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## Effect Of Addiction On COVID-19 IgG Antibody Among The Adult Urban Population Of The Malegaon, Maharashtra

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### Abstract:

The COVID-19 pandemic has brought major challenges to health care systems and public health policies globally and it required novel treatment as well as prevention strategies. Individuals with addiction come under a high risk for infection. In various studies, it has been observed that alcohol and tobacco consumption increases the risk of acquiring infections. The magnitude of the problem of drug addiction is very high in the Indian population. Hence, it is a vulnerable population to acquire this infection.

This study is to understand the influence of addiction and non-addiction on synthesis of IgG antibodies for SARS-CoV-2 among Malegaon urban area population.

The researcher has analysed the research with Chi-square without Yates correction for learning statistical relevance

Chi squared equals 16.362 with 1 degree of freedom and two-tailed P value is less than 0.0001

The association between rows (groups) and columns (outcomes) is considered to be extremely statistically significant

**Key Words:** Addiction, Antibodies, Covid-19, SARS-CoV-2, IgG, Antibody, ELISA, Malegaon.

### Background of the research study:

There are 219 virus species that are known to be able to infect humans. The first of these to be discovered was yellow fever virus in 1901, and three to four new species are still being found every year. Extrapolation of the discovery curve suggests that there is still a substantial pool of undiscovered human virus species, although an apparent slow-down in the rate of discovery of species from different families may indicate bounds to the potential range of diversity. More than two-thirds of human viruses can also infect non-human hosts, mainly mammals, and sometimes birds. Many specialist human viruses also have mammalian or avian origins. Indeed, a substantial proportion of mammalian viruses may be capable of crossing the species barrier into humans, although only around half of these are capable of being transmitted by humans and around half again of

transmitting well enough to cause major outbreaks. A few possible predictors of species jumps can be identified, including the use of phylogenetically conserved cell receptors. It seems almost inevitable that new human viruses will continue to emerge, mainly from other mammals and birds, for the foreseeable future for this reason, an effective global surveillance system for novel viruses is needed<sup>1</sup>

Very recently COVID19 novel virus has been identified.

A novel corona virus (CoV) is a new strain of corona virus. The disease caused by the novel corona virus first identified in Wuhan, China, has been named corona virus disease 2019 (COVID-19) – ‘CO’ stands for corona, ‘VI’ for virus, and ‘D’ for disease. Formerly, this disease was referred to as ‘2019 novel corona virus’ or ‘2019-nCoV.’ The COVID-19 virus is a new virus linked to the same family of viruses as Severe Acute Respiratory Syndrome (SARS) and some types of common cold.

The emergence of severe acute respiratory syndrome corona virus 2 (SARS-CoV-2; previously provisionally named 2019 novel corona virus or 2019-nCoV) disease (COVID-19) in China at the end of 2019 has caused a large global outbreak and is a major public health issue<sup>2</sup>. The global public health emergency of COVID-19 pandemic disease caused by severe acute respiratory syndrome corona virus 2 (will be referred as SARS-CoV-2 hereafter) has been unfolding rapidly that emerged in Wuhan, China and has now spread to at least 180 countries<sup>3</sup>. The COVID 19 disease had taken a shape of a pandemic and had spread in almost all parts of the world. As per the epidemiological study, the mortality and morbidity were very high. The pace of transmission of disease was very fast. No age and sex was immune to this disease. The disease agent has changed its variants several times and has generated waves or what we call an episodic appearance. India has witnessed an outbreak of COVID-19, SARS COV- 2. Several cases were detected in other parts of the country, most of which had travel history to affected countries. Infection has increased rapidly since March 2019 with a significant growth in testing.

Epidemiology: In India, from 3<sup>rd</sup> January 2020, 5:18pm CET to 21<sup>st</sup> March 2022, there are 43,009,390 confirmed cases of COVID-19 with 516,510 deaths, reported to WHO<sup>4</sup>.

In the first wave, the morbidity and mortality were very high at Malegaon, a city of Maharashtra, India where it had created panic situation in the local population, including health workers.

