans in three phases.

Phase I

The vaccine is given to a smaller number of volunteers to check for its safety, to confirm that it generates a response, and determine the correct dosage. Generally during this phase vaccines are tested in healthy adult volunteers.

Phase II

Here vaccine is given to a group of a greater number of volunteers to check its safety when it generates a reaction. During this phase, the study population has the same characteristics (such as age and sex) as the persons who would get the vaccine. Several trials are routinely conducted to check in various age groups and vaccine forms.

Phase III

Here the vaccine is tested for protection in larger group of people. Some are given vaccine, and some are given placebo.

During phase I and phase III studies, both the volunteers and the researchers are not informed about whether they received the vaccination being tested or the placebo. This process is known as "blinding," and it ensures that neither the volunteers nor the scientists are carried away in safety evaluation by knowing who got which product. Volunteers and trial scientists are informed later about who received which product.

Once the results of these clinical studies are out, efficacy and safety reviews are sent for regulatory and public health policy clearances. Each country's officials inspect the study results before deciding whether to use the vaccine. Before a vaccine is licenced and used, it must be proven to be safe and effective in a large population. Only then it will be approved and introduced into a national immunization programme.

Phase IV

Once a vaccine is in use, approved and licensed, it is continuously monitored to make sure it continues to be safe in long time.

Mass vaccination

The concept of herd immunity explains the mass immunisation effort. When a large percentage of a community is vaccinated, the presence of an infectious person among the vaccinated persons interrupts individual-to-individual disease transmission. The number of vaccinated people required to stop transmission is determined by the microbe's infectivity, using these data, crude herd immunity thresholds for potentially vaccine protecting diseases may be understood.

The success of herd immunity depends on the proportion of the population that must be vaccinated to prevent person-to-person transmission. When the minimum threshold is reached, disease transmission ceases, and the epidemic or pandemic is brought to a halt.

Vaccination program for *Diphtheria, Polio, H1N1* has time and again emphasized on the importance of creating herd immunity to limit the spread of the communicable disease.

Importance of vaccination in current COVID-19 pandemic

Brief on Coronavirus

The coronavirus disease 2019 was first identified in patients with severe disease in Wuhan, China. The causative agent was completely a novel coronavirus scientifically named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). They are much capable of mutation. Its symptoms are runny nose, cough, raw throat, headache, and fever which remains for several days. In immunocompromised patients, there's a chance that the virus could cause a lower respiratory disease like pneumonia and bronchitis.

In 2003, the primary pandemic of the 21st century caused was Severe Acute Respiratory Syndrome Coronavirus which appeared first in Guangdong, China, causing 774 deaths and affected 8000 patients. Again in 2012, a strain of Coronavirus evolved in Saudi Arabia which caused East Respiratory Syndrome Coronavirus (MERS-CoV) and approximately 2500 cases were confirmed, including 861 deaths, case–fatality rate being 34.4%.

Current Status of Pandemic

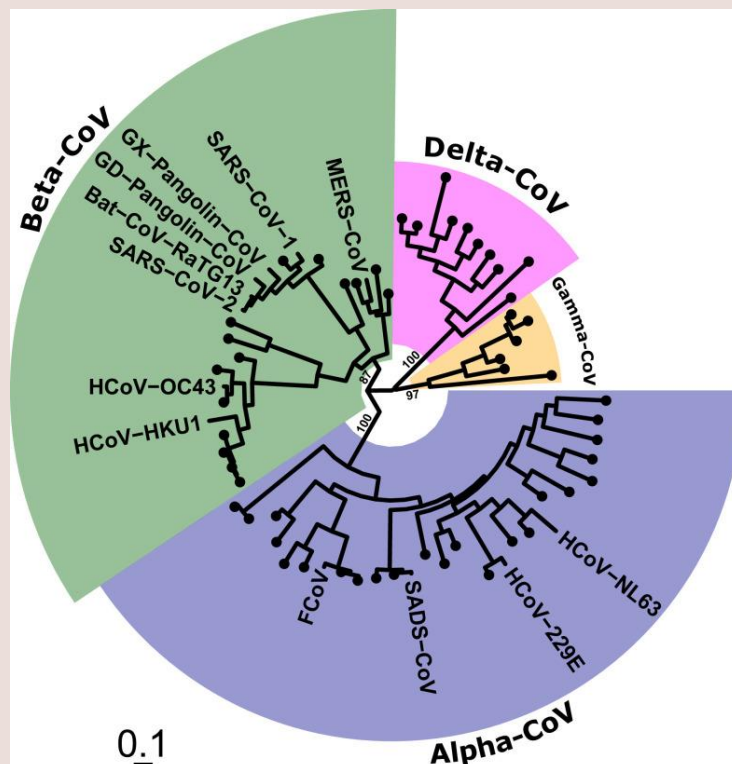
“Globally, as of 1:02pm CEST, 29 June 2021, there have been 181,007,816 confirmed cases of COVID-19, including 3,927,222 deaths, reported to WHO. As of 27 June 2021, a total of 2,660,756,547 vaccine doses have been administered.

Global numbers of cases and deaths continued to decrease over the past week (14-20 June 2021) with just over 2.5 million new weekly cases and over 64 000 deaths, a 6% and a 12% decrease respectively, compared to the previous week. While the number of cases reported globally now exceeds 177 million, the lowest weekly case incidence since February 2021 was reported last week. Globally, mortality remains high with more than 9000 deaths reported each day over the past week, however, the number of new deaths reported in the past week decreased across all Regions except for the Eastern Mediterranean and the African Regions.

