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COMPARATIVE ANALYSIS OF PRE-VACCINATED COVID ANTIBODY TITERS AND POST-VACCINATED COVID ANTIBODY

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Abstract

Corona virus, also known as SARS-CoV-2, was found to be the cause of the COVID-19 respiratory pandemic in 2019. In the early months of 2020, the World Health Organization recognized SARS-CoV-2 as a new corona virus in response to an epidemic in China. The first incidence of COVID-19 was identified on December 1, 2019, and the primary issue was a newly discovered corona virus known as SARS-CoV-2. Three to four weeks after the initial dosage, the COVID-19 vaccination against corona virus offers adequate protection. For long-term protection against corona virus, it's vital to acquire all of the required immunization doses. The study comprised 260 COVID19 patients, ranging in age from 20 to 70 years old, who were hospitalized to the Aziz Bhatti Shaheed hospital in Gujrat between Januarys to June 2021. A cross-sectional investigation is carried out using a practical sampling strategy. Clinical records were used to acquire patient information such as illness beginning date, clinical categorization, and personal demographics. The research comprised 260 COVID19 patients who were hospitalized to the hospital and ranged in age from 20 to 70 years old. The study demonstrates that vaccines have a significant impact on human immunity and, as a result, aid in disease prevention. This study demonstrates that immunization can help avoid COVID-19 outbreaks even if it only provides little protection against disease. Getting immunized with COVID-19 seems to be a more reliable and secure strategy to build immunity than contracting the virus directly.

Introduction:

The corona virus causes throat, sinus, and nasal infections. The Global Health Agency released SARS-CoV-2 as a new corona virus in early 2020 in response to an epidemic in China in December 2019.[1] The disease soon spread around the globe. The Nidovirales order's corona viridae family, which includes the corona virus, was recognized as a distinct viral family in 1968 because to its visual shape and intracellular budding site, which set them apart from other RNA viruses. Later, this categorization was supported by the traits of their gene, replication method, protein, and polymerase. In 1993, the Corona viridae family recognized corona viruses and toro viruses as distinct genera.[2]

Early in December 2019, Wuhan, Hubei Governorate, China, experienced the onset of an unexplained pneumonia pandemic that was connected to Huanan Seafood Market. Bats are the most major natural hosts.[3] There are at least twelve different corona viruses that have been identified to far, making up around 35% of the viruses that they produce.

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Numerous people have died from the deadly COVID-19 virus throughout the world, while another has been left with long-term health concerns.[4] Higher than since the epidemic's start, 16.4 thousand COVID-19 cases have been discovered worldwide, and as of July 28th, 2020, 653,862 fatalities had been recorded. An original COVID variant was discovered on November 24, 2021, in South Africa (Wednesday).[5] The new COVID variant known as Omicron has been flagged as a subtype of concern by the United Nations. The entire world is terrified of the COVID Variant "Omicron" due to its high mutation rate.[6]

The unusual corona virus epidemic, which has spread quickly across the country and even the world, has led to a huge rise in the number of affected people.[7] The fast spread of COVID-19 has drawn attention worldwide, and the United Nations has declared it a public health emergency of major global concern (WHO).[8] The infection has since spread to 216 other locations and areas. According to the World Health Organization (WHO), COVID-19 became a pandemic as of January 30, 2020, and was subsequently declared a global pandemic in March 2020. 340,543,962 confirmed COVID-19 cases had been reported to WHO as of January 21, 2022, with 5,570,163 deaths and 1530000 cases in Pakistan. While countries like China, the United States, and Italy see extremely high disease peaks. [9]

Reclassification of the Arteriviridae and Coronaviridae families results in the monopartite plus-strand RNA genomes of the nidovirales virus family are translated into a nested collection of overlap sub genomic mRNAs with a shared 3′ terminus.[10] The spread of infections in asymptomatic types and early symptomatic stages is accelerated by limited access to testing in many healthcare settings.[11] It has been called "the greatest challenge that humanity has faced since World War II" and "the most catastrophic global health issue of the century." The corona virus has an effect on many aspects of life in addition to the public health concern, such as politics, education, economy, social issues, the environment, and climate.[12] Additionally, it has a big impact on supply chains and industries throughout the world. The only known way to stop the disease's spread, according to a number of studies and a thorough study, is to impose very harsh social isolation laws on the people.[13]

Corona viruses are a group of viruses that may cause anything from a common cold to more serious illnesses like Acute Respiratory Distress Disorder. The recently identified middle east respiratory syndrome corona virus is what causes COVID-19 (SARS-CoV-2).[14] When exposed to ultraviolet radiation in sunshine, corona viruses immediately disappear.[15, 16] SARS-CoV-2 flourishes in conditions with low relative humidity and temperatures at or below room temperature, just like some of the other encapsulated viruses. The single-stranded RNA of the corona virus has a diameter of 80 to 120 nanometers. It is classified into five categories: Omicron, -CoV, -CoV, and -CoV.[15]

