

ISBN: 978-93-91768-46-1

# **COVID 19: IMPACT AND RESPONSE**

## **VOLUME X**

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**FIRST EDITION: 2022**

## COVID 19: Impact and Response Volume X

(ISBN: 978-93-91768-46-1)

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*Bhumi Publishing*

**2022**

**First Edition: June, 2022**

**ISBN: 978-93-91768-46-1**



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Published by:

Bhumi Publishing,

Nigave Khalasa, Kolhapur 416207, Maharashtra, India

Website: [www.bhumipublishing.com](http://www.bhumipublishing.com)

E-mail: [bhumipublishing@gmail.com](mailto:bhumipublishing@gmail.com)

Book Available online at:

<https://www.bhumipublishing.com/books/>



## **PREFACE**

*The new respiratory pandemic disease i.e. COVID-19 has caused disruptions in the lives and customs of people with significant impact on the economies of nations. The outbreak of the disease is a global health emergency and of international interest. This global health challenge leads to the infection, morbidity and mortality of many people.*

*In the weeks since the World Health Organization manifest the corona virus (COVID – 19) episode a worldwide unstipulated wellbeing crisis, the COVID-19 pandemic has influenced 212 nations and forfeit increasingly than 400,000 lives. Still today there is no successful remedy to lockup the spreading of this infection. The pandemic is developing prior disparities, uncovering vulnerabilities in social, political and financial frameworks which are thusly intensifying the effects of the pandemic.*

*Governments of various nations adopted restrictive measures involving both within the countries and at international borders as effective response to the corona virus pandemic. These measures includes confinements of workers and order to work from home, banning of social and religious gatherings, closure of market places, closure of workplaces including airports, building or creation of testing and isolation centers, quarantining/isolation of suspected persons, self-imposed isolations, and the use of face masks whether surgical or cloth type in situations where there is a cogent reason to defy the restriction.*

*Academic communities were not left out as institutions of learning were requested to close in many countries since it is very easy to spread the virus among students and youths in tertiary institutions where socialization is an essential part of their lives.*

*To address the various issues related with the COVID – 19 we have published the present book. The interdisciplinary approach of the book will make the book useful and informative to the students, teachers, researchers, scientists and policy makers in India and abroad.*

*We thank all contributors, publishers and all our well-wishers for their blessings, without which this book would not have come into existence.*

- **Editors**

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## **MENTAL HEALTH PROGNOSIS, DEVELOPMENT AND COMBAT STRATEGIES IN THE COVID-19 PANDEMIC**

**Swati Tulshan**

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The emergence of the Novel Coronavirus has impacted each individual, directly and indirectly. Mental health concerns emerge specifically in this regard. Reviews and researches from around the globe have been analysed and presented. The researches have been subcategorized for ease of understanding and concerned emphasis. The key categories into which the above has been divided are information pertaining to the various domains of mental health in COVID -19 pandemic, the mental health of specific target groups and vulnerable population like children, elderly and healthcare workers. Finally, an analysis of the role of technology in catalysing treatment for the mental health issues faced by various individuals is conducted. Upon careful study and inspection, it was seen a vast majority of individuals suffered from a plethora of mental health issues which surfaced either as a result of the panic caused by the COVID-19 pandemic or were imbibed by the person while fighting the pandemic. Target groups like children, health care workers and individuals already diagnosed with mental health issues were researched on, and all the above mentioned groups showed increased levels of anxiety and distressed aggravated by the pandemic. Finally, the role of technology was understood in the pandemic situations, and where a number of researchers are fighting infodemics, and its related evils, through telephones, video calls and similar facilities a lot of help is being extended to individuals who are in quarantine.

### **General Information and specific aspects of mental health during COVID 19 situation**

Galea *et al.* (2020), have understood the mental health effects of physical and social distancing among individuals. As distancing is recommended as a primary and effective precaution, it is practised by individuals enormously. This has led to the population showing symptoms of PTSD (Post Traumatic Stress Disorder), increased anxiety, depression, substance abuse and loneliness. As the schools are shut, the cases of child abuse and violence have also risen. Some recommended strategies for prevention and early intervention for managing the phase of loneliness as a by-product of the social and physical distancing are planning in advance, engaging activities to combat the same. Taking the help of technology and maintaining virtual social contact and planning and implementing a routine in one's life are other effective strategies for psychological first aid.

Ornell *et al.* (2020), while studying the mental health burden and strategies, stated that during an epidemic, 'fear' was the most common emotion experienced by individuals which escalated by the spread of dubious/wrong information related to the reach, incubation and geographical outreach of the virus. In case of the COVID-19 pandemic, the fear has transformed into anxiety, depression, stress and anger catalysed by high contagion and mortality rates of the virus. Even among patients with common flu symptoms, stress and fear due to the similarity of the conditions can generate mental distress and worsen psychiatric symptoms. Researchers recommend 1) multidisciplinary mental health teams (including psychiatrists, psychiatric nurses, clinical psychologists) 2) clear communication regarding updates on the COVID-19 outbreak; and 3) establishing safe psychological counselling services, as mental health strategies for aiding better psychological well-being among the population.

Reiterating the claims made above, Rajkumar (2020), reviewed articles on the mental health status of the population. It was seen that symptoms of anxiety, depression and self-reported stress were among the most common psychological responses to the pandemic. Lack of and disturbed sleep was another emergent response. It also emerged that populations which were well informed about the pandemic and had sufficient knowledge about the preventive measures, showed reduced signs of distress and were better adjusted. Preventive and curative measures pertaining to mental health issues were highly recommended. As the data was obtained from primarily Asian countries, it was recommended that data from other countries is analysed for a clear representation of the global picture.

Ventriglio *et al.* (2020), also studied the outbreak of the COVID-19 coronavirus and its impact on global mental health. It was opined that the global concentration on understanding the physical transmission of the novel coronavirus may detract the attention from its psychosocial consequences. Compatible to the earlier researches, symptoms of PTSD, depression, anxiety and loneliness seem to be the strongest, especially among the vulnerable population like infected and sick patients, their families and colleagues, individuals with pre-existing medical conditions (both physical and/or mental) and health care providers, especially nurses and doctors who work directly with sick or quarantined people. Apart from providing good mental health services to these individuals, it was recommended that the information from media and social network should be closely controlled and community supportive psychological interventions globally promoted.

### **Mental Health of Target groups during COVID 19**

Greenberg *et al.* (2020) analysed the management of mental health challenges faced by **healthcare workers** during the COVID-19 pandemic. It was seen that they were at an increased risk of moral injury and mental health problems, when dealing with the challenges of the



pandemic, where they may be filled with feelings of remorse, regret and inadequacy especially at the death of patients. In such situations, it is recommended, healthcare managers proactively take steps to protect the mental wellbeing of staff, staff can be supported by reinforcing teams and providing regular contact to discuss decisions and check on wellbeing and once the crisis begins to recede, staff must be actively monitored, supported, and, where necessary, provided with evidence based treatments

When understanding the mental health considerations for children quarantined because of COVID-19, Lu *et al.* (2020) observed that to control the spread of the pandemic causing virus, nations are implementing a lockdown/quarantine among the masses, causing sharp changes in the environment of individuals. These changes have been especially difficult for children quarantined during this time. Children living with their families and primary caregivers, show lesser psychological distress compared to children who have been quarantined because of developing symptoms of the COVID-19 or symptoms shown by a family member. To alleviate the distress of these children, the government of China has introduced facilities like availability of nurses for constant communication, virtual connection with family members and community members volunteering as substitute caregivers. These strategies however become difficult to implement on a large scale. Appropriate paediatric care, training and knowledge building of mental health professionals are recommended to be implemented among the masses.

Xu *et al.* (2020), while studying the patients with mental health disorders, in the COVID-19 Pandemic, observed that large populations of the country suffer from mental health disorders and there are surrounding neglect and stigma present in the society regarding the same. It was also illuminated that such individuals are at an increased risk of infections due to cognitive impairments, lack of awareness of the risks associated and confined conditions in the psychiatric ward. Additionally, facing discrimination in the hospitals for treatment and experiencing heightened fear, anxiety and depression may lead to an aggravated and/or relapse of the condition. It becomes evident that the increase in mental health issues, especially among individuals already detected with issues in the past is evidence of a parallel pandemic.