In this edition, a special focus update is provided on SARS-CoV-2 Variants of Interest (VOIs) and Variants of Concern (VOCs) Alpha (B.1.1.7), Beta (B.1.351), Gamma (P.1), and Delta (B.1.617.2). This includes updates on emerging evidence surrounding the phenotypic characteristics of VOCs (transmissibility, disease severity, risk of reinfection, and impacts on diagnostics and vaccine performance), as well as updates on the geographic distribution of VOCs.”

[<https://www.who.int/publications/m/item/weekly-epidemiological-update-on-covid-19---22-june-2021>]

The Figure 3 here is showing various strain of Coronavirus



[Source of image: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7470595/>]

Rationale

The pandemic is a situation which has occurred again, almost after 100 years of previous pandemic, The Spanish Flu. The current circumstance is novel for majority of today's population. Though, there are numerous studies on limiting and restricting the pandemic, the present situation differs by multiple prospects.

Mass vaccination and herd immunity is the only focus of the researchers, doctors, and government around the globe. And the large population is presenting a major challenge. From research studies, manufacturing to supply chain, all of these is major setback in achieving the much-needed results.

Social media is one of the major sources of news consumption for past one decade. No matter the source, it spreads in very short span of time. Likewise, any information of Covid vaccines is spreading quick.

Before vaccination drive started, it was found that people were reluctant and sceptical about taking vaccine since it was in research phase and not much was said by researchers and bigger organization.

This study was therefore conducted to understand what people think about the entire vaccine and vaccination campaign after it has started in the country for age group 18 to 45 years, to find out the perception and attitude towards it once they get vaccinated or plan to take in near future.

Study Question

What is the COVID 19 Vaccine related behavior of people in 18 - 45 years age group after the start of vaccination program?

Study Objectives

- A. To study COVID 19 Vaccine related behaviour, for Covid-19 vaccination drive for 18-45 years age group
- B. To review the COVID-19 guidelines post vaccination provided by the Government of India and the states in 18-45 years age group
- C. To understand current vaccine hesitancy among the study population, if any.

Literature Review

COVID-19 vaccine overview

In early December 2020, the first COVID-19 ‘mass vaccination program’ started in India, the number of doses administered is updated daily on WHO website. Almost 13 different vaccines have been in use.

“Globally available vaccine is:

- The Pfizer/BioNtech vaccine was listed for WHO Emergency Use Listing on 31 December 2020.
- The SII/Covishield and AstraZeneca/AZD1222 vaccines (developed by AstraZeneca/Oxford and manufactured by the State Institute of India and SK Bio respectively) were given EUL on 16 February.
- The Janssen/Ad26.COV 2.S developed by Johnson & Johnson, was listed for EUL on 12 March 2021.
- The Moderna COVID-19 vaccine (mRNA 1273) was listed for EUL on 30 April 2021.
- The Sinopharm COVID-19 vaccine was listed for EUL on 7 May 2021. The Sinopharm vaccine is produced by Beijing Bio-Institute of Biological Products Co Ltd, subsidiary of China National Biotec Group (CNBG).
- The Sinovac-CoronaVac was listed for EUL on 1 June 2021.”

Types of developed COVID-19 vaccine

Scientists round the clock are growing many effective vaccines for COVID-19. These vaccines are all manufactured to train the body’s immune device to respond, apprehend and stop the virus that cause infection.

Several distinct kinds of vaccines for COVID-19 are in development, including:

- ***Inactivated or weakened virus vaccines***, which use a form of the virus that has been weakened or inactivated so it does not create any disorder, however it generates an immune response.
- ***Protein based vaccines***, use weak fragments of protein that mimic the COVID-19 virus so that it soundly produces an immune response.
- ***Viral vector vaccines***, which use a secure virus that does not create disorder however serves as a platform to supply virus proteins which generate an immune response.
- ***RNA and DNA vaccines***, a current method that makes use of genetically modified RNA or DNA to generate a protein that adequately activates an immune response.

The benefits of getting vaccinated

The COVID-19 vaccinations provide protection against the sickness. There is a reduced risk of increasing contamination and its repercussions while developing immunity by vaccination. If someone is exposed to the virus, this immunity allows them to fight it. Getting vaccinated can also protect others around us from getting infected. This is especially essential to shield humans at expanded hazard for excessive contamination from COVID-19.

Eligibility for taking vaccine

The COVID-19 vaccines are secure for maximum human beings 18 years and older, inclusive of people with pre-present situations of any kind, inclusive of auto-immune disorders. These situations are hypertension, diabetes, pulmonary, liver and kidney disease, asthma, or other co-morbidities.

Side effects of COVID vaccine

Like any vaccine, COVID-19 vaccines can create slight outcomes, together with a low-grade fever, body pain or redness and soreness at injection site. Most reactions to vaccines are slight and leave inside some days on their own. More extreme or long-lasting aspect outcomes to vaccines are viable however extraordinarily uncommon. Vaccines are always monitored for so long as they are in use, to hit upon uncommon damaging activities and enforce techniques to restriction their occurrence.

The possibilities of any of those aspect outcomes following vaccination vary in keeping with the unique COVID-19 vaccine. However, fever, fatigue, headache, muscle ache, chills, diarrhea, and ache on the injection site are noticed.

Having side effects suggest vaccine is working

The vaccine stimulates the immune system to defend from the virus. This may cause fever, chills, or headache. The presence or importance of the response vaccination does no longer expect or replicate your immune reaction to the vaccine. Symptoms does not explain the functionalities of vaccine.

Difference in side effects of vaccine if any

The impact of the COVID-19 vaccine varies from individual to individual. As more people get vaccinated, researchers will be capable of decide patterns. This statistic will take time to be gathered and shared, however for now, we cannot assume who can also additionally have side effects.

COVID positive and vaccination

Even when the person already had COVID-19, they must be vaccinated while it's far presented to them. The safety that a person profits from having COVID-19 will range from individual to individual, and its additionally not understood how long herd immunity would possibly last.