Since a good neutralising reaction would significantly reduce the amount of virions that may survive, antigens to the SARS-CoV-2 virus are essential to defeating the virus. ACE-2 receptors are expressed in infected cells. The CDC must make research on SARS-

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CoV-2 antibody responses a high priority.[17] In terms of the epidemic's treatment and preventative strategies being used by the scientific community. After infection, neutralizing antibodies develop quickly in the majority of acute viral infections and are maintained under control for decades or more by memory B cells and long-lived plasma, both of which are essential for viral clearance and immunity against viral diseases.[18]

The body's immune system responds to the weak or inactive components of a particular species that are employed as antigens in immunizations. These immunizations give the recipe for manufacturing them, not the epitope itself.[19] Whether the vaccine contains the target itself or the instructions for the body to create the antigen, the less potent form won't hurt the recipient but will induce their white blood cells to respond similarly to how they would during the first reaction to the virus. First off, over time, antibody levels often decrease.[20] Second, a complete picture cannot be drawn from these experiments. Once you've been infected, they're not responsible for keeping you healthy; your memory immune response is. It does this by remembering the pathogen it previously faced and becoming ready to combat infection. T-cells, another component of your immune system, have the job of recognizing viruses in your body, spotting virus-infected cells, and destroying them.[21] The incubation is between two and fourteen days, and illness is transmitted by breathing or contact with infectious droplets. Sore throats, fevers, coughs, dyspnea, malaise, and weariness are common symptoms.[22] The sickness is normally minor, but in some persons it can progress to infection, pulmonary fibrosis (ARDS), and multi-organ failure (typically the elderly and those with co morbidities). Many folks don't have any symptoms.[22] The unique COVID variant "Omicron" is characterized by fever, cough, exhaustion, and change of taste or smell." Some of the less frequent signs and symptoms of the unique COVID variant "Omicron" include a sore throat, congestion, aches, pains, diarrhea, a rash on the skin, discoloration of the fingers or toes, and red or itchy eyes."[16, 23] Acute symptoms of the new COVID Variant "Omicron" include chest pain, shortness of breath, slurred speech, paralysis, and confusion. Over the course of the pandemic, kids seem to be less likely to contract COVID-19. Inhaled SARS-CoV-2 binds to nasal epithelial cells and starts to replicate.[24]

In this study we distinguish between pre- and post-covid19 vaccination antibodies in patients and assess the effectiveness of vaccinations in preventing symptomatic Covid-19 illness. Antibody rates were better defined in the acute section, which lasted up to three months from the commencement of the illness. In included investigations, IgM was usually discovered earlier than IgG, peaking at weeks 2 to 5 and then dropping for depending on the patient group, another 3 to 5 weeks after the commencement of the symptoms. After reaching their peak between weeks 3 and 7, IgG levels stayed steady for at minimum eight weeks. Understanding the immunological response that generates protective immunization against SARS-CoV-2 is critical.

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Literature Review:

Duro M, Duro I, Rebelo I, Moreno F, Pires M, Jacinto S, and others carried out this research in 2021 ascertain the level of immunisation and the IgM and IgG antibody responses to SARS-CoV-2 in a population in Northeast Portugal without immunization (including both RT-PCR identified and undiagnosed people). 362 volunteers who volunteered to be examined were evaluated for IgM and IgG SARS-COV-2 antibodies (more toward the N core protein) using a scientific-epidemiological survey. In the study group (n = 114), 31.7 percent had previously been identified as having SARS-CoV-2, 48.3 percent were silent, and 71.9 percent were IgG antibody titers at the time of analysis. Eighty three percent were IgM and sixty percent were IgG seropositive within two weeks after the initial diagnosis. In conclusion, IgG exhibited a significant fall after the mid-20th month post-diagnosis, showing a loss of immunity, whereas IgM showed a comparable initial surge (within 1/2 week). The earliest and oldest affected age groups had the strongest results. Participants who had not previously been diagnosed might be found thanks to antibody testing.

Yamayoshi S, Yasuhara A, Ito M, Akasaka O, Nakamura M, Nakachi I, et al. did this investigation in 2021. Understanding the longitudinal antibody responses against a new viral disease is critical for developing a successful vaccination against it. In this study, we examined the evolution of SARS-CoV-2 antibody responses in symptomatic patients. 39 individuals between the ages of 0 and 154 days after the study's start had blood samples sequentially obtained. The zinc finger domain (RBD), ectodomain, and N protein of the S protein were tested for IgG or IgM titers using an ELISA. Neutralizing antibody titer measurements were made using a plaque reduction assay. At 20 days after starting, IgG viremia to the RBD of the S protein, the S protein's ectodomain, and the N protein peaked, then progressively declined and remained stable for several months. In conclusion, despite the small number of patients, our findings demonstrate that the antibody response in symptomatic individuals to the initial SARS-CoV-2 infection resembles acute viral illnesses in many ways.