### **Use of technology in addressing mental health issues due to COVID-19**

Dai *et al.* (2020), attempted gauging mental health problems and social media exposure during COVID-19 outbreak. A cross-sectional study among Chinese citizens aged  $\geq 18$  years old was conducted during Jan – Feb, 2020. Online survey was used to do rapid assessment. Total of 4872 participants from 31 provinces and autonomous regions were assessed. Besides demographics and social media exposure (SME), depression was assessed by The Chinese version of WHO-Five Well-Being Index (WHO-5) and anxiety was assessed by Chinese version

of generalized anxiety disorder scale (GAD-7). Multivariable logistic regressions were used to identify associations between social media exposure with mental health problems after controlling for covariates. The prevalence of depression, anxiety and combination of depression and anxiety (CDA) was 48.3% during COVID-19 outbreak in Wuhan, China. More than 80% of participants reported frequent exposure to social media. After controlling for covariates, frequently SME was positively associated with high odds of anxiety (OR = 1.72, 95%CI: 1.31–2.26) and CDA (OR = 1.91, 95%CI: 1.52–2.41) compared with less SME.

Firt *et al.* (2020) expressed that the COVID-19 crisis has highlighted the role of telehealth and digital tools like apps to offer care in times of need specially when face to face interaction is limited. Although efforts are made to ‘new normalize’ online consultations and therapies, generalization, to the entire public is still debatable. One underdeveloped area for digital therapy and mental health apps is the remote delivery of “lifestyle interventions.” Lifestyle factors such as physical exercise, sleep, and healthy diet play an important role in mental health conditions and these may be particularly important during periods of isolation/prolonged home time, due to the adverse psychological effects of reduced exercise or prolonged sedentary behaviour, and the ongoing debate about certain types of screen time and social media usage. Social distancing and self-quarantine will place people at higher risk of disruption to lifestyles showing effect in their mental health. Nonetheless, digital technologies and smartphone apps may present a novel platform for the remote delivery of lifestyle interventions.

Smith *et al.* (2020) when analysing The Role of Telehealth in Reducing the Mental Health Burden from COVID-19, stated that tele mental health services, are practically feasible and appropriate for the support of patients, family members, and health service providers during this pandemic. Activities like panic buying, reduced access to support from family and friends, and degraded normal social support systems causes loneliness, and is a risk for worsening anxiety and depressive symptoms. It is a challenge to provide mental health services in the context of patient isolation, highlighting the role of telehealth (through video conference, e-mail, telephone, or smartphone apps). Examples of support for the effectiveness of tele mental health are diverse, especially in the context of depression, anxiety, and PTSD. Video conferencing, online forums, smartphone apps, text messaging, and e-mails have been shown to be useful communication methods for the delivery of mental health services. Tele mental health services are suited to this pandemic situation—giving people in remote locations access to important services without increasing risk of infection.

It may thus be concluded that mental health issues have steeply risen due to the pandemic. All individuals especially vulnerable and target groups are deeply affected by the

adversities. Intensive and continuous care and intervention must be provided. The possibility and effectiveness of therapy and counselling via digital platforms is new and still being tested, however it can be considered for long term use and as a permanent solution if situations currently prevailing continue.

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## **AN IN-DEPTH EXAMINATION OF COVID-19'S ECONOMIC IMPACT ON INDIA**

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### **Abstract:**

COVID-19 slowed down economic and social activity. Analysis of the impact on oil and oil-related industries such as aviation and tourism is included in this chapter. Travel and tourism revenues, which account for 9.2 percent of the GDP, have been severely restricted, and this will have a negative impact on GDP growth. The industry is expected to lose \$1.56 billion as a result of this decision. After crude oil fell to \$ 22 per barrel in March, foreign portfolio investors (FPIs) withdrew a total of USD 571.4 million from India. As oil prices fall, the current account deficit will widen due to reversal of capital flows. The rupee is losing value. They'll need every penny they've got. The crisis resulted in a terrifying mass exodus of migrants on foot as the country was put on lockdown. Loss of employment, scarcity of rations, and lack of social security were among their primary concerns. This country's growth strategy needs to be more inclusive. COVID 19 has benefited India. As multinationals lose faith in China, labour reforms are needed in India to 'Make in India.'

**Keywords:** Covid-19, Measures to alleviate the effects of COVID 19, economic impact, relief measures

### **Introduction:**

As a result of COVID-19's nationwide lockdowns, social and economic life has been put on hold across the country. There are no resources left to deal with this unprecedented crisis. The virus has a wide-ranging effect on the economy, affecting a wide range of industries. As early as 2019, the WHO issued a global pandemic alert, citing the world's inability to contain such an outbreak. It was estimated that a pandemic would cost 2.2 percent to 4.8 percent of global GDP in a WHO-World Bank report released in 2019. As expected, this crisis has engulfed the entire world. There has already been an economic and labour market shock, as explained in a report by the International Labour Organization titled COVID-19 and the World of Work: Impact and Policy Responses. This has affected both supply and demand (the creation of goods and services)

(consumption and investment). "The world faces extraordinary uncertainty about the depth and duration of this crisis," said IMF chief Christine Lagarde. "It's the worst economic fallout since the Great Depression," she added. The COVID-19 lockdown is expected to cost India \$120 billion, or 4% of its GDP, according to economists quoted in the Economic Times on March 23, 2020. (The Economist, 2020). Affected industries by COVID-19 include those that provide goods and services to the general public such as hotels and real estate as well as the manufacturing and service industries. The strain on the economy is becoming more acute by the minute. Workers' productivity is slashed, but so is demand for goods and services, leading to the collapse of the economy. There are no other cost-effective COVID-19 prevention methods. However, as in the case of Rajasthan's Bhilwara district, the economic dangers of a closed economy remain. A flattening of the demand curve is critical for the economy, but it is expensive.

### **Methodology:**

In the past, researchers used simulation models to estimate the economic impact of epidemics. Using a neoclassical growth model, Martin Karlsson (2014) assessed the impact of the 1918 Spanish flu epidemic on the Swedish economy. He adapted the standard difference-in-differences estimator to take advantage of the differing flu mortality rates in different Swedish regions. "Analyzing the economic impact of the Avian Flu pandemic on Asian economies, the Asian Development Bank used macroeconomic simulations based on the Oxford Economic Forecasting (OEF) global model. An equilibrium is established after a shock because the model takes into account both demand and supply (Bloom et al., 2005). For the SARS epidemic, Lee and McKibbin used G-Cubed (Asia-Pacific) to estimate the economic impact (2004). Economists use medical costs or lost wages as a measure of the economic impact of epidemics. Supply chains and capital markets in a global economy spread the economic burden of an epidemic to other countries. The novel coronavirus infection that is the source of the COVID-19 pandemic is being studied by scientists, who hope to find a treatment. Assumptions such as infection source, infection rate, and asymptomatic-to-symptomatic ratio are all used in epidemiological calculations for this disease. The disease's cause and spread will be discovered in the future. Economic forecasts are intertwined with predictions of disease patterns. We did not use simulation models because of the uncertainty of disease. Damages are evaluated in this study. Aviation, tourism, and retail industries will be affected by COVID-19's productivity loss and socioeconomic impact of lost labour hours, as well as the implications of policies or programmes for these industries.