Time needed for COVID-19 vaccine to stop pandemic

The impact of COVID-19 vaccines on this ongoing pandemic will depend on multiple factors. These include:

- effectiveness of the vaccines
- time taken for approval, manufacturing, and delivering
- development of other variants and
- number of people getting vaccinated in short span

Several COVID-19 vaccines have showed high efficacy in clinical trials. COVID-19 vaccinations, like other existing vaccines, will not be completely effective. WHO is aiming to get vaccines approved as quickly and effectively as possible, to have the most impact on the pandemic and bring it to an end as soon as feasible.

COVID-19 vaccine; long term impact

COVID vaccinations have only recently been developed, thus it is early to say how long COVID-19 vaccines will protect us. Various studies are being conducted to answer a variety of vaccine-related questions. However, existing data suggest that most patients recovering with COVID-19 generate an immune response that gives protection against the virus for a period and need to wait for its long-term protection again the infection.

Taking precaution after being vaccinated

COVID-19 vaccination protects against serious illness and death. It ***does not provide major protection for the first fourteen days after receiving a vaccination***, but it gradually improves. Immunity in single dose vaccine usually develops two weeks following inoculation. Both doses for two-dose vaccine are required to get the highest level of protection.

While a COVID-19 vaccine protects from major illness and death, more research is needed to know about the extent to which it provides protection from being infected and its transmission. The research data from various countries shows that the vaccines that are currently in use are protecting against severe disease and hospitalization.

The ongoing studies suggests that vaccines offer a few safeties from contamination and transmission, however that safety is much less than that for extreme contamination and death. Researchers are gaining knowledge of additionally approximately the editions of problem and whether the vaccines are as protecting in opposition to those lines because the non-version virus. For those reasons, and at the same time as lots of the ones withinside the network will not but be vaccinated, retaining different prevention measures is essential mainly in groups wherein SARS CoV-2 circulate is significant. To assist hold you and others safe, and at the same time as efforts hold to lessen viral transmission and ramp up vaccine coverage, ***must need to keep as a minimum a 1-metre distance from others, in enclosed, busy, or poorly ventilated settings, covering a cough or sneeze with elbow, ease arms regularly, and wearing a mask. Always follow the advice of your local government***, which is based entirely on the situation and threat in particular location.

Different dosage from different vaccines

There is not much data available on this currently and the research is ongoing.

Vaccine for children

Vaccines were examined in adults first, and handiest later assessed in youngsters whilst protection has been validated in adults. COVID-19 has additionally been a greater extreme and perilous sickness amongst older human beings.

The WHO's Strategic Advisory Group of Experts (SAGE) has determined that the ***Pfizer/BionTech vaccine is safe for children aged 12 and up***. Children between the ages of 12 to 15 who are at a higher risk of infection that can be given this vaccine along with other prioritization companies for vaccination. Vaccine trials for children are ongoing, and the World Health Organization will replace their pointers while the proof or epidemiological scenario justifies an alternate in policy.

While the delivery of vaccines is limited, the continued precedence is to vaccinate the ones maximum susceptible to extreme contamination who nevertheless have now no longer been vaccinated in lots of parts of the world: older human beings, people with continual fitness conditions, and fitness workers.

Most youngsters are at low risk of great sickness and vaccinating them is in the main approximately decreasing transmission, which also can be finished through public measures, including bodily distancing from others, cleansing fingers frequently, sneezing and coughing into their elbow, sporting a mask if age suitable and heading off crowded, poorly ventilated spaces.

Chance of getting infected post-vaccination

While COVID-19 vaccines have good efficacy, especially against hospitalization and severe disease, no vaccine is 100% protective. As a result, there will be some small percentage of vaccinated people who fall ill with COVID-19 despite being vaccinated.

In addition to a vaccine's specific characteristics, several factors such as a person's age, their underlying health conditions, previous COVID-19 disease, current exposure to SARS-CoV-2, or the circulation of virus variants may have an impact on a vaccine's effectiveness. It's not known how long immunity will last from different COVID-19 vaccines. That is one reason why, even as COVID-19 vaccines are being rolled out, we must continue using all public health measures that work to decrease exposure risk, such as physical distancing, masks, and handwashing.

Protection against variants

More research needed to investigate the effectiveness of the modern-day COVID vaccines in opposition to the versions. A developing frame of statistics indicates that maximum vaccines stimulate sufficient immunity to keep massive efficacy in opposition to maximum versions, for intense disorder, hospitalization, and death. The effect of the versions on efficacy in opposition to moderate disorder and in opposition to contamination without disorder is greater impacted than for the greater intense outcomes.

The purpose of vaccines is to drastically keep safety in opposition to disorder is probably associated with the large immune reaction they induce, because of this virus modifications or mutations vaccine will not be effective. If any of those vaccines emerge as much less powerful in opposition to one or greater versions, it is going to probably be feasible to alternate the composition of the vaccines to guard in opposition to those versions, but this may take time and extra statistics to absolutely evaluate. Data remains accumulated and analyzed on new versions of the COVID-19 virus.

Currently available vaccines in India

There are 3 vaccines currently available in India specifically for COVID-19 pandemic. They are:

- COVISHEILD
- COVAXIN
- SPUTNIK

COVISHEILD

- This Covid-19 vaccine was developed by Oxford University in partnership with British-Swedish firm AstraZeneca and in India it is manufactured by Serum Institute of India (SII), Pune.



[Source of image: <https://www.indiatoday.in/coronavirus-outbreak/story/covid-vaccines-india-price-availability-dose-gap-1821594-2021-07-01#covishieldmadeby>]

- It's built on the viral vector platform, which is generated from a **weakened variant of a common cold virus (known as an adenovirus)** that infects chimps. It has rebuilt to resemble coronavirus; however, it is incapable of causing illness. The virus that is introduced into the body tells the body to fight off other viruses like it.
- The vaccination course consists of two doses of 0.5 ml each. The second dose is given **between 12-16 weeks after the first dose**, as per the latest Union Health Ministry guidelines. The Centre has allowed students who need to go on foreign travel for education to receive the second dose within a gap of 28 days.