As per one of the paper it is mentioned “Abuse of legal substances in India includes alcohol and tobacco, which are the major risk factors for various non-communicable diseases and deaths. The current pandemic has identified tobacco consumption as a risk factor for COVID-19, highlighting the need to control substance abuse”<sup>5</sup>. The researcher decided to prove this fact by evidence based research.

Marginalized community, particularly those with substance use disorders (SUD), are particularly vulnerable to contract the infection and also likely to suffer from greater psychosocial burden.<sup>6</sup>

The high morbidity and mortality has been identified at the city of Malegaon. As per the commissioner of Malegaon, the first case was detected on 8<sup>th</sup> April 2020 at Malegaon. In the first week of May, the doubling rate was between 2 to 3 days. That rate between 10<sup>th</sup> - 12<sup>th</sup> June had increased to 56 days. At the same time in the month of June, the doubling rate of India was 16 days. The doubling rate has improved at Malegaon to maximum in India. The average mortality rate of Malegaon for the last two years was in between 15 to 16 per day. Between 12<sup>th</sup> May it had reached 55. In the month of June, it has reduced to 9- 10 days. At that time, the doubling rate was very high. The doubling rate of COVID 19 was as mentioned by MMC as dated on 18<sup>th</sup> May 2022 was 619. On 25<sup>th</sup> May 2022 was 699 and 31<sup>st</sup> May 2022 was 767, 07/06/2022 was 822. Doubling rate in days were 97.6. The doubling rate of mortality as mentioned by Malegaon Municipal Corporation dated on 18<sup>th</sup> May 2022 was 40 days, 25<sup>th</sup> May 2022 was 48 days, 31<sup>th</sup> May 2022 was 58 days, and 07<sup>th</sup> June 2022 was 6 days. Thus research team considered the Malegaon urban area population as vulnerable population and conducted the IgG antibody research study.

The researcher team has conducted sampling survey for Covid 19 IgG antibody addicted and non-addicted group for analysis.

## **Materials and Methods**

### **Data and Sources of Data:**

#### **Population:**

A representative sample of an urban population of Malegaon was considered for the study in which the depth of the COVID 19 problem was very high during the first wave. The study was conducted between 12 January 2022 to 28 May 2022. The general information of patients was collected from the electronic medical records system. This study was approved by the Ethics Committee of the Maharashtra University of Health Sciences, Nashik, and a collaborative partner.

**Theoretical framework:**

The population of Malegaon was distributed among the rural and urban area. According to census 2011, 70% of the population lives in the rural areas while 30 % lives in the urban area. This research aims to study Covid 19 IgG antibody in the urban areas. The research team have used a cluster sampling method for data collection. Sampling units were individual subjects and municipal wards were considered as clusters. Malegaon district was divided into 84 wards. Malegaon urban area was divided into 4 zones: the North, the South, the East and the West. 4 wards were selected randomly from each zone. And from each selected ward, 130 subjects were selected randomly to collect blood samples for the present research study.<sup>7</sup>

**Statistical tools:**

The study was analyzed by the researcher with Chi-square without Yates correction for learning statistical relevance.

**Study Procedure:**

Teachers, PG scholars, Interns were deputed to collect the information and blood samples for research. The health workers of Malegaon like ASHA and Lab technicians played a vital role. After giving information and clinical counselling to the people, the lab technicians collected the blood samples. Written consent has been taken from each individual. The researcher has used questionnaire for data collection.

Covid 19 antibody testing was done by taking 3 ml venous blood with all due aseptic precautions in plain bulb. 1.5 ml Serum has separated by using screw capped vials for serum separation and using a centrifuge available at the district health facility from whole blood which was then stored at +4°C or frozen to -20°C and then transported by using cold chain on same day to Virus Research & Diagnostic Laboratory Shri Bhausaheb Hire Government Medical College, Dhule.