## **Impact of COVID-19 in India's various sectors:**

### **Retail, Tourism, and Aviation**

COVID has the greatest impact on tourism around the world. The UN World Tourism Organization (UNWTO) predicts a 20–30 percent decline in international tourism in 2020. These figures are based on the current state of affairs and are subject to revision. Millions of industry workers could lose their jobs as a result. In terms of economic impact, the travel and tourism industry in India is booming. According to a FICCI-Yes Bank report, India is South Asia's most important tourism market. In 2018, Indian tourism generated \$247.3 billion in revenue and created 26.7 million jobs. It's the eighth-largest source of GDP in the country (JaganMohan, 2020). There will be 53 million people working in this industry by 2029, according to predictions. FTAs totaled 10 million in 2017. Worldwide travel has been restricted due to the coronavirus pandemic, reducing GDP growth. The rate of GDP growth may fall by 0.45%. Despite the fact that India's aviation industry generates \$72 billion in annual revenue, international tourism to the country is on the decline. Second-quarter arrivals will be affected by the lockdown. 18 billion would be lost if aviation's contribution dropped by 25%. Railroads contributed \$27.13 billion to the GDP in 2019. It will cost \$1.56 billion to implement a 21-day lockdown. Indian retail sales in FY 2019 totaled \$790 billion. It accounts for 10% of the country's GDP and 8% of the workforce. By 2020, online retail is expected to grow by 30 percent, based on current market projections. According to the National Investment Promotion and Facilitation Agency, 2020 The second quarter's sales will be harmed by a one-month retail closure. In most cases, retailers can quickly recover their losses once the lockdown is lifted. The industry's losses will be partially offset by the fact that some online retail was open during the lockdown.

### **Impact on India's GDP Growth**

There is no indication that the COVID-19 pandemic will be contained by the deadline of April 15, 2020, and the consequences for economic growth will be severe. Coronavirus pandemic will have a negative impact on the global economy, particularly India's (United Nation 2020). According to the UN's Economic and Social Survey of Asia and the Pacific (ESCAP) 2020, COVID-19 would have significant socioeconomic ramifications in the region, flooding tourism, trade, and financial ties (United Nations, 2020). GDP growth was estimated at 5% in the Economic Survey 2019–2020, down from 6.8% in 2018–2019. The nominal GDP for 2019–2020 is estimated at 204,400 billion dollars, an increase of 7.5% over the provisional estimates for 2018–2019. (190,100 billion). the second quarter's GDP growth estimate was cut from 7% to 6.2 percent, and the third quarter's GDP growth estimate was also cut from 7% to 6.2 percent on

February 28<sup>th</sup>, 2020, according to the National Statistical Office. If the COVID-19 pandemic was contained by the middle of May, according to KPMG India's estimates, India's GDP would grow by 5.3 percent to 5.7 percent. There is a global recession, and growth could be as low as 4-4.5 percent in this second scenario. If the virus spreads and the lockdown is extended, KPMG India predicted that India's GDP growth rate would fall below 3%. (KPMG, 2020). Motilal Oswal estimates that a single day of lockdown could reduce annual growth by 14–19 basis points (Oswal, 2020). Bloomberg calculated that the shutdown would cost US\$120 billion, or 4% of total GDP (Barclays, 2020). By Yashwant Sinha's estimation, a 21-day lockdown would cost the Indian economy 1% of GDP. In 2020–2021, a global recession and future uncertainties could reduce growth by 2%.

### **COVID-19 and migration**

The coronavirus pandemic has been dubbed the "worst global crisis since World War II" by the International Labor Organization, which estimates that 76.2 percent of India's workforce is at risk of falling into poverty as a result of the virus. There will be an estimated 195 million full-time job losses when half of the world's businesses close. Many people have low-paying, low-skilled jobs where their income is severely reduced as a result of the extended workweek (International Labour Organisation, 2020). Seasonal labour migration is common in rural India. The rural-to-urban and rural-to-agricultural migration rate is in the millions. Indian migration routes include the states of Uttar Pradesh, Bihar, Punjab, Haryana, Maharashtra, and Gujarat. Indian states like West Bengal, Rajasthan, Madhya Pradesh, and Tamil Nadu are getting new corridors to Karnataka and Andhra Pradesh. Over 40 million migrant workers work in construction, 20 million in domestic service, 11 million in textiles, 10 million in brick kilns, and more than a million in mining and agriculture (IIPS, 2001). Nearly 92.5 percent of workers were forced to miss one to four weeks of work as a result of lockdown. Between March 27 and 29, Jan Sahas conducted a survey of 3196 migrant workers in the northern and central parts of India. Eighty percent feared that they would go hungry before the lockdown on April 14 and thus would be unable to return to work. Most migrant workers are paid between \$200 and \$400 per day, while 39 percent earn between \$400 and 600. Fewer than 4% of the workforce earns a salary of 600 or more, which is close to the minimum wage. In other words, they've been taken advantage of. Fifty-nine percent of those polled said they were short on rations. Rationing for two weeks was reported by 39.4% of the respondents.

These workers have 99.2% Aadhaar cards, 86.7 percent bank accounts or Jan Dhan documents, 61.7 percent ration cards, and 23.7 percent BPL cards according to the survey. The

government's 1,700 billion relief package may be difficult to get a hold of for a lot of people. Workers were accustomed to receiving monthly rations and financial aid from the government (Jan Saahas Survey, 2020). There was a horrifying mass exodus of migrants on foot during the country-wide lockdown. They are concerned about losing their jobs and not having a safety net in place. Despite government assurances, they decided to return home. Victimized groups are caught in a web of social exclusion and economic inequality as they fight to survive this crisis.

The Supreme Court requested that the Centre provide an update on its efforts to prevent migrant workers from returning to their home countries. Worker exodus brought on by a coronavirus will be detrimental to India's economy. Other residents of Gurugram, Surat and Mumbai may not return home. It's possible they work on small farms in the area. The shortage of workers will put pressure on small businesses and the agricultural sector as a result of lockdown-forced behaviour changes. If the COVID-19 pandemic's social crisis is not properly addressed, it could lead to a rise in inequality, exclusion, discrimination, and worldwide unemployment.

### **Markets in India, the Oil Markets, and Capital Markets**

Markets around the world have been rattled by concerns about the coronavirus. Indian capital markets are expecting funds to move to Western markets as a result of lower interest rates and falling stock prices. There were 247.76 billion in equity and 140.50 billion in debt withdrawals by FPIs in 13 days between March 1 and March 13, 2020, according to NSDL data. During the next six months, there will be significant volatility due to the rapid flow of capital between markets.

For the first time in history, crude oil prices dropped to US\$22 per barrel in March from US\$65 per barrel in January. A \$5 drop in crude oil prices could save India \$7–8 billion, according to estimates. India's current account deficit, which was 1.55 percent of GDP in 2019–2020, could be reduced by falling oil prices. 2020 Economic Survey A country's savings from the current account deficit may be outpaced by its capital outflows. Currently, the average exchange rate between Indian rupees and US dollars is 70.4. A yen is worth 75 cents. Policymakers must work together to deal with a Coronavirus pandemic. The costs of pandemic medical care are included in the budget measures, everything from gloves and masks to testing kits and PPE to ventilators and ICU beds. The price of the equipment would skyrocket. India makes a significant investment.

This fiscal year, GDP is expected to rise by 1.1 percent. For the poor and vulnerable, the government has announced a \$1,700 billion relief package. The government is expected to announce a new aid package for small businesses and farms soon. The tourism industry and the



global supply chain will require assistance. Tax revenue decreases during a recession. In the event of a 2% drop in GDP revenues, As a result, the fiscal deficit is expected to rise from 3.2 percent to 3.5 percent as a result of these fiscal measures.

Investment and consumption will decline as a result of the outbreak of the coronavirus. Traditionally, 72.1 percent of GDP's consumption is accounted for by demand-side components, with government consumption accounting for 11.9 percent of GDP's consumption. Anxiety-induced spending restrains growth. Increased government spending will boost demand. Diverse industries will require assistance in order to spur investment demand. The repo rate was lowered by 75 basis points as a result of loose monetary policy. One percentage point was taken off US interest rates, which now stand at 0–0.25 percent. Monetary policy is ineffective because pandemics aren't just about liquidity. Uncertainty about the future of the economy dampens investor confidence. Afraid frugality suffocates investment.