In 2021, A. **Tretyn, J. Szczepanek, M. Skorupa, J. Jarkiewicz-Tretyn, D. Sandomierz, J. Dejewska, et al**. Population-based immunization campaigns using new generation mRNA-based vaccinations began practically everywhere in the globe by the end of 2020. The study's objective was to examine the quantity of interferon-gamma, a marker of the cellular response, in 28 individuals and the titer of pro IgG antibodies even against S1 portion of virus's spike protein in 477 cases. Conclusion determining the level of antigens to the S protein in both image into multiple segments and vaccine recipients allowed for the analysis of the evolution of the production of antibodies to COVID-19. If the patient responded to the vaccination, anti-SARS-CoV-2 IgG antibody testing reveals whether or not they did and how strongly they did. It also allowed researchers to analyze the humoral immunity established following SARS-CoV-2 infection.

W. Alhazzani, M. Mller, Y. Arabi, M. Loeb, M. Gong, E. Fan, and B. Du conducted this study in 2020. The novel SARS-CoV-2 corona virus, initially identified in China in 2019,

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produced a global pandemic of COVID-19 illness in just a few months. The high prevalence and fatality of COVID-19 prompted researchers to focus their efforts on developing an effective vaccination .ELISA/Euroimmun was used to assess serum samples taken from 140 NIPH-NIH employees shows a lot of IgA and IgG antibodies against the spike (S protein) of SARSCoV-2 (137 were vaccinated). Secondly, using an ELISA technique created in-house at NIPH-NIH, the presence of IgG antibodies to S protein, fusion protein, and a combinations of both in particular serum samples was assessed .The conclusion of this trial show that the Pfizer vaccine is highly efficient in stimulating the production of antibodies by the human immune system against the S glycoprotein of the Severe acute respiratory. Establish the likely duration of humoral immunity, vaccine antibody levels must be tested at various intervals following immunization

Material and Methods:

The study comprised 260 COVID19 patients, ranging in age from 20 to 70 years old, who were hospitalized to the Aziz Bhatti Shaheed hospital in Gujrat between January to June 2021. Throat swabs and sera were collected from patients both while they were in the hospital and after they were discharged. COVID19 was diagnosed Using the Novel Corona virus Respiratory Treatment and Prevention Program of the China National Health Commission (5th edition). A cross-sectional investigation is carried out using a practical sampling strategy. Demographic data is critical in research since it allows us to capture demographic characteristics such as gender, age, ethnicity, and patients' dates of birth, among other things. Clinical records were used to acquire patient information such as illness beginning date, clinical categorization, and personal demographics.

Sample collection:

For the collecting of covid-19 samples, personal protective equipment must be used. We will also collect blood (plasma/serum) from persons who have recovered from covid-19 before vaccination, as well as a sample from those who have received covid-19 vaccine. We'll also compare the antibody titers of pre- and post-vaccination patients. Processing needs around 5ml of blood. The blood will then be centrifuged, and the serum or plasma will be used for processing.

Laboratory examination:

Centrifuge: A centrifuge is a machine that separates serum or plasma from blood using centrifugal force. To obtain serum, we shall spin our sample at 3000 rpm for 10 minutes.

ELISA (enzyme-linked immunosorbent assays):

After that, we'll do enzyme-linked immunosorbent tests (ELISA). In an ELISA test, certain bind specifically the target antigen, and a detection tool shows the presence and degree of antigen binding. To improve the assay's precision and accuracy, the plate has to be completely covered with high-affinity antibodies. We will examine antibody titer by using ELISA to compare pre- and post-covid immunisation antibodies in patients.

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COVID-19 IgG/IgM Rapid Test Cassette:

In order to detect and differentiating among IgM and IgG antigens to SARS-CoV-2 in living thing blood pretty much the entire vascular system, plasma using heparinized blood (Li+ heparin, K2EDTA, and sodium citrate), or serum, a sideways flow biosensor known as the COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) is used. The COVID-19 IgG/IgM Clear Sign Cassette (Whole Blood/Serum/Plasma) is used to help determine if a person has recently or previously been infected with SARS-CoV-2 by detecting adaptive immune responses to the virus. We still don't know if antibodies give protective immunity or how long they last after an infection.

Materials required:

- We need sealed packets that each included a test disc, a pipette, and a desiccant.
- Buffer
- Package inserts
- Containers for collecting specimens Centrifuge (for plasma only
- Timer

Storage and stability:

You may either refrigerate or keep the kit at room temperature (between 2 and 30 degrees Celsius). Up to the sealed packet's expiration date, the test device is stable. Until everything is time to use it, the test device must remain in the sealed bag. DON'T FREEZE OFF. After expiration date has past, do not use.