During transportation, the national regulations were strictly followed. Serum samples were tested for the presence of COVID-19 virus specific IgG antibodies using serological testing. Tests for IgG were carried out using Anti spike RBD enzyme linked immunosorbent assay (ELISA) kits in BSL2 lab at VRDL SBHGMC Dhule.(7)

This article has considered two objectives, first to measure the effect of addiction on COVID-19 IgG antibody among the adult urban population of Malegaon, Maharashtra in comparison with the general population under study, and second to find out morbidity among addicts in the adult urban population of Malegaon, Maharashtra.

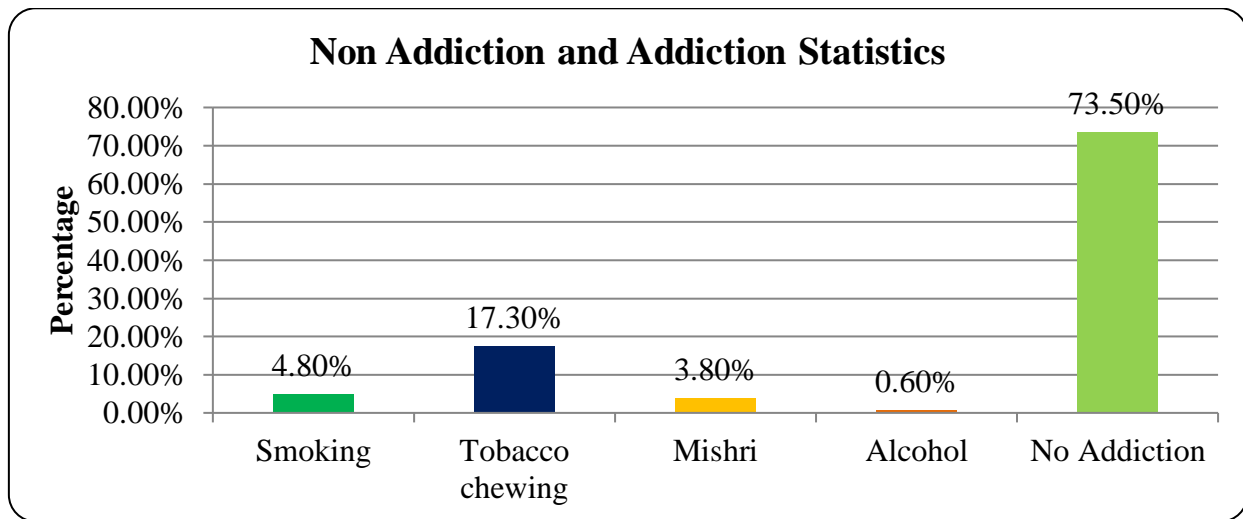
**Methodology:**

The research team has done cross sectional study. The researcher identified two groups as addicted and non-addicted populations in study group. The IgG antibody levels are compared in addicted and non-addicted group. The statistical analysis has been done with prevalence rate- chi square test and with 2\*2 contingency chart and p value.

**Result and Statistical analysis:**

table no 1: representative sample of urban population, malegaon - addicted and non-addicted statistics

Variables	Category	Percentage	Frequency
Any addiction	Smoking	4.80%	119
	Tobacco chewing	17.30%	424
	Mishri (Roasted tobacco)	3.80%	94
	Alcohol	0.60%	14
	No Addiction	73.50%	1803