### **Impact on Small and medium-sized businesses (SMEs) and startups**

Small and medium-sized businesses (MSME), which account for 30 percent of India's GDP and 90 percent of the country's jobs (Radhika Pandey, 2020), face severe cash flow problems if the lockdown is extended to eight weeks. Loans and EMIs are common responsibilities for many MSMEs. If the lockdown disrupts their cash flow and leaves them with fixed costs, many of them may go out of business. They are in desperate need of a reduction in their debt. In addition to NBFCs, the RBI has released funds. The movement of perishable goods is hindered, and businesses suffer significant losses as a result. Without a vibrant MSME sector, India will not be able to grow long-term. Startups in India are being tested at COVID-19. International funding is essential for new businesses. The businesses of several founders are faltering. They have to cut costs because receivables are rising. Because of the restrictions on global capital flows, venture capital firms may require more time to raise funds, necessitating government support.

### **An Analysis of Inequality in India's Economic Development**

OxFAM's 'Income Inequalities in India, 2019' report uncovered asymmetrical development within the country. In 2017–2018, the wealthiest 1% owned 73% of the nation's total wealth. There was a 20913 billion increase in this group's wealth, or the government's annual budget. Americans' wealthiest 1% has four times the wealth of the bottom 70%. It is estimated that the wealth of India's 670 million poor people increased by 1 percent between 2017 and 2018. Few people in society have claimed the positive effects of development. A large

portion of the country's subsistence population is unable to afford more than food and shelter because of the country's wide disparity in income. After a natural disaster or pandemic, many people return to their pre-disaster lifestyles. Uneven growth in the country has been exposed by COVID-19. A large portion of the population has been affected by the loss of daily wages, which has resulted in hunger.

### **Discussion:**

Wealth and investor confidence have been eroded due to a micro virus, which has slowed private consumption and investment and has distorted the markets. There are plans to increase network product exports, integrate assemble in India for the world into Make in India, and achieve a 5 trillion dollar economy by 2025, according to the Economic Survey 2019–2020. P. 100, Economic Survey of 2020) New strategies are being implemented due to the COVID-19 pandemic. The country's supply chain is exposed to supply shocks on a global scale. According to the survey, no country can match China's labour supply, so we must fill the gap in labor-intensive sectors. By restricting the movement of Chinese migrant workers, the COVID-19 pandemic threatened the global economy. A deep recession will result if China's firms, which employ half of the world's population, do not make up for the lost sales. They will have to cut investment and lay people off. Even if there is a global supply shock and high unemployment, a rise in commodity demand will lead to an increase in prices. Then, stagflation takes hold. Because Indian producers aren't linked to global supply chains, the Indian economy will be relatively unaffected by global changes.

Supply chain risks have been taken on by global corporations in order to save money. "Just in Time" product refurbishment and low inventories are critical to the global industry. China accounts for 16 percent of global exports and 7 percent of global mining imports (The Economist, 2020). Multinational assembly lines for mobile phones, cars, and optical fibres are located in Wuhan and Shanghai, the areas hardest hit by COVID-19. Companies in India should assess their supply chain risks before integrating their supply chains globally or sourcing from abroad.

A virus outbreak and its containment efforts have been modelled by economists. Prior to May's economic recovery, the virus will have been contained. When a community-wide virus spreads, economic recovery is delayed until September in this second scenario. Demand shocks and inflation are also caused by a lack of essential commodities, such as food. Supply and year-end revenues will be affected by a longer lockdown period for production houses. There will be an increase in the cost of healthcare, so relief efforts need to be stepped up. Second or third

outbreaks take place, and containment efforts fail. Without herd immunity or a vaccine, the third scenario is uncontrollable. The alternative is a severe downturn in the economy, high levels of unemployment, the loss of lives, and a significant increase in the number of people living in poverty.

The issue of a lockout and the potential return to work of Indian workers is being discussed. Any government has to make a choice between the well-being of its citizens and the health of the economy. Economists have predicted that the poor will starve to death if the government continues its lockdown. India's economy is one of a kind. More than half of all Indian families make their living in some way or another from agriculture. It is because subsistence workers are not covered by the social security system that they cannot receive unemployment benefits. Expect the government to provide food and shelter when times are tough. "They'll bounce back if their basic needs are taken care of. To ensure that the poor and vulnerable are not harmed, the government has a responsibility. Many philanthropists are creating their own social security system. Following lockdown, workers' return to the workplace will be influenced by factors such as socioeconomic and behavioural variables. There is a fear among workers that they will not be able to find work elsewhere. They may be employed in nearby towns or on small farms. There will be a shortage of industrial labour. The resumption of normal operations in factories and construction sites is possible after a temporary lifting of the partial lockdown. Workers' trust in government and business must be restored by meeting their basic economic and health care requirements. A supply shock will occur as a result of industries having to operate at suboptimal capacity as a result of the lockdown being lifted.

The current model of development in India must be reexamined. Equitable development necessitates the availability of quality health care and education for all. After the COVID-19 pandemic, the government of India realized that it needed to focus on reducing income inequality. COVID-19 has demonstrated that people turn to agriculture in times of crisis. For all of its agricultural potential, India's farm sector faces structural challenges. Agriculture still plays a significant role in the lives of half of all households. The country must increase its support for small and medium-sized enterprises (MSMEs), as well as its public expenditures on health and education.

The country is on the verge of major labour reforms. Some Indian labour laws date back to the early 1900s. Indian labour laws are blamed for keeping manufacturing businesses small and limiting job creation. Labor laws that are too convoluted lead to lower wages as businesses resort to hiring on the cheap. Unemployment in India reached a 45-year high in 2018 with a rate of 8.1%. (The Hindu, 2019). Wages will rise as labour regulations are liberalized because of

increased demand and increased investment. The COVID-19 has accelerated labour reforms. A rise in wages and a decrease in unemployment are both aided by labour reform and financial inclusion.

Pre-modern India's social security system was based on local cooperation. The elderly, the poor, and the vulnerable were once looked after by the community. Our daily routine and culture included food sharing and almsgiving. Those in the community who had the means to help out did so. The state and local philanthropists helped in times of crisis. With the rise of the modern state, community-based social security was abolished. A statewide social safety net is needed in India. Social security benefits should be kept separate from other benefits. Everyone must have a social security card (with a unique ID number) and financial inclusion at all times. This is made possible by India's cutting-edge digital technology. The images of a mass exodus of migrant workers, some of whom have died as a result of their long walks in the hot sun, and many others who have gone hungry for days are alarming. When there is no formal social security net, there is a risk that relief efforts will be duplicative and that some people will remain uninsured. State-sponsored social security is long overdue.

### **Conclusion:**

The global economy has been skewed by the COVID-19 pandemic. Recessions like this one haven't shook the economy in the same way as previous ones. Despite the fact that governments, conglomerates, corporations, and multinationals are still trying to grasp the scope of the pandemic, now is the time to start planning for a long-term, structurally viable future.

It is imperative that the government take fiscal measures to deal with the unprecedented situation, especially during lockdowns. People's lives and livelihoods are at risk because of the government's policies. Economic activity must begin gradually after the screening of the workforce. Strict preventive measures should be taken by industry to safeguard the health of workers. In order to save the economy, government policy and reforms are required, but the private sector, civil society, and local communities also have a role to play. People should avoid or cancel social gatherings until the virus can be eradicated and should wear masks and sanitizer at all times. There are many factors that go into restoring economic activity, and the government is not solely responsible for them.

The shutdown of all economic activities, including production, consumption, and investment, has been observed around the world as a result of COVID-19 in 2020 and 2021. COVID-19 spread control trade is about to take place. COVID-19's shutdown is one-of-a-kind because of supply, demand, and market shocks. The timing and magnitude of government

support, corporate debt, and how businesses and markets deal with lower demand all play a role in the economy's recovery. Many lives can be saved by helping the unorganized sector, migrants, and marginalized communities. When a person, a community, or an entire society is in crisis, they have the opportunity to take a new direction. It is clear that India's COVID-19 pandemic sends a clear message to adopt self-reliant, inclusive, and environmentally friendly development models.