Test procedure:

i. We'll take the test cassette out of the sealed foil packet as soon as feasible and utilise it. The results will be available in one hour.

ii. After that, we'll set the test instrument on a clean, flat surface.

iii. Transfer the obtained serum/plasma specimen to the specimen well using a 5 mL small plastic dropper after drawing the sample to the edge of the specimen line (S). The buffer well will then receive 2 drops (about 80 L) of sample buffer right away (B). Avoiding air bubbles is advisable..

iv. We'll look out for the bright line (s). Add one more drops of buffer was added to the buffer well if the red color has not moved across the test screen after two minutes or if blood is still present in the specimen well(S) (B).

v. The result ought to be accessible in 10 minutes. Positive results might surface as few as two minutes. Not after 15 minutes should the results be interpreted.

INTERPRETATION OF RESULTS:

Negative: In the control line region (C), the colored line shifts from blue to red. In the test line areas M and G, no line emerges. The end outcome is a failure.

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IgM Positive: The limit switch region (Colored)'s line changes from blue to red, and a coloured line develops in the experiment line area M. The test result indicates the presence of IgM antiSARS-Cov-2 antibodies...

IgG Positive: In the regarding the onset area G, a coloured line appears and the colour of the coloured line in the limit switch region (C) changes from blue to red. The results of the test demonstrate the presence of IgG antiSARS-CoV-2 antibodies..

Positive IgG and IgM: Two coloured lines appear in the test line areas M and G, while the coloured line in the fusible link region (C) changes from blue to red. The test results revealed IgM and IgG anti-SARS-CoV-2 antibodies..

RESULTS

Methods: - we are using Paired sample T-Test for this study.

Following are the hypothesis used in the study.

Null Hypothesis: - The average values of IGg and IGm before and after vaccination are remaining same.

Alternative Hypothesis: - The average value of IGg and IGm before and after vaccination will be different.

Level of Significance: - $\alpha=0.05$

Test statistics: - Paired sample T- Test

Decision Rule: - If P value is ≤ 0.05 we can reject the null hypothesis.

The research comprised 260 COVID19 patients who were hospitalised to the hospital and ranged in age from 20 to 70 years old. Throat swabs and sera were collected from patients both while they were in the hospital and after they were discharged. COVID19 is diagnosed. As stated in the table, Male patients made up 143 patients (55.0%) while female patients made up 117 patients (45.0%). (Table and Graph 1).The age group of the patients is shown in (Table and Graph 2), with 1 patient being between the ages of 20 and 25 with percentage of (.4%), 3 patients being between the ages of 26 and 30(1.25%), and 11 patients being between the ages of 31 and 35. (4.2 percent). 36 patients in the 36-to-40-year-old age group have a proportion of (13.8 percent). Between the ages of 41 and 45, 114 patients were considered, with a proportion of (43.8 percent). There are 82 patients in the 46-to-50-year-old category, with a proportion of (31.5 percent). 4 patients are between the ages of 51 and 55, and 4 patients are between the ages of 56 and 60. (1.5 percent). Four patients in the age range of 66 to 70 had a percentage of (.4 percent), whereas just one patient in the 61 to 65 age range did (1.5 percent).

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Table and Graph 1

Gender					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Male	143	55.0	55.0	55.0
	Female	117	45.0	45.0	100.0
	Total	260	100.0	100.0	

Table and Graph 2

Age Group					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	20-25	1	.4	.4	.4
	26-30	3	1.2	1.2	1.5
	31-35	11	4.2	4.2	5.8
	36-40	36	13.8	13.8	19.6
	41-45	114	43.8	43.8	63.5
	46-50	82	31.5	31.5	95.0
	51-55	4	1.5	1.5	96.5
	56-60	4	1.5	1.5	98.1
	61-65	1	.4	.4	98.5
	66-70	4	1.5	1.5	100.0
	Total	260	100.0	100.0	

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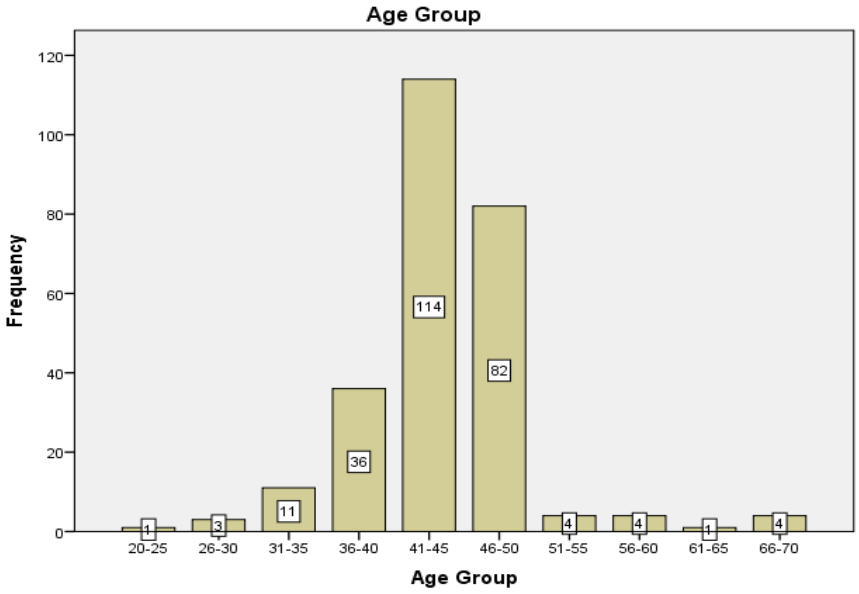