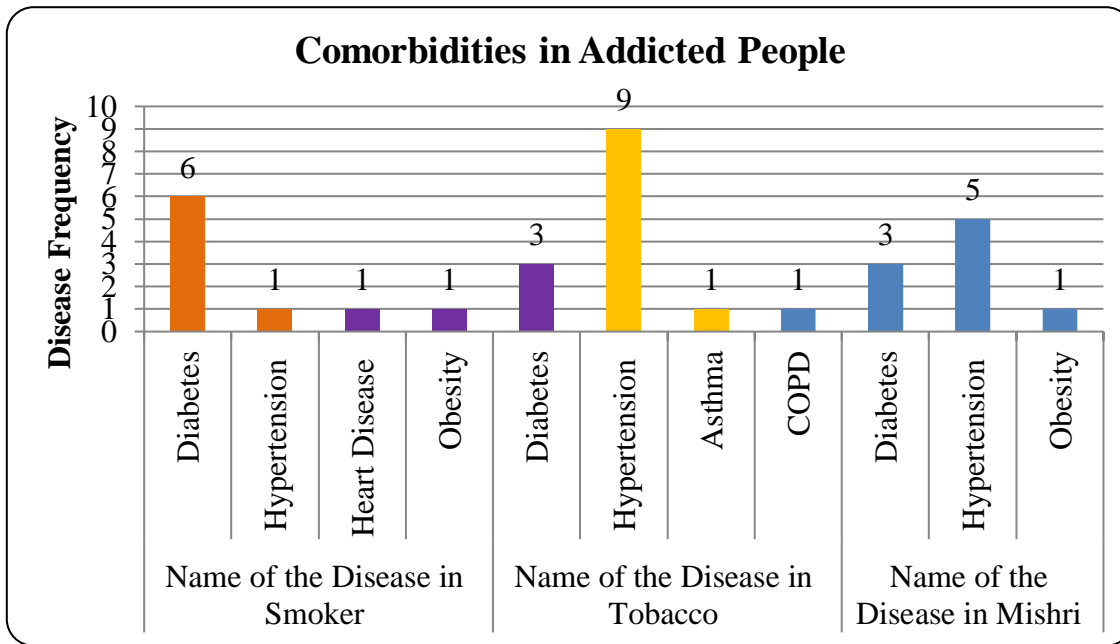


graphical presentation no 1: representative sample of urban population, malegaon - addicted and non-addicted statistics

Among the addiction group, the frequency in percentage of smoking- 4.80%, tobacco chewing- 17.30%, mishri- 3.80%, alcohol- 0.60%. Among the non- addiction group the frequency in percentage was 73.50%

table no 2: co-morbidity status in addicted group in malegaon urban study population.

Variables	Category	Frequency	Percentage
Name of the Disease in Smoker 1.68 mean percentage	Diabetes	6	4.20%
	Hypertension	1	0.84%
	Heart Disease	1	0.84%
	Obesity	1	0.84%
Name of the Disease in Tobacco 2.2 mean percentage	Diabetes	3	1.97%
	Hypertension	9	5.92%
	Asthma	1	0.65%
	COPD	1	0.65%
Name of the Disease in Mishri ( Roasted tobacco) 3.1 mean percentage	Diabetes	3	3.19%
	Hypertension	5	5.31%
	Obesity	1	1.06%

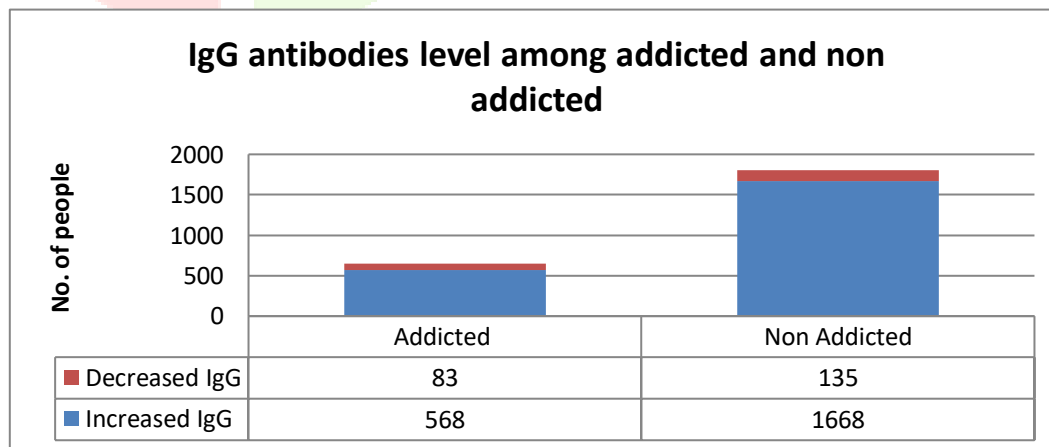


graphical presentation no 2: co-morbidity status group in Malegaon urban study population.