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## HAS COVID-19 SUBSTITUTED CHEMICALS TO LABOUR IN AGRICULTURE? – A STUDY OF COIMBATORE DISTRICT IN TAMILNADU

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### Abstract:

The novel Corona virus (COVID-19) pandemic has rapidly spread across the world, adversely affecting the lives and livelihoods of millions across the globe. Given that the disease is highly contagious, the much needed nation-wide lockdown was enforced for 21-days in India, for its population of 1.3 billion starting from 24 March 2020 in order to contain the spread of COVID-19. The immediate lockdown resulted in people migrating to their native land which caused labor shortage in all the sectors including agriculture. The lockdown affected the farmers with labor insufficiency, input shortage, supply chain disruptions, difficulties in timely harvesting, etc. Hence, the study was proposed to analyze the impact of COVID 19 on agriculture. Cobb-Douglas production function is used in the study to find out the use of all inputs before and during the pandemic. The result revealed that the farmers preferred to use of more of herbicide to overcome the problem of non-availability and shortage of labourers in Coimbatore district of Tamil Nadu and thus it had influence on the gross income of the farmers.

**Keywords:** cropping pattern, herbicides, labor shortage, Cobb-douglas production function

### Introduction:

Corona virus Disease 2019 (COVID-19), a serious infectious disease of the respiratory tract caused by the novel corona virus first identified in the Chinese city of Wuhan, is a global pandemic. The disease has been spread to almost every country in the world and has destroyed lives and livelihoods. Economies of about more than 100 countries have been destroyed and the baseline forecast was for a 5.2 percent decline in global GDP in 2020 using market exchange rate weights - the deepest global recession in decades. The COVID-19 pandemic has been a major disruptor in global socio-ecological systems, impacting billions of livelihoods and costing be US\$3.3 trillion under a rapid recovery scenario to \$82.4 trillion in an economic depression scenario (Naidoo and Fisher, 2020). The emerging markets and developing economies are affected by economic headwinds and had an impact on health care systems, trade, tourism, degenerated remittances, capital flows, mounting debts and financial conditions. Demand for metals, the energy of industrial commodities and transport-related commodities were hugely affected. Agricultural were well supplied before the pandemic have been hit hard by trade

restrictions and supply chain disruptions, adding to food insecurity in some places. The restrictions world-wide had blocked the outflow channels of agricultural products, hindered necessary production inputs, destroyed production cycles and undermined the production capacity (Pu and Zhong, 2020).

### **Impact of COVID-19 in Indian Economy**

The Government of India has imposed a national lockdown due to COVID 19. India took action early to limit the spread of COVID-19, ordering a 21-days nationwide lockdown for its population of 1.3 billion people starting on March 24, 2020 (Kumar *et al.*, 2020). India is one of the hardest-hit developing countries in the world, with more than three million cases as of January 2020. The Indian economy was projected to shrink by 4.8 per cent in 2020 and by a further 2.8 per cent in a baseline scenario for 2021 due to COVID-19 (World Bank report, 2020). Developing countries like India have a more fragile economic and social fabric, and the current situation has brought more suffering to industrial sectors and migrant workers. Industrial production fell sharply in April 2020, the index fell by 55.5 per cent and the unemployment rate had also risen to 8.80 per cent. Besides, that the secondary and territory sector, primary sector like agriculture is also affected due to COVID 19 moreover, it plays a key role in the development of the country. However, about 43 per cent of the cultivable area is affected due to non-availability inputs especially in labours during the lockdown; Due to challenges like the shortage of labor in agriculture sector affected the production during the pandemic, the timely delivery of harvested crop and transport of inputs were a major threat which in turn affected the perishable producing farmers (Arundhathi, 2020), which lead to negative impact on the income of the farmers. The more labor-intensive crops (fruits and vegetables) require large amounts of human labor, thus being more vulnerable to the effects of COVID-19 (Laborde *et al.*, 2020).

### **Impacts of COVID 19 in Tamil Nadu state**

The nationwide lockdown had impacted farmers and floriculturists in the state. The Tamil Nadu Federation of All Farmers' Association stated that about 15 lakh acres of summer rice and eight lakh acres of groundnuts across the state were affected due to unavailability of labour for harvesting the crops during lockdown similarly; perishables such as fruits and vegetables have not been harvested and not taken into markets without transportation. The COVID 19 lockdown not only affected the agricultural sector and also affected the dairy and fishery sector. The supply chain disruption is the major impact of COVID-19 as the industries in the state had to purchase raw materials from different parts of the country and other countries as well. The closure of hotels, processing units, public markets, etc., had affected the farmers with no market for their



produce, and the price of the product was also slashed like anything. Labour migration and travel restrictions had influenced the production pattern of the crops and the marketing of the produce. Under this context, it is right time to carry out the study to identify the changes in crop pattern and tackled situations that were followed by farmers during the pandemic and a different pattern of association was observed from the research conducted.

### Data Collection and Methodology

The study was conducted in Coimbatore district which was the second most affected district in the state of Tamil Nadu. The major cultivating crops (2019-2020) were Coconut (87749.28 ha) followed by banana (7070.88 ha), tomato (1338.04 ha) and onion (2031.035 ha). The study was conducted with an objective to assess the impact in the input usages during COVID-19 for the year 2019-2020 (Directorate of Economics and Statistics, Coimbatore). Hence, the study was conducted among tomato and onion growers due to the area coverage and more consumption of inputs.

A multi-level random sampling technique was used to collect the samples in the study area. Out of 12 blocks in the district, Thondamuthur block was selected due to varied cropping pattern, soil type and irrigation. 120 farmers were selected randomly for the study. The primary data was collected by using well structured interview schedule from the sample respondents for the year 2020-2021.

In this study the Cobb-Douglas Production function is used to analyze the changes in cropping pattern of major crops in the district during the COVID-19 pandemic. The production function can be defined as a technical and mathematical relationship describing the manner and the extent to which a particular product depends upon the quantities of inputs or services, used at a given level of technology and in a given period of time (Reddy *et al.*, 2004). The production function used in the study as

$$Y = \beta_0 + X_1^{\beta_1} + X_2^{\beta_2} + X_3^{\beta_3} + X_4^{\beta_4} + X_5^{\beta_5} + X_6^{\beta_6} + X_7^{\beta_7} + e^{ui}$$

Where,

- Y = Gross Income (Rs/ha)
- X<sub>1</sub> = Cost of Seed material (Rs/unit)
- X<sub>2</sub> = Cost of Fertilizers (Rs/kg)
- X<sub>3</sub> = Cost of Pesticides (Rs/kg)
- X<sub>4</sub> = Cost of Herbicides (Rs/kg)
- X<sub>5</sub> = Cost of Manures (Rs/kg)
- X<sub>6</sub> = Cost of Human Labor (Rs/day)
- X<sub>7</sub> = Harvesting cost (Rs)
- e<sup>ui</sup> = Error term

## **Results and Discussion:**

### **The result of Cobb-Douglas Production function - Tomato**

From table 1, the coefficient of multiple determination ( $R^2$ ) value implied that 51 per cent and 46 per cent of the variation in gross income was explained by the explanatory variables before and during the pandemic, respectively. The variables such as the cost of herbicides and human labor cost had positively influenced the dependant variable and were statistically significant at five per cent level, the coefficient of the variables for cost of herbicides and cost of human labor are 13.886 and 12.339 respectively, which indicated that one per cent increase in the respective cost would increase the income of the tomato farmers by 13.886 per cent, and 12.339 per cent, respectively. Similarly, the cost of seeds and harvesting cost had negatively influenced by the explanatory variable and were statistically significant at 10 per cent level. This can be stated with the coefficient of the variables for cost of seeds and harvesting cost are -7.659 and -9.163 respectively, if one per cent increase in the respective costs would decrease the income for tomato farmers by 7.659 per cent and 9.163 per cent, respectively whereas, all other inputs were held constant of their respective geometric mean levels.

The results of the study during COVID 19 revealed that, cost of the herbicide and harvesting cost were positively statistically significant at one per cent and five per cent respectively. The co-efficient shows that cost of herbicide (13.641) and harvesting cost (10.363), which indicated that if one per cent increase in cost of herbicide and harvesting cost the cost of production would be increased by 13.641 per cent and 10.363 per cent respectively.