Table (3, 4) and Graph (3)

Paired Samples Statistics					
		Mean	**N**	**Std. Deviation**	**Std. Error Mean**
Pair 1	Pre Vaccinated IGm	104.75	260	56.706	3.517
	Post Vaccinated IGm	448.24	260	103.176	6.399

Paired Samples Test						
		Paired Differences		**t**	**df**	**Sig. (2-tailed)**
		Mean	**Std. Deviation**			
Pair 1	Pre Vaccinated IGm – Post Vaccinated IGm	343.492	116.744	-47.443	259	.000

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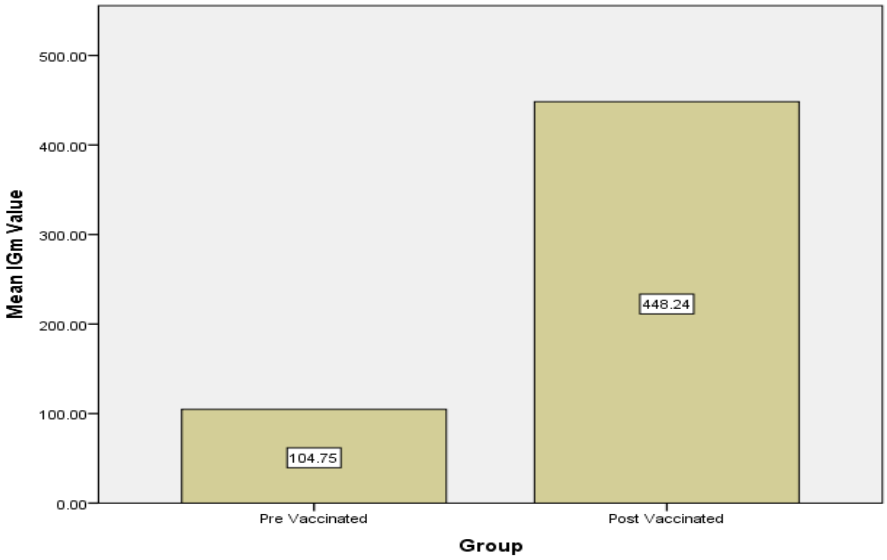

The Paired Sample T-Test with Mean Value and Comparison of IGm Antibody in Pre and Post Vaccination Covid -19 Patients is shown in (Figure and Table).

Table (5, 6) and Graph (4)

Paired Samples Statistics					
		Mean	**N**	**Std. Deviation**	**Std. Error Mean**
Pair 1	Pre Vaccinated IGg	760.29	260	495.408	30.724
	Post Vaccinated IGg	1796.88	260	116.996	7.256

Paired Samples Test						
		Paired Differences		t	df	Sig. (2-tailed)
		Mean	Std. Deviation			
Pair 1	Pre Vaccinated IGg – Post Vaccinated IGg	711.592	499.355	-22.978	259	.000

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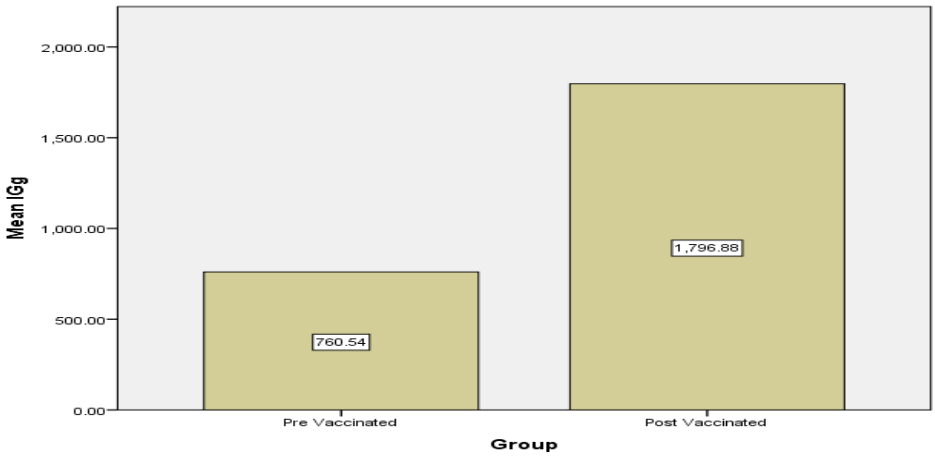

The Paired Sample T-Test with Mean Value and Comparison of IGg Antibody in Pre and Post Vaccination Covid -19 Patients is shown in (Figure and Tables).