- Vaccine is being given for free at government vaccination centers, while at private hospitals, it is given for Rs 780 which includes Rs 150 as GST.
- According to AstraZeneca, primary analysis of Phase 3 clinical trials said that the vaccine was 76% effective against symptomatic Covid-19 and with a dose interval of 12 weeks or more, vaccine efficacy was found 82%.
- This has received authorization from World Health Organization. Countries like South Korea, Dubai, Switzerland, and 7 EU nations have opened their borders to Indians who completed both doses with it.

COVAXIN

- Covaxin is an indigenous vaccine developed by Hyderabad-based Bharat Biotech International Limited in collaboration with the Indian Council of Medical Research (ICMR) and National Institute of Virology, Pune (NIV).



[Source of image: <https://www.indiatoday.in/coronavirus-outbreak/story/covid-vaccines-india-price-availability-dose-gap-1821594-2021-07-01#covishieldmadeby>]

- It's an inactivated coronavirus vaccination made consisting of destroyed coronaviruses that can't infect or multiply. Human cells identify the dead virus after being injected, prompting the immune system to produce antibodies against SARS-CoV-2.
- Covaxin is administered in two doses given at an interval of 28 days or four weeks.
- It is being given for free at government vaccination centers while at private hospitals, the charges are Rs 1,410. This includes Rs 150 in GST.

- Data collected from the Phase 3 trials of Covaxin showed that the vaccine is 77.8% effective. Preliminary Phase 3 trial data, however, put the efficacy rate at 81%
- It has received regulatory approval from 13 countries by now, including Iran, Philippines, Mauritius, Mexico, Nepal, Guyana, Paraguay, and Zimbabwe.
- It is still waiting for approval from the World Health Organization (WHO). For now, most countries will treat those administered with Covaxin as "not vaccinated".
- Bharat Biotech is presently conducting trials of Covaxin on 2-18-year-olds and not authorized for children yet.

SPUTNIK-V

- The Sputnik V vaccine is developed by Gamaleya National Research Institute of Epidemiology and Microbiology in Moscow, Russia, in partnership with the Russian Direct Investment Fund (RDIF).
- Dr Reddy's Laboratories in Hyderabad distributes it in India. For its manufacture, RDIF has partnered with Hetero Biopharma, Gland Pharma, Stelis Biopharma, and Virchow Biotech, all of which are based in India.



[Source of image: <https://www.indiatoday.in/coronavirus-outbreak/story/covid-vaccines-india-price-availability-dose-gap-1821594-2021-07-01#covishieldmadeby>]

- Sputnik V is also a viral vector vaccine. However, the Sputnik V vaccine **uses two human recombinant adenovirus vectors** for its two doses, aimed at providing longer protection. The vaccine delivers an information for making the coronavirus spike

protein. So, when the actual virus enters the body, it forms an immune response in the form of antibodies.

- The Sputnik V vaccine is administered in two doses at a gap of 21 days.
- Currently, Sputnik V is not available at government centers. Dr Reddy's has partnered with major hospitals all over the country, including chains like Apollo, Medanta, Fortis Healthcare for vaccine roll out.
- The government has priced the vaccine at Rs 1,145 per dose, including GST.
- According to results published in The Lancet, efficacy of Sputnik V was 91.6% after Phase 3 trials.
- It has been authorized in over 60 countries, including Argentina, Bolivia, Serbia, Hungary, the UAE, Iran, Bahrain, Egypt, Iraq, Myanmar.
- It has not been approved by the EU's European Medicines Agency or the World Health Organization (WHO) and so, Indians vaccinated with Sputnik V allowed in most countries.

Registration for vaccine slots

For taking vaccination in India, it is mandatory to register on the website of Co-Win by Ministry of Health and Family Welfare. The official numbers are:

- Co-WIN Registrations - 36.94 Crores
- Vaccinations Delivered - 35.61 Crores
- Fully Vaccinated - 6.61 Crores

(Till 6th July 2021)

Another official website, Arogya Setu, is also linked to the Co-Win portal for registration.

These websites enable prior registration to get vaccinated. It requires basic profile details and asks for pin code of the area for suggesting nearby vaccination centers. It shows the available vaccine at the center too. By registering, certificate is generated mentioning every detail for the individual.

And post vaccination, another certificate is generated showing completion of 1st dose or both dosages, depending upon the situation.

Start of vaccination for 18-45 years in India

- In India, Covid-19 vaccination campaign on January 16, 2021 with two available vaccines then, Covishield and Covaxin.

- On March 1, the second phase of the Covid-19 immunization campaign to protect persons over 60 and those over 45 with comorbidities from the coronavirus began.
- The 3rd phase began on April 1 for all above 45 years of age.
- The vaccination campaign for the age between 18 to 45 years started on 1st May 2021, in India.

Methodology

Study Area

This study was conducted to understand the change in vaccine related behavior of people across the country.

Study Respondents

The persons in the age group of 18 – 45 years belong to India

Study design

During the month of June 2021, this cross-sectional survey was done utilizing a self-administered questionnaire that was delivered via emails (Gmail and Outlook) and online social networking platforms such as WhatsApp and Facebook. The participants were given information regarding the objective of the study.

Sampling and Sample Size

Convenience sampling was done. Inclusion criteria was people belonging to age groups 18 to 45 years whether taken COVID-19 vaccine and if not taken. Exclusion criteria were people of age above 45 years and below 18 years.