The study revealed that, during the pandemic the cost of herbicide and harvesting cost had positively influenced on the gross income, which clearly indicated that the usage of the herbicide might be increased due to non-availability labours for weeding of crops due to lockdown during pandemic situation.

### **The result of Cobb-Douglas Production function -Onion**

From table 2, the coefficient of multiple determinations ( $R^2$ ) implied that 63 per cent and 46 per cent of the variation in gross income was explained by the explanatory variables included in the regression model before and during the pandemic. The variables such as cost of seeds, fertilizers, herbicides and manures had negatively influenced the dependent variable. The variables like cost of seeds, fertilizers and manures were statistically significant at five per cent level whereas, the cost of herbicides was highly significant at one per cent level, if one per cent increase in the cost of herbicide the income would be decreased by 9.532 per cent. The coefficient values of the variables viz., cost of seeds, fertilizers, and manures was -10.117, -5.657, and -6.036 which implied that one per cent increase in the respective costs would be

decreased the income of onion farmers by 10.117 per cent, 5.657 per cent, and 6.036 per cent respectively, while, all other inputs were held constant of their respective geometric mean levels.

The results of during pandemic showed that the cost of herbicide had positively influenced on the gross income and was statistically significant at five per cent level and harvesting cost was statistically significant at ten per cent level with negative influence on the gross income. This can be concluded with the coefficient of the cost of herbicides, 3.678, that one per cent increase in the cost would increase the income for onion farmers by 3.678 per cent, with all other variables held constant and the coefficient of the variable harvesting cost was - 49.34 which implied that one per cent increase in the respective costs would decrease the income for onion farmers by 49.34 per cent.

The study revealed that, during the pandemic the cost of herbicide had positively influenced on the gross income, which clearly indicated that the usage of the herbicide had become significant due to non-availability labours for weeding of crops. Similarly, the harvesting cost had negatively influenced by the gross income, it indicated that the increased harvesting cost due to scarcity of labour during pandemic situation.

### **Summary and policy implications**

Over all the study revealed that, the variable cost of herbicide had positive influence on the gross income during the pandemic situation and it can be concluded that use of herbicides has been shoot up due to and non-availability of labour and migration of labour. Thus, the farmers preferred herbicide application in order to match up hand weeding that proportionately helped to meet out the problems of labor shortage during the lockdown prevailed in the state.

Some of the policy implications to be suggested based on the study conducted are, farmers should be aided to adopt management strategies viz., diversification of crops and cultivate less labouries crops, which leads to reduce the loss of income during pandemic like situations. The efforts of the Government should be directed towards promotion of new technologies, integrated farming, project oriented agriculture and rural entrepreneurship through training and skill development in alternative highincome generating opportunities like agro-processing units, micro enterprises in handicrafts, etc., The Government may take initiatives to strengthen the extension system and provide agricultural services like transport, credit and trade to decrease the damages caused during the pandemic like situation.

**Table 1: Estimation results of Cobb-Douglas production function for tomato crop**

Sl. No.	Particulars	PRE-COVID				DURING COVID			
		Coefficient	Standard error	t-stat	P- value	Coefficient	Standard error	t-stat	P- value
1.	Cost of seeds	-7.659*	4.252	-1.801	0.081	-5.393	3.989	-1.352	0.186
2.	Cost of fertilizers	-7.218	19.365	-0.373	0.712	8.306	15.668	0.530	0.599
3.	Cost of pesticides	6.809	6.738	1.010	0.319	-5.306	6.625	-0.801	0.429
4.	Cost of herbicides	13.886**	6.557	2.117	0.042	13.641**	5.167	2.639	0.013
5.	Cost of manures	2.775	7.832	0.354	0.725	-1.208	6.213	-0.194	0.846
6.	Human labor cost	12.339**	5.057	2.440	0.020	1.948	2.810	0.693	0.493
7.	Harvesting cost	-9.163*	5.205	-1.760	0.088	10.636*	6.114	1.739	0.091
	Intercept	-51.167	233.187	-0.2194	0.827	-161.91	197.88	-0.818	0.419
		R <sup>2</sup> = 0.5062				R <sup>2</sup> = 0.4596			
		Adjusted R <sup>2</sup> = 0.2763				Adjusted R <sup>2</sup> = 0.2195			
		Standard error = 3.6596				Standard error = 3.0176			

\*\* & \* 5 % and 10 % significant respectively

**Table 2: Estimation results of Cobb-Douglas production function for onion crop**

Sl. No.	Particulars	PRE-COVID				DURING COVID			
		Coefficient	Standard error	t-stat	P- value	Coefficient	Standard error	t-stat	P- value
1.	Cost of seeds	-10.117**	4.307	-2.348	0.025	-9.590	14.581	-0.657	0.515
2.	Cost of fertilizers	-5.657**	2.835	-1.995	0.044	3.828	6.161	0.621	0.538
3.	Cost of pesticides	1.299	0.828	1.569	0.126	7.535	6.631	1.136	0.264
4.	Cost of herbicides	-9.532***	3.115	-3.060	0.004	3.678**	2.910	1.951	0.049
5.	Cost of manures	-6.036**	2.451	-2.463	0.019	-7.776	11.478	-0.677	0.502
6.	Human labor cost	-0.103	1.901	-0.054	0.957	-10.282	11.209	-1.184	0.244
7.	Harvesting cost	1.426	0.99	1.440	0.159	-49.34*	25.706	-1.919	0.064
	Intercept	289.985***	65.003	4.415	0.0001	696.363*	353.635	1.960	0.058
		$R^2 = 0.6327$				$R^2 = 0.4617$			
		Adjusted $R^2 = 0.3086$				Adjusted $R^2 = 0.1002$			
		Standard error = 1.7643				Standard error = 4.9674			

\*\*\*, \*\* & \* 1%, 5 % and 10 % significant respectively.

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## A CASE STUDY ON COVID-19 PANDEMIC IN MUNGELI DISTRICT OF CHHATTISGARH STATE

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### **Abstract:**

The current COVID-19 pandemic is clearly an international public health problem. There have been rapid advances in what we know about the pathogen, how it infects cells and causes disease, and clinical characteristics of disease. Due to rapid transmission, countries around the world should increase attention into disease surveillance systems and scale up country readiness and response operations including establishing rapid response teams and improving the capacity of the national laboratory system. Like many countries, major part of India was also affected by Corona pandemic. The present study was attempted to assess the impact of Corona health crisis among three blocks namely Mungeli, Patharia and Lormi in Mungeli district of Chhattisgarh state.

**Keywords:** Covid-19 impact, Corona cases, test preference, death rate, recovery rate

### **Introduction:**

Corona viruses are a large family of viruses which may cause disease in animals or humans. Seven corona viruses can produce infection in people around the world but commonly people get infected with these four human corona viruses: 229E, NL63, OC43, and HKU1. They usually cause a respiratory infection ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respirator Syndrome (SARS) and the most recently discovered corona virus (COVID-19) causes infectious disease (Chatterjee *et al.*, 2020). This zoonotic disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The WHO originally called this infectious disease Novel Coronavirus-Infected Pneumonia (NCIP) and the virus had been named 2019 novel corona virus (2019-nCoV) The virus is typically rapidly spread from one person to another via respiratory droplets produced during

coughing and sneezing. It is considered most contagious when people are symptomatic, although transmission may be possible before symptoms show in patients. Time from exposure and symptom onset is generally between two and 14 days, with an average of five days (World Health Organization, 2021). Common symptoms include fever, cough, sneezing and shortness of breath. Complications may include pneumonia, throat pain and acute respiratory distress syndrome. Currently, there is no specific antiviral treatment or vaccine; efforts consist of symptom abolition supportive therapy. Recommended preventive measures include washing your hands with soap, covering the mouth when coughing, maintaining 1-meter distance from other people and monitoring and self-isolation for fourteen days for people who suspect they are infected. The standard tool of diagnosis is by reverse transcription polymerase chain reaction (rRT-PCR) from a throat swab or nasopharyngeal swab. The infection can also be diagnosed from a combination of symptoms, risk factors and a chest CT scan showing features of pneumonia (Ministry of Health and Family Welfare, 2020).