Table 7: Sample with a partner Correlation depicts the distribution of Male and Female patients in relation to IGg and IGm Antibody, in before and post vaccination.

Paired Samples Correlations					
Gender			N	Correlation	Sig.
Male	Pair 1	Post Vaccinated IGm & Pre Vaccinated IGm	143	-.063	.457
	Pair 2	Post Vaccinated IGg & Pre Vaccinated IGg	143	.123	.142
Female	Pair 1	Post Vaccinated IGm & Pre Vaccinated IGm	117	.121	.192
	Pair 2	Post Vaccinated IGg & Pre Vaccinated IGg	117	-.022	.818

Table 8: The Mean Value of IGm and IGg Antibody in Pre and Post Vaccinated Covid -19 Patients by Gender in a Paired Sample.

Paired Samples Statistics						
Gender			Mean	N	Std. Deviation	Std. Error Mean
Male	Pair 1	Post Vaccinated IGm	450.26	143	103.857	8.685
		Pre Vaccinated IGm	107.28	143	57.240	4.787
	Pair 2	Post Vaccinated IGg	1803.69	143	118.247	9.888
		Pre Vaccinated IGg	1102.38	143	627.807	52.500
Female	Pair 1	Post Vaccinated IGm	445.77	117	102.730	9.497
		Pre Vaccinated IGm	101.65	117	56.135	5.190
	Pair 2	Post Vaccinated IGg	1788.56	117	115.406	10.669
		Pre Vaccinated IGg	1064.39	117	254.363	23.516

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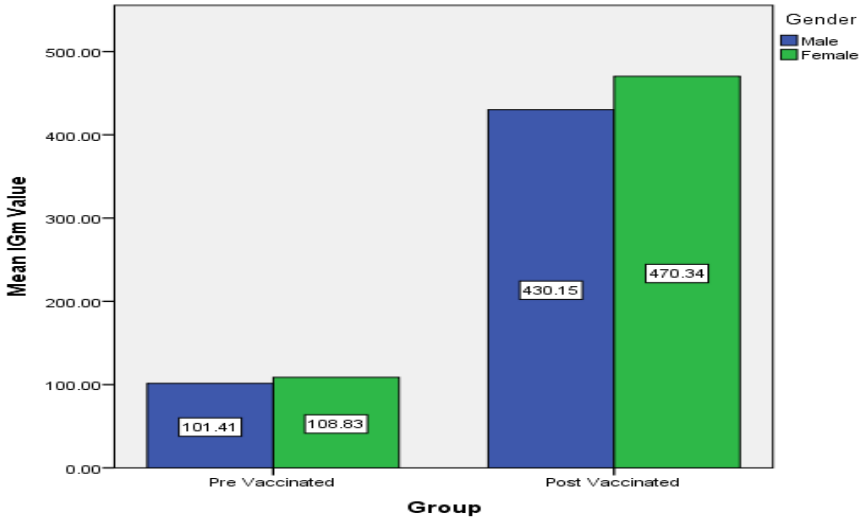
Table 9: The IGg and IGm Antibody in relation to pre and post vaccination patients, the Paired Sample T-Test is conducted.

Paired Samples Test

Gender			Paired Differences					t	df	Sig. (2-tailed)
			Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
						Lower	Upper			
Male	Pair 1	Post Vaccinated IGm – Pre Vaccinated IGm	342.979	121.685	10.176	322.863	363.095	33.705	142	.000
	Pair 2	Post Vaccinated IGg – Pre Vaccinated IGg	701.308	624.345	52.210	598.098	804.518	13.432	142	.000
Female	Pair 1	Post Vaccinated IGm – Pre Vaccinated IGm	344.120	110.923	10.255	323.809	364.431	33.557	116	.000
	Pair 2	Post Vaccinated IGg – Pre Vaccinated IGg	724.162	281.573	26.031	672.604	775.721	27.819	116	.000

Graphs (5):-



This graph depicts the link between gender and IGm Antibody in Covid-19 patients before and after vaccination.