The total number of responses were 172. However, based on the inclusion criteria, 158 responses were analyzed for their responses.

Data Collection Methods

The data was collected utilizing a self-administered questionnaire via various online platforms like Gmail, Outlook, WhatsApp, and Facebook.

Data Collection Tool

Questionnaire

The outline of the questionnaire was prepared to capture their knowledge, perception, and prospects on vaccination. The questionnaire comprised of major sections that collected data on:

- socio-demographic details of the respondents
- perception on COVID-19 vaccine safety
- willingness and potential barriers to get vaccinated
- preference of vaccines available currently in India and globally
- side effects of taking vaccine
- safety from COVID-19 infection post vaccination
- perception on following the COVID-19 safety guidelines post vaccination

- experience at vaccination centers in vaccinated respondents
- preference of vaccination centers in non-vaccinated respondents
- opinion on increasing vaccine dosage duration
- opinion on taking 2 separate dosages from 2 different vaccine
- opinion on predicted 3rd wave

The logic testing questionnaire was prepared on Google forms. Questions were asked as single select and multi select. Few questions were based on Likert's scale to capture the response better.

Pilot-testing

The questionnaire was initially circulated among few respondents to check for the needed correction in the format and whether it is collecting appropriate responses for which the study was designed.

Data Collection Process

The Google form on questionnaire was circulated online via different platforms to collect responses. The form link was kept open from June 01 to 30, 2021

Data Cleaning

The total collected response were 172. Out of these, those respondents of age more than 45 years and below 18 years were filtered. 1 response was captured twice, of which 1 was removed. After filtering out the responses, final number of respondents were 158.

Data Analysis

The data was analyzed using the MS excel. The data collected were analyzed using descriptive statistics including percentage, mean and standard deviation and Chi square hypothesis testing.

Results

To study Covid-19 Vaccine related behavior among the respondents

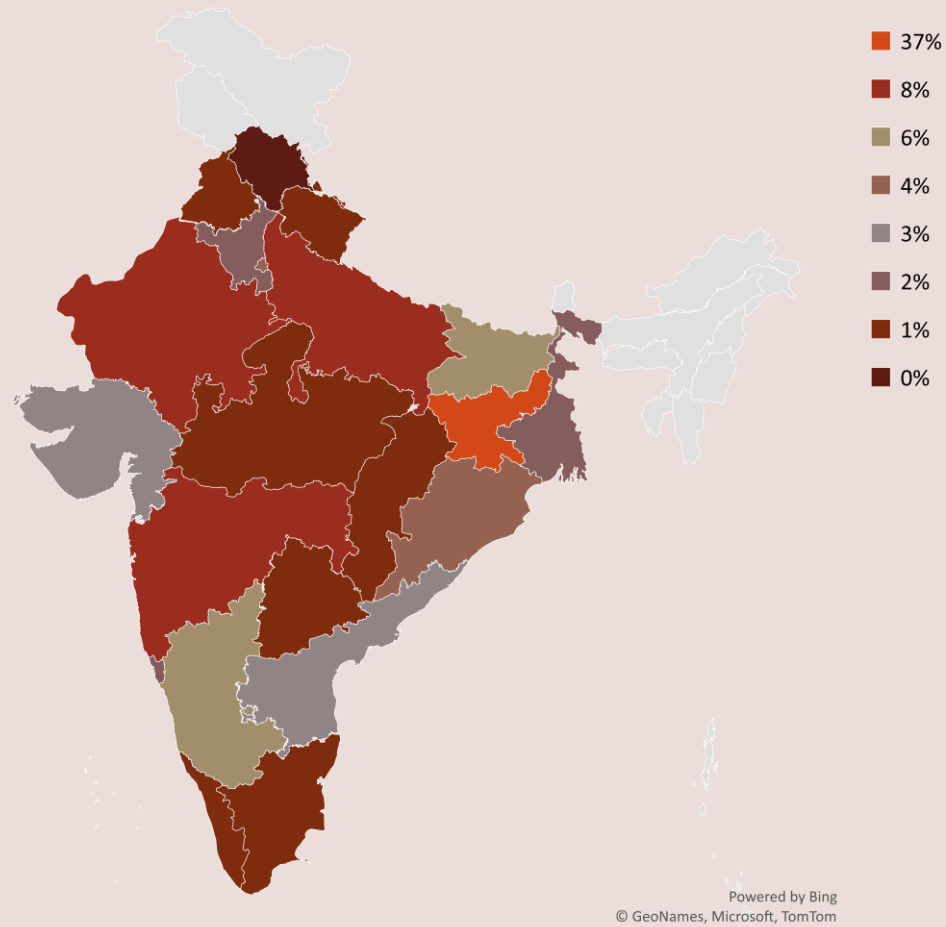
Socio-demographic description of the respondents

This section gives an overview on respondent's general profile, their age and sex, geographical location, education qualification and job profile. Table 1 results revealed that out of 158 respondents were analyzed for their responses, 54% were male and female constituted 46%. Majority of the respondents (84%) belonged to the age group that extended between 20 years to 35 years followed by 36 years and above who were 13% of the study population.

Table 1: Percent distribution of the respondents by their age and sex (n=158)			
Age in years	Male	Female	Total
Below 20	1	6	3
20-25	31	35	33
26-30	26	31	28
31-35	20	26	23
36-40	17	1	10
41-45	5	1	3
Total number of respondents	86 (54)	72 (46)	158 (100)
Mean Age: 29±6 years			

Among the study population, 37% of the respondents belonged to the state of Jharkhand. Majority of the individuals participated in the online survey was from Eastern India (49%) while the remaining participants belonged to Central (15%), Western (13%), Southern (12%) and Northern (11%) India. (Figure 4)

Figure 4 Percent distribution of the respondents by their Geographical location (n=158)



Most of the respondents, 96% of the population had university degree (graduates and above) and remaining 4% were not graduate as shown in Table 2. However, qualification of majority of respondents were postgraduate and above (49%) and graduates made up to 46% of the study population.