In the context of COVID-19, airborne transmission may be possible in specific circumstances and settings in which procedures or support treatments that generate aerosols are performed; i.e., endotracheal intubation, bronchoscopy, open suctioning, administration of nebulized treatment, manual ventilation before intubation, turning the patient to the prone position, disconnecting the patient from the ventilator, non-invasive positive-pressure ventilation, tracheostomy, and cardiopulmonary resuscitation (World Health Organization, 2021). Similar to several countries, most part of India was also affected through Corona pandemic. Therefore, there is a need of investigation the health crisis for the better implementations of safety measure and improvement in public health sector. There is no work reported on COVID-19 situation in Mungeli district of Chhattisgarh. Thus, the present study was planned to explore the impact of Corona health crisis over the public residing in Mungeli district of Chhattisgarh state.

### **Methodology:**

The study was conducted in the three blocks (Mungeli, Patharia and Lormi) of Mungeli district of Chhattisgarh, India. The Mungeli district has a population of 7, 01,707 with the sex ratio of 974 females on every 1000 males and literacy rate of 64.75 per cent. The Mungeli district has a total of 669 villages of 350 Gram-Panchayat lies under the three major blocks of Mungeli district i.e., block Mungeli (282 villages), block Patharia (228 villages) and block Lormi (159 villages) (Census, 2011). The study was purely an online questionnaire-based survey. For the current study block wise details of Corona cases along with the information of total death and



health recovery rate were collected through the Booth Level Officers (BLO) and Corona on duty school teachers working in the different Gram Panchayat of Mungeli district of Chhattisgarh State via the online mean of google form questionnaires. The BLOs and teachers were recruited by sharing and circulating the URL links of Google Survey forms in English and Hindi language through social media platforms such as Gmail, WhatsApp and Facebook. Ethical approval was obtained from the medical officers of all three block of district Mungeli. Further, data was recorded in the MS Excel worksheet for analysis.

## **Findings and Discussion:**

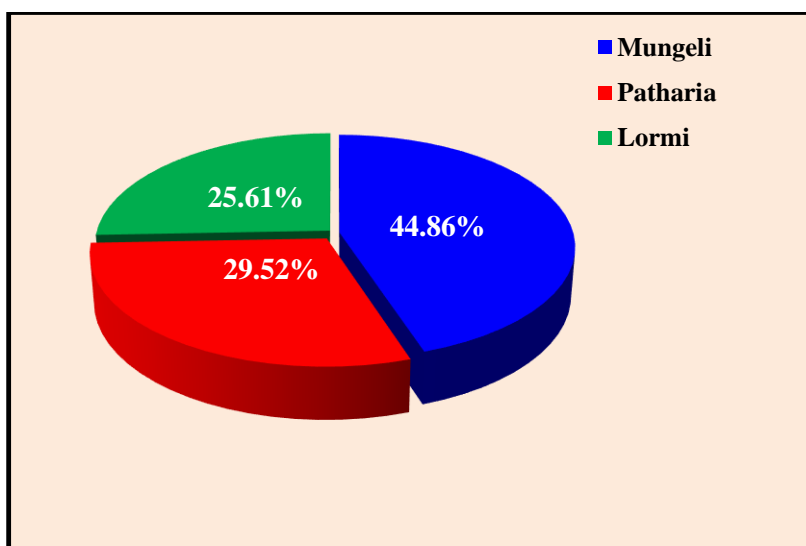
### **Age wise study of Corona case**

According to Census, 2011 a total of 669 villages of 350 Gram-Panchayat lies under the three major blocks of Mungeli district i.e., block Mungeli (282 villages), block Patharia (228 villages) and block Lormi (159 villages). For the current study block wise details of Corona cases along with the information of total death and health recovery rate were collected through the Booth Level Officers (BLO) and Corona on duty school teachers working in the different Gram Panchayat of Mungeli district of Chhattisgarh State via the online mean of google form questionnaires. The present three month study (February-2021, March-2021 and April-2021) of Corona cases clearly revealed that a total 613 people of district Mungeli were affected by Coronavirus disease (COVID-19) included 275 cases in Mungeli block followed by 181 from Patharia block and 157 from Lormi block respectively (**Table 1**). Moreover, the percentage of Corona patients were documented maximum in Mungeli block with 44.86% than Patharia Block (29.52%) and Lormi block (25.61) **Figure 1**. In contrast of months the month of April 2021 shows the maximum infection of COVID-19 as compared to month of February 2021 and March 2021 for all three blocks of Mungeli district (**Table 1 and Figure 2**).

On the other hand age wise analysis of Corona patients depicted that in Mungeli block the maximum number of Corona case prevailed between the age group of 30-40 year and 50-60 year people followed by 40-50 years, 20-30 years, 60-70 years and 10-20 years age group. However, very few cases were recorded with the age group of 0-10 years and 70-80 years restricted with month of April 2021 only (**Figure 3**). In Patharia and Lormi block the maximum number of Corona case prevailed between the age group of 40-50 year followed by 50-60 years, 30-40 years, 60-70 years, 20-30 and 10-20 years age group. However, very few cases were recorded with the age group 70-80 years in April 2021 while there was no case recorded for the age group of 0-10 years (**Figure 4 and Figure**).

**Table 1: Age wise distribution of Corona patients between three blocks i.e., Mungeli, Patharia and Lormi under Mungeli district of Chhattisgarh, India**

<b>Mungeli Block</b>									
<b>Month of Study/ Age Group (Years)</b>	<b>0-10</b>	<b>10-20</b>	<b>20-30</b>	<b>30-40</b>	<b>40-50</b>	<b>50-60</b>	<b>60-70</b>	<b>70-80</b>	<b>Total</b>
February-2021	-	-	-	11	16	18	9	-	54
March-2021		2	13	17	21	20	8	-	81
April-2021	3	6	21	36	22	36	11	5	140
<b>Total</b>	3	8	34	64	59	74	28	5	<b>275</b>
<b>Patharia Block</b>									
February-2021	-	-	2	9	11	15	6	-	43
March-2021	-	-	5	11	14	17	4	-	51
April-2021	1	3	12	17	19	23	9	3	87
<b>Total</b>	1	3	19	37	44	55	19	3	<b>181</b>
<b>Lormi Block</b>									
February-2021	-	-	1	4	7	10	4	-	26
March-2021	-	2	2	8	11	14	2	-	39
April-2021	-	2	11	17	27	22	11	2	92
<b>Total</b>	-	4	14	29	45	46	17	2	<b>157</b>



**Figure 1: Percentage of Corona case between three blocks i.e., Mungeli, Patharia and Lormi under Mungeli district of Chhattisgarh, India**

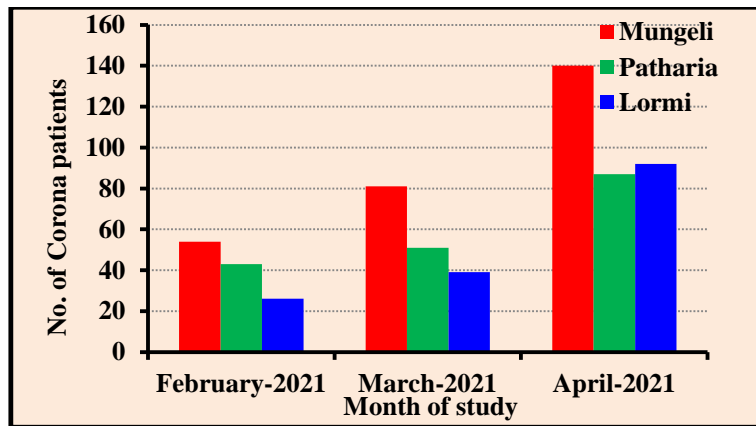


Figure 2: Month wise Corona case between three blocks i.e., Mungeli, Patharia and Lormi under Mungeli district of Chhattisgarh, India