As per the graph, hypertension and diabetes mellitus is highest among the addicted group.

table no. 3 IgG levels among addicted and non-addicted 2 x 2 contingency table

Category	Increased Level of IgG Antibodies	decreased Level of IgG Antibodies	Total
Addicted	568	83	651
Non Addicted	1668	135	1803
Total	2236	218	2454



graphical presentation no. 3 IgG levels among addicted and non-addicted.

The graphical presentation of IgG antibody level among addicted and non-addicted groups of Malegaon Urban population. In 651 population of addicted group, it has been found that 568 people were having increased levels of IgG antibodies and 83 people were having decreased level of antibodies. In 1803 population of non-addicted

group, it has been found that 1668 people were having increased levels of IgG antibodies and 135 people were having decreased levels of IgG antibodies.

### **Result:**

The researcher done analysis with the help of Chi-square without Yates correction for learning statistical relevance

Chi squared equals 16.362 with 1 degree of freedom and two-tailed P value is less than 0.0001.

The association between rows (groups) and columns (outcomes) is considered to be extremely statistically significant

### **Conclusion:**

In percentage study the antibody level was 12.7% in addicted and 7.4 %among non-addicted.Thus , it has been observed the addiction has association with antibody level.

### **The findings of the research study**

As per our objective, research team have considered a well-defined representative sample from the Malegaon urban area. Data was collected with the help of a questionnaire and blood samples were also collected. The team of interns, PG scholars and teachers were involved in this process. The ASHA and lab technicians played the crucial role of communication and collection of samples. From the selected data we have taken information regarding addiction. Research team have identified the development of IgG antibodies in addicted and non-addicted groups. Furthermore, team have made a subgroup in regards to addiction like smoking, Mishri (Roasted Tobacco) and tobacco consumption. In study groups, research team have identified that 4.80% of the population had smoking habit, and 17.30 % of the population had addiction to tobacco chewing, and mishri (roasted tobacco) 3.80 %. The population with addiction is considered as a vulnerable group. The research team have done statistical studies and found that the significance level is high.

Another vulnerable group in the study was population with the co-morbidity like diabetes, hypertension, asthma, renal diseases, Cancer, COPD.

The prevalence among co-morbidity percentage was diabetes- 1.90%, hypertension- 2.20%, obesity- 0.20%, COPD- 0.00%, asthma- 0.20%, heart disease- 0.20%, TB- 0.10%, CKD- 0.1%, immune compromised- 0.00%, malnutrition- 0.10%, and no co morbidity- 94.90%. As per the estimation the mean average ranges from 1% to 5 %. The co morbidity is considered to have influence on production of antibodies. This co-morbidity was present in all addicted groups .Thus researches team tried to neutralize the influence of co morbidity variable.

### **Conflict of Interests:**

The authors declared no conflict of interest.

### **Author Contributions:**

Dr. F.F. Motiwala who supervised the project. Dr. Swanand Shukla who accomplished and wrote the manuscript. Dr. Kamlesh Bagmar and Dr. Nimbhore Vishal helped in contributing and motivating the sample collection.

### **Acknowledgment:**

Vice-Chancellor Lt-Gen Dr.Madhuri Kanitkar developed the concept, directed and implemented the project. With the guidance of Maharashtra University of Health Sciences, the team of colleges with unified activity accomplished the field work. Motiwala (National) Homeopathic Medical College and Hospital, Nashik played a vital role in collection of survey information, counselling and sample collection. Dr. Madhuri Kalal and team contributed to the detection of serum SARS-CoV-2 antibodies. Dr. Sapna Thakre for assistance logistics for the research. Mr.Pravin Ghatekar for statistical analysis. Dr. Prashant Shivgunde for assisting the review and publication process.

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