Table 2: Percent distribution of the respondents by their qualification (n=158)	
Education level	% of respondents
12 th standard	4
Graduate	46
Postgraduate & above	49

Among the study population, 61% were salaried, 32% were students while the other 4% were involved in business and remaining 3% were not working. (Table 3)
Among the total respondents, there were 22% healthcare professional as well.

Table 3: Percent distribution of the respondents by their occupation (n=158)	
Occupation	% of respondents
Salaried	61
Student	32
Business	4
Unemployed	3

Out of the total 158 respondents, 58% were vaccinated either by 1st dose of Covid vaccine or completed both the dosage. Those taken the 2nd dosage of vaccine (11.4%) were the healthcare professionals. And 42% of the study population had not taken the vaccine dosage by the time when this study was conducted.

Barriers in getting vaccinated

Out of those respondents who did not get vaccinated, 62% respondents (65% men) mentioned of the unavailability to slots for taking vaccination. About 26% of the respondents mentioned of getting infected with Covid-19 and therefore not found eligible according to GOI guidelines. Such persons who got infected may get vaccinated after 90 days only. 6% of the study population (more women) could not find the vaccine of their preference. About 4% of the respondents didn't know the how to register and place for vaccination. (Table 4)

Table 4: Percent distribution of the respondents who did not take 1 st dose of vaccination by reasons (n=67)			
Reasons for not taking vaccine	% of respondents	Male %	Female %
Unavailability of vaccination slots	62	65	57
Not eligible according to Covid guidelines for vaccination by GOI	26	24	27
Preferred vaccine was not available	6	3	10
Did not wish to take vaccine	3	3	3
Did not know how to register	2	3	0
Did not know place of vaccination	2	0	3

Perception among the respondents on Covid-19 vaccine safety

This section studies the perception of respondents on vaccine efficacy and safety in general and change of opinion after being vaccinated, if any. About 78% respondents were confident that the COVID-19 vaccination will increase immunity against covid infection while others remained neutral on it. However, among 91 respondents who had the 1st dose, 57% felt safe and 34% were found to be neutral. (Table 5)

Table 5: Percent distribution of the respondents by their rating on scale of 1 to 5					
Attributes	Least confident 1	Less confident 2	Neutral 3	More confident 4	Most confident 5
Increasing immunity after vaccination (n=158)	2	1	19	34	44
Feeling safe after 1st dose (n=91)	2	8	34	27	30

Preference of vaccine in respondents

Among the available vaccines in India while this study was conducted, out of 91 vaccinated respondents, 82% shared that they got preference vaccine. Most of the respondents (80%) preferred Covisheid followed Covaxin (17%) and Sputnik (3%). However, Sputnik was made available very late while the study was conducted. (Figure 5). Among non-vaccinated study respondents, 40% respondents preferred to take jab of Covisheid, followed by Covaxin (35%) and Sputnik (25%)

However, among the globally available vaccines, Covaxin was the preferred vaccine in 30% of the study population and Pfizer was second most preferred vaccine with 27% respondents. 23% study population said Sputnik to be their preferred vaccine globally. Oxford AstraZeneca was preferred by 13% of the respondents when asked among all global vaccine, on the contrary, where 80% of the vaccinated participants previously mentioned it their preferred vaccines amongst available currently in India. Johnson & Johnson (4%), Moderna (2%) and Sinopharm (1%) are some other preferred global vaccines. (Figure 6)

The preference of global vaccines among Graduates and Postgraduates were observed to be same and there was no significant difference noticed. (Table in annexure)

Figure 5 Percent distribution of vaccinated respondents who got their preferred vaccine (n=91)

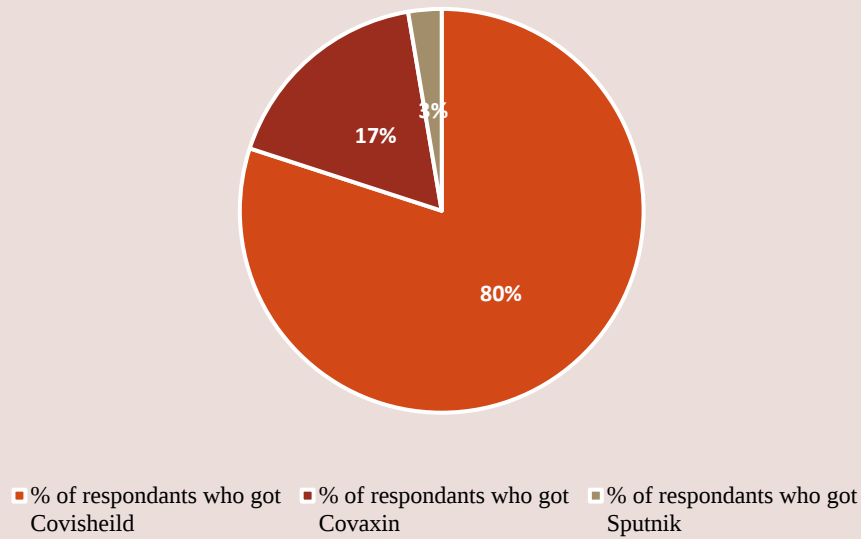
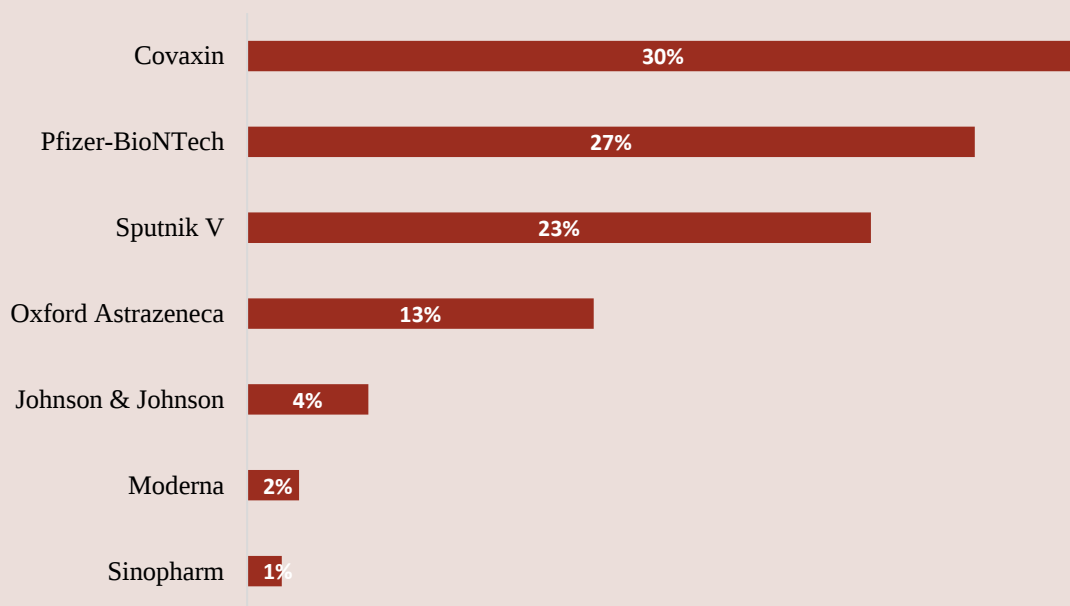


