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### RESEARCH ARTICLE

#### A COMPARISON OF SERUM ANTIBODY LEVELS IN VACCINATED PEOPLE OF DISTRICT SHOPIAN WHO HAVE TAKEN ONE OR TWO DOSES OF COVISHIELD VACCINE WITH THE UNVACCINATED ONES

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#### Abstract

**Background:** Covid-19 disease emerged nearly two and a half years back and lead to a pandemic whose severity ranged from a mild to a severe disease, those who were vaccinated had an asymptomatic infection or had a mild variety of the disease.

**Objective:** We aimed to compare the serum antibody levels in vaccinated and unvaccinated subjects.

**Method:** Antibody levels in vaccinated and unvaccinated subjects were measured and compared.

**Results:** Of the 200 subjects, the vaccinated subjects had a higher antibody level (mean 5616.13 AU/ml) against the unvaccinated subjects (mean 181.22 AU/ml), hence a greater protection against the Covid.

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#### Introduction:-

##### Corona Virus Introduction.

Corona viruses are enveloped viruses of around 80-220 nm size and possess a single-stranded positive-sense RNA genomes and received huge attention during the SARS outbreak in 2002-2003, which resulted in death of around 800 in approximately 30 countries<sup>1</sup>. In 2012, another type of Corona virus called MERS-CoV (Middle East Respiratory Virus- Corona virus) originated in the Middle East infecting around 2000 individuals worldwide. Almost all MERS-CoV infected cases reported outside of the Middle East were related to travel in the Arabian Peninsula<sup>2</sup>. Some seventeen years after the epidemic of SARS which originated in China yet another important novel corona viral zoonosis emerged in December 2019, again in China in the city of Wuhan, the capital of Hubei province which spread nearly to whole of the world<sup>3, 4</sup>. It led to pneumonia and sequencing analysis from lower respiratory tract samples identified a virus causing severe acute respiratory syndrome (SARS)<sup>5</sup>. The SARS-CoV and MERS-CoV corona viruses cause acute lung injury and acute respiratory distress syndrome which can lead to respiratory failure and death. The viruses were thought to infect only animals until a SARS outbreak caused by SARS-CoV, 2002 in Guangdong, China<sup>6</sup>. On February 11th, 2020, the World Health Organization named the disease caused by the SARS-CoV-2 as "COVID-19", and by March 2020 with involvement of more than 100 countries and around 4000 deaths, the WHO declared it pandemic<sup>7</sup>. Since COVID-19 symptoms/signs are non-specific with exception of olfactory/taste dysfunction, diagnosis was made on identification of virus by PCR test (to detect RNA) of SARS-CoV-2<sup>8</sup>.

Diagnosis of the disease is usually based on amplification by reverse transcription quantitative PCR (RT-qPCR) of at least two different fragments of the SARS-CoV-2 RNA genome<sup>9</sup>.

**Vaccine Introduction:**

Prevention remains a better option in order to reduce load of COVID-19 considering the lack of effective treatment. There are now many vaccines available, but the best prevention is to avoid exposure to the virus. In order to prevent oneself from the disease, the ways are:

(1) using face masks (2) covering coughs/sneezes (3) washing hands at required intervals with soap (4) disinfecting hands with an alcohol based sanitizer (5) avoid contact with corona +ve patients (6) maintaining the necessary social distance etc, etc<sup>10</sup>. In December 2020, the FDA authorized the use of two SARS-CoV-2 mRNA vaccines that uses 2-dose schedule: BNT162b2/Pfizer and mRNA-1273/Moderna<sup>11, 12</sup>. In February 2021 World Health Organization added AstraZeneca/Oxford (as Covishield in India) for emergency use as was announced by Dr Mariangela, WHO Assistant Director General for Access to Medicines and Health Products<sup>13</sup>.

The **Oxford–AstraZeneca COVID-19 vaccine**, codenamed **AZD1222** and sold as **Covishield** among others, is a viral vector vaccine developed in the United Kingdom by the Oxford University and British-Swedish company AstraZeneca and is given by intramuscular injection. Studies carried out in 2020 showed that the efficacy of the vaccine is 76-81.3%<sup>14</sup>.

**Aims and Objectives:-**

To compare the Serum antibody levels in vaccinated and unvaccinated (CASES vs. CONTROLS) people of district Shopian.

**Materials and Method:-**

We had a total of 225 candidates for the measurement of antibody levels in both groups. We collected 3 ml of whole blood in a sterile manner from each participant for the estimation of the antibody levels. However 25 samples were not received in the lab due to some technical error and only 200 samples were analysed for the estimation of the antibody levels. Of the 200 samples, cases & controls were 100 each. Of the 100 cases, 78 were male and 22 female participants and of 100 controls, 31 were male and 69 female participants. We used Enzyme Immune Assay for the estimation of the antibody levels against the Spike antigen (anti-S).

**Consent:**

A proper consent, both verbal and written was taken from each of the participants in local official and English languages both.

**Results:-**

We had a net sample size of 200 with 100 cases and 100 controls. Of 200 participants, 109 were males and 91 females. In the case group, there were more males (78) compared to females (22), but in control group, there were more females (69) as compared to males (31).

The mean antibody level in cases was 5616.13 AU/mL with the highest levels reaching to 24064.9 AU/mL while in the control group, the mean level was 181.22 AU/mL with highest levels reaching to just around 784 AU/mL (only one such case actually) which was statistically significant (p-Value <0.01). The case group i.e. the vaccinated group had almost 31 times the mean antibody levels compared to the control group i.e. the unvaccinated group. The data is expressed in tables and diagrams below:

**CASES vs. CONTROLS:**

GROUP	N	MALES	FEMALES
CASES	100	78	22
CONTROLS	100	31	69
TOTAL	200	109	91

**2. Mean IgG Levels in CASES vs. CONTROLS:**

GROUP	NUMBER	Mean IgG Levels (AU/mL)
CASES	100	5616.13
CONTROLS	100	181.22

**3. Mean IgG Levels in Males vs. Females in CASES:**

GROUP CASES	NUMBER	Mean IgG Levels (AU/mL)
MALES	78	6733.87
FEMALES	22	1704.05

**4. Mean IgG Levels in Male vs. Females in CONTROLS:**

GROUP CONTROL	NUMBER	Mean IgG Levels (AU/mL)
MALES	31	123.8
FEMALES	69	207.54

**Discussion:-**

Corona viruses caused respiratory illness of mild variety before world witnessed SARS followed by MERS and lately COVID 19. In last three years, the Covid-19 pandemic has devastated lives of thousands of people with devastation of economy of a number of countries. Not only aged but younger people succumbed to the diseases caused. The illness caused by Covid-19 ranged from mild to severe variety.

There was no specific treatment especially in the initial months and treatment was supportive. The whole world was in search of a vaccine and WHO approved many vaccines for use to protect the people contracting the virus which prevented the vaccinated ones from severe illness, hospitalisation and death. Among them, the Astra-Zeneca was approved by government of India for vaccination for the protection of its people. In our study we concluded that the people vaccinated with one or two doses of Covishield vaccine had greater amount of antibody levels in their blood (Mean 5616.13 AU/mL) and hence greater amount of protection especially from severe illness or hospitalisation as compared to the unvaccinated people (Mean 181.22 AU/mL). Hence Covishield vaccine generates a very good immune response in its recipients.

**Conclusion:-**

Hence it can be concluded that the serum antibody levels in cases who had received one or the two doses of vaccine were much higher than those who had not received the vaccine. Hence Covishield vaccine generates a good immune response in its recipients and offers a possible protection to them.

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