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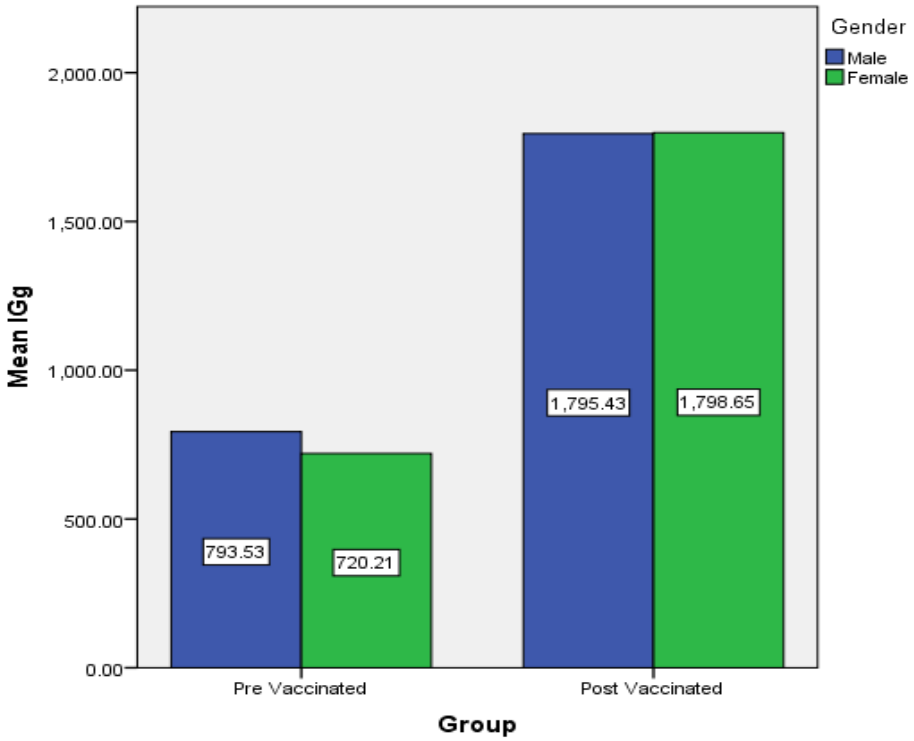
Graphs (6):



This Graph Demonstrates the Relationship of Gender and IGg Antibody with

Pre and Post Vaccinated Covid-19 Patients.

Table (3, 4) and Graph (3) shows us the paired sample test of IGm antibody between Pre and Post vaccinated Covid-19 Patient with mean value of (104.75) in Pre vaccinated patients and (448.24) in post vaccinated patients in total population of (260). On the other hand Table (5, 6) and Graph (4) shows us the paired sample test of IGg antibody between Pre and Post vaccinated Covid-19 Patient with mean value of (760.29) in Pre vaccinated patients and (1796.88) in post vaccinated patients in total population of (260). The (Table 7, 8) shows the Sample with a partner Correlation depicts the distribution of male and female patients in relation to IGg and IGm Antibody, in before and post vaccination. In pre and post vaccinated Covid-19 patients, the male IGg and IGm antibody ratio is (143) patients with mean value of (107.28) in Pre vaccinated IGm antibody and (450.26) in post vaccinated IGm antibody, and the mean value of (1102.38) in Pre vaccinated IGg antibody and (1803.69) in post vaccinated IGg antibody. Whereas the female IGg and IGm antibody ratio is (117) patients with mean value of (101.65) in Pre vaccinated IGm antibody and (445.77) in post vaccinated IGm antibody, and the mean value of (1064.39) in Pre vaccinated IGg antibody and (1788.56) in post vaccinated IGg antibody. The (Table 9) demonstrate us The IGg and IGm Antibody in relation to pre and post vaccination patients, the Paired Sample T-Test is conducted. A part from this the (Graph 5) depicts

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the link between gender and mean IGm Antibody value in Covid-19 patients before and after vaccination. Therefore the mean value of IGm in pre vaccinated male is (101.41) and in female is (108.83) while in post vaccinated the mean value in male is (430.15) and in female is (470.34). This (Graph 6) Demonstrates the Relationship of Gender and IGg Antibody with Pre and Post Vaccinated Covid-19 Patients so the mean value of IGg in pre vaccinated male is (793.53) and in female is (720.21) while in post vaccinated the mean value in male is (1795.43) and in female is (1798.65). We looked explored how SP–IgM and SP–IgG levels in COVID19 patients were related to their clinical features so according to the current findings, immunisation has a positive impact in Covid-19 patients; we first look at the results of natural antibodies in non-vaccinated patients, then compare their results with non-vaccinated patients using different sample tests following vaccination. It demonstrates that vaccines have a significant impact on human immunity and, as a result, aid in disease prevention.

Discussion:

The main method for validating the prognosis of SARS CoV2 illness too far is the viral nucleic acid test. Despite the high sensitivity of RT PCR, the nucleic acid detection sample is often a pharyngeal swab sample, which is challenging to evaluate for quality because to differences in collection techniques across specialists, and the detection results are still not satisfactory.[25] The danger of infection will also grow as more samples are collected. The ELISA test is a low-cost, time-saving approach with excellent specificity and sensitivity that is frequently utilised in clinical practice. It's also appropriate for large-scale sample testing.[26] Early in the course of the illness, SARSCoV2 antibodies can be found, and they can be used as a supplement for clinical laboratories of patients with suspected or those whose SARSCoV2 nucleic acid results are negative. We selected COVID19 patients with many consecutive blood and urine for antibody testing in this investigation, and we developed antibody change trend curves. Post-vaccination individuals had higher levels of IgM and IgG antibodies.