Figure 6 Percent distribution of respondents according to their preference of globally available vaccines (n=158)



Post vaccination symptoms among respondents

Post vaccination symptoms like mild to moderate fever (54%), severe fever (4%), body pain (46%), and weakness (45%), were reported by the respondents. In addition, headache (33%), nausea (10%) and pain or soreness at injection site (4%) were also reported. About 38% of the participants said to have taken medication for these symptoms. (Table 6)

Table 6: Percent distribution of the respondents by their symptoms post-vaccination (n=91)	
Symptoms (Multiple responses)	% of respondents
Fever (mild & moderate)	54
Weakness	45
Body pain	46
Headache	33
Nausea	10
Pain & soreness at injection site	4
Severe fever	4
Other; Hypertension Shoulder pain, Blood clot	13
No noticeable effects	13

Experience of respondents with the vaccination centres

Most of the respondents (74%) availed vaccine from the government health or vaccination centers while about 26% from the private centers. Majority of respondents were very satisfied with the overall process of vaccination at both the centers.

For those who will avail vaccine in future, they shared that Government center was the preferred place (58%), while 23% respondents suggested that session should be arranged at their community. Private vaccination centers were choice of 11% of the population and 8% of population found door to door vaccination campaign as one of the options. (Table 7)

Table 7: Percent distribution of the respondents by their preference of vaccination center				
Different segment of respondents	Government vaccination center	Private vaccination center	Community arrangement	Door to door service
Vaccinated (n=91)	74	26	N/A	N/A
Non vaccinated (n=67)	58	11	23	8

Perception on Covid-19 guidelines post-vaccination provided by the Government of India and the states

This section explains about the perception of the respondents on Covid-19 guidelines by central and state government.

Almost all respondents (97%) found it essential to follow Covid guidelines. Maintaining social distancing, wearing masks, following proper hygiene methods and self-awareness was found important even post vaccination.

Perception on vaccine hesitancy among the study population, if any.

This section shows the perception of respondents about increasing gap between the two dosages of vaccine.

Majority of the study population (45%) found increasing gap between the two dosages of vaccine as doubtful. 31% of the study population agreed to the fact that Corona virus is new and hence it requires lot of research and studies. And the change in interval is result of these. And 24% respondents found it to be due to shortage of vaccine supply in the country. (Table 8)

Table 8: Percent distribution of respondents by their understanding on increasing interval between 2 vaccine doses (n=158)	
Reasons for increasing interval	% of total respondents
Depends on ongoing research and studies since this virus is new	31
Shortage of vaccine supply in the country	24
No comments	21
It is not worth waiting	9
Situation is doubtful	8
Interval should be re-analyzed	6
No good reason noticed	1

Perception of the respondents towards prevention of the 3rd wave of Covid-19 infection

Since researchers and doctors are predicting 3rd wave in India, this section shows the perception of respondents on measures to control or restrict predicted 3rd wave.

Out of 112 responses here, 56% of the study population suggested of following proper Covid guidelines and 25% found maintaining proper hygiene as better precaution. 26% respondents found mass vaccination, a solution to prevent or limit 3rd wave of Covid infection. Staying indoor and being self-aware (12%) and lockdowns (7%) presented as another measure to prevent it. Better management is expected from government and healthcare facilities by 5% of the respondents along with ban on in and out foreign travel (1%). However, 5% also believes that it cannot be controlled due to viral mutation and changing its strain. (Table 9)

Table 9: Percent distribution of respondents by their understanding on 3rd covid wave prevention (n=112)

Measures to be taken (Multiple responses)	% of total respondents	Total respondents
Following proper covid guidelines	56	63
Mass vaccination	26	29
Proper hygiene maintenance	25	28
Staying indoor/self-awareness	12	13
Lockdown in state/country	7	8
No idea	7	8
Better management by government/health facility	5	6
It cannot be controlled due to changing virus strain	5	6
Ban on foreign in/out travel	1	1

Discussion

“Vaccination is one of the game-changing health sector intervention in the 21st century. Despite the benefits of vaccination, this fundamental health protecting tool is facing many obstacles globally. Many factors like geography, time, social class, contextual human behavior, and ethnicity are affecting the acceptance of vaccination among the population. It has been reported that public perception of the benefits and relative risks of vaccination is a major obstacle for vaccine acceptance”.

This study has minor constraints because it was conducted utilizing an online self-administered questionnaire. Multiple factors, such as internet availability and social media platform access, may have impact on the survey population. As a result, prejudice in reporting must be considered. Further discrepancies in response rates were identified across different regions, majority being from Eastern India (49%).

The study population was highly educated population (96%) and almost 84% of the respondents belonged to the age category that spanned from 20-35 years. Random sampling technique was chosen for study population.

Understanding the attitude and perception towards vaccination drive:

The study revealed that the participants initially were confident on increasing immunity post vaccination (78%), however, after taking the 1st dose of vaccine, when asked how safe they felt from Covid infection, the percentage value came down to 57%. It reveals little unsatisfied behavior of the participants towards vaccine.

Major challenge among the study population emerged to be difficulty in getting available slots for vaccination (62%). The reason behind this is could not be covered in this study and was beyond the scope, this would require another research to reach to the root cause.

Covisheild was the preferred vaccines amongst the three available vaccines in India by now followed by Covaxin. Similar pattern was observed in healthcare professionals as well. However, when asked about preference amongst globally available vaccine, there were no clear winner, but Covaxin secured the maximum percentage with 30%. Oxford AstraZeneca was preferred by 13% of the respondents when asked among all global vaccine, on the contrary, where 80% of the vaccinated participants previously mentioned it their preferred vaccines amongst available currently in India.

Post vaccination symptoms varies with individuals, fever, body pain, weakness, headache is few of the reported symptoms. But this does not indicate the efficacy of vaccine, as also specified by WHO and it needs to be conveyed in crisp and concise manner. Satisfaction level with the vaccination center was found good among study population, but there were few (almost 30%) who had better expectation by the management.

Following Covid-19 guidelines post vaccination

Almost all respondents (97%) found it essential to follow covid guidelines post vaccination too. Maintaining social distancing, wearing masks, following proper hygiene methods and self-awareness was found important even post vaccination to prevent further transmission of the infection.

Current vaccine hesitancy among the study population

Though people are willingly taking vaccine, it was found that there is still some doubt regarding its effects and long-term protection. The study focuses on the attitude of the study population regarding increase in interval between dosage, where only 31% accepts that the change is due to new research results coming up, whereas all others were skeptical on this matter and found this situation doubtful and concerning. Moreover, 24% respondents even said that the increase in interval is due to supply chain issues. More and correct information on this matter is needed to give clear understanding of the current scenario.

When talking about predicted 3rd wave, mass vaccination does have a role to play (26%) to restrict it, but major suggested attempts emerged to be maintaining social distancing, wearing proper mask, following hygiene practices and other Covid guidelines by the government. Self-awareness reflected to be the key to protect from the predicted danger.

Conclusion

Covid-19 vaccine acceptance is determined by individual's attitude, perception, and knowledge. It was noticed that despite all the measures taken by the governments and higher organization, not much change is noticed in their perception towards entire vaccination drive.

There is not one complete solution to the pandemic situation, and it needs to be conveyed in appropriate method to one and all. Lack of authentic information emerged to be major problem. People who are vaccinated are not much sure of their protection against further infection and those who dint take vaccine however willing to take, still not confidence about its efficacy and safety.

On one hand people are taking vaccine, on the other, they are not properly convinced about its efficacy and safety, however, vaccine hesitancy has decreased as more people are willingly taking vaccine dosages.

By impeding the process, these concerns have the greatest potential to sabotage the efforts of researchers and organisations like the World Health Organization (WHO) to disseminate the vaccine. Furthermore, if future studies can demonstrate the safety and long-term effectiveness of current vaccines, public acceptance of vaccines can be improved. More research, especially with a bigger sample size.

A gap is seen between communication of information which must be bridged for better protection against future infection surge.

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Annexure

Understanding the preference of global vaccines among Graduates and Postgraduates

Null Hypothesis: The preference of global vaccines among Graduates and Postgraduates are same

Alternate Hypothesis: The preference of global vaccines among Graduates and Postgraduates are not same

Chi Square table						
		Sputnik	Pfizer	Covaxin	Oxford AstraZeneca	Total
Observed Count (Oi)	Among Graduates	17	18	24	11	70
	Among Postgraduates	19	23	19	8	69
	Total	36	41	43	19	139
Expected Count (Ei)	Among Graduates	18	21	22	10	
	Among Postgraduates	18	20	21	9	

So, by the chi-square test formula for that particular cell in the table, we get;

$$= (\text{Observed} - \text{Expected})^2 / \text{Expected Value}$$

Therefore, after calculating all values, we get;

		Oi-Ei	Oi-Ei square	(Oi-Ei square)-Ei
Graduates	Sputnik	-1.1	1.3	0.1
	Pfizer	-2.6	7.0	0.4
	Covaxin	2.3	5.5	0.3
	Oxford AstraZeneca	1.4	2.0	0.1
Postgraduates	Sputnik	1.1	1.3	0.1
	Pfizer	2.6	7.0	0.4
	Covaxin	-2.3	5.5	0.3
	Oxford AstraZeneca	-1.4	2.0	0.1
X ² (chi squared)				1.8

So, calculated chi squared (X^2) = 1.8

Degree of freedom = (No. of rows - 1) * (No. of columns - 1)
= (2-1) * (4-1)
= 3

So, df 3, 0.05 (from table) = 7.45

Since, calculated value (1.8) is less than the estimated value (7.45), we accept the null hypothesis that the preference of global vaccines among Graduates and Postgraduates are same, and no significant difference noticed.

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