Vaccination provides protection to the immune system's natural processes. SARACoV2 is a developing human infectious disease with a high infectivity and fatality rate, posing a severe threat to human health and disrupting people's regular lives all over the world. More crucially, by following the findings of our studies on antibody levels in patients, we are able to better direct and assess vaccine research and development. Chang Zhou, Ge Bu, Linding Wang, Liang Sun, and Yan Liu et al. completed this study in 2020. A research comprised 165 COVID-19 patients, ranging in age from 15 to 75, who were hospitalised to the Fuyang Second People's Hospital between January 20, 2020 and February 28, 2020.To analyse the pattern of changes in antibodies, an enzyme-linked immunosorbent assay (ELISA) was coated with SARS-CoV-2 recombinant spike protein and used to detect blood immunoglobulin M (IgM) and immunoglobulin G (IgG) antibodies against SARS-CoV-2 in corona virus illness 2019 patients. Since the end of 2019, the severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) has spread over the world.

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Antibody titer changes against SARS-CoV-2 must be elucidated, and the clinical and preventative utility of antibodies must be explored further. Finally, the established indirect ELISA has a high level of specificity and sensitivity. In the early stages of SARS-CoV-2, IgM and IgG antibodies emerged virtually simultaneously, and the level of IgG antibodies could not sustain a high plateau during a 7-month monitoring period.[27]

Duro M, Duro I, Rebelo I, Moreno F, Pires M, Jacinto S, and others did this study in 2021.A Research to investigate the immunization status of an unvaccinated community in Northeast Portugal, as well as the behavior of responses to the SARS-CoV-2 (severe acute respiratory syndrome corona virus) in both IgM and IgG form (including RT-PCR diagnosed and undiagnosed individuals).Utilization of a scientific-epidemiological survey and evaluation of IgM and IgG SARS-COV-2 antibodies (towards N core protein) in 362 volunteers for laboratory testing. At the time of the analysis, 31.7 percent of the study group (n = 114) had previously been diagnosed with SARS-CoV-2, 48.3 percent were asymptomatic, and 71.9 percent were IgG seropositive. Within two weeks of the original diagnosis, 83.3 percent and 60% of them were IgM and IgG seropositive, respectively. Finally, IgM and IgG both showed a comparable initial rise (within 1/2 week), with IgG showing a substantial decline after the 21st week post-diagnosis, indicating a loss of immunity. The greatest responses were identified in the youngest and oldest symptomatic age groups. Antibody testing allowed previously undiagnosed participants to be identified.[28]

Yamayoshi S, Yasuhara A, Ito M, Akasaka O, Nakamura M, Nakachi I, et al. did this investigation in 2021. Understanding the longitudinal antibody responses against a new viral disease is critical for developing a successful vaccination against it. In this work, We tracked the evolution of SARS-CoV-2 antibody responses in symptomatic patients. 39 individuals between the ages of 0 and 154 days after the sickness started had their blood sequentially drawn. The receptor binding domain (RBD), ectodomain, and N protein of the S protein were tested for IgG or IgM titers using an ELISA. Despite the limited number of patients, our data indicate that the antibody response to the first SARS-CoV-2 infection in symptomatic individuals is comparable to that found in an acute viral infection.[29] This investigation was carried out in 2020 by Legros V, Denolly S, Vogrig M, Boson B, Rigaill J, Pillet S, et al. For the development of a COVID-19 vaccine and public health policies, it is essential to comprehend the immunological processes induced by SARS-CoV-2 infection. We used either live SARS-CoV-2 particles or retroviruses pseudotyped with the SARS-CoV-2 S viral surface protein to examine the neutralising antibody (nAb) initial reaction in serum specimens from a cohort of 140 SARS-CoV-2 qrt - pcr patients, including patients with mild symptoms as well as those who need intensive care (Spike). We discovered a strong correlation between nAb titers, disease severity, and anti-Spike IgG levels. Finally, we found that neutralisation escape is prevented by the Spike protein D614G mutation, which has recently been identified as the most prevalent variant in Europe. Overall, our findings support a prompt evaluation of the humoral response's participation in SARS-CoV-2 pathogenesis and contribute to a better appreciation of the serological correlate of SARS-CoV-2-induced disease.[30] Our research will help in the

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development of a vaccine. If S protein may be used as a component of a vaccine, more study is required. It is still uncertain which anti-SARSCoV2 antibody can maintain a higher level in patients.

Conclusion:

This study demonstrates that immunisation can have a substantial role in reducing COVID-19 outbreaks, even with only little protection against infection. However, consistent adherence to non-pharmaceutical approaches is necessary to get this advantage. The benefits of vaccination wore off with time. The PCR Ct values at the time of the reference patient's diagnosis could only partially account for the decreased transmission. Instead of becoming sick from COVID-19, getting vaccinated is a safer and more effective way to build immunity. The COVID-19 vaccination safeguards you by causing an immune reaction without necessitating that you experience illness, even potentially deadly sickness.

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