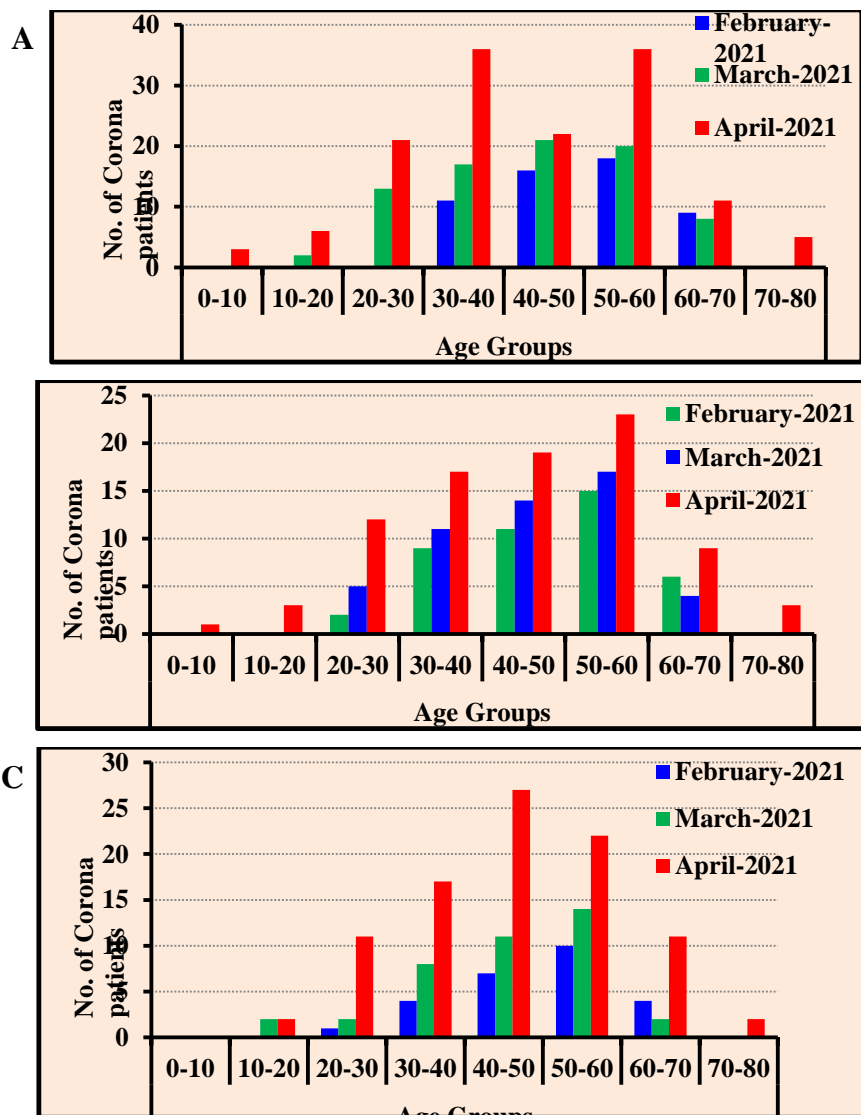


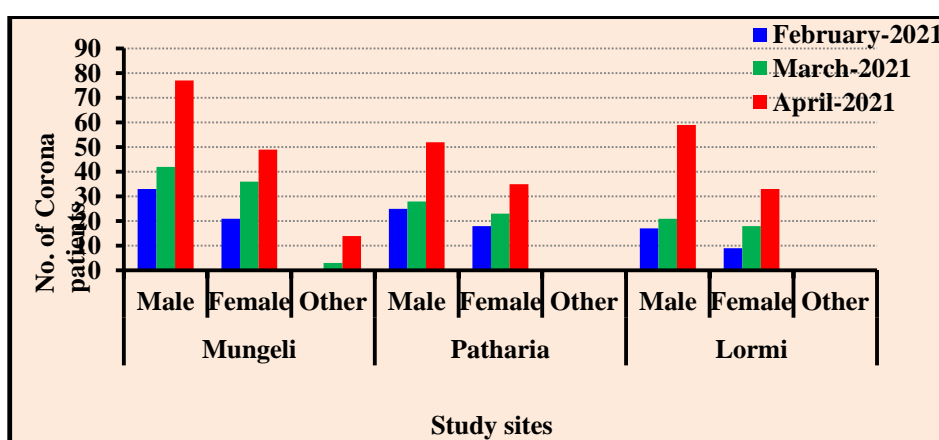
Figure 3: Age wise Corona case under Mungeli district of Chhattisgarh: A. Mungeli block, B. Patharia block and C. Lormi Block

### Gender wise study of Corona case

The results of gender wise analysis of Corona cases clearly indicated that during this three month (February, March and April 2021) of pandemic male were highly affected as compared to the females for all three blocks (Mungeli, Patharia and Lormi) of Mungeli district of Chhattisgarh. However, very few Corona patients (17) were recorded at urban area of Mungeli belonging from other i.e. people third gender category (Table 2 and Figure 4).

**Table 2: Gender wise distribution of Corona patients between three blocks i.e., Mungeli, Patharia and Lormi under Mungeli district of Chhattisgarh, India**

Mungeli Block				
Month of Study/ Gender	Male	Female	Others	Total
February-2021	33	21	0	54
March-2021	42	36	3	81
April-2021	77	49	14	140
<b>Total</b>	<b>152</b>	<b>106</b>	<b>17</b>	<b>275</b>
Patharia Block				
February-2021	25	18	0	43
March-2021	28	23	0	51
April-2021	52	35	0	87
<b>Total</b>	<b>105</b>	<b>76</b>	<b>0</b>	<b>181</b>
Lormi Block				
February-2021	17	9	0	26
March-2021	21	18	0	39
April-2021	59	33	0	92
<b>Total</b>	<b>97</b>	<b>60</b>	<b>0</b>	<b>157</b>



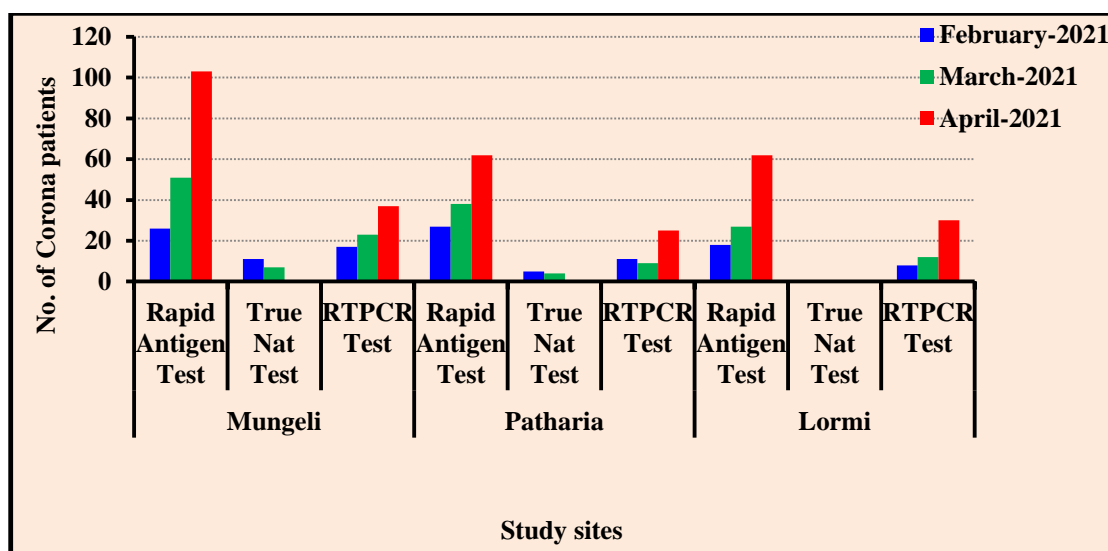
**Figure 4: Gender wise Corona case between three blocks i.e. Mungeli, Patharia and Lormi under Mungeli district of Chhattisgarh, India**

### Preference of COVID-19 Test Kit by Corona patients

The observations of preferences of COVID-19 Test Kit by Corona patients' revealed that Rapid Antigen Test was found to be most preferred mean of test among suspected persons from all three blocks (Mungeli, Patharia and Lormi) of Mungeli district of Chhattisgarh. On the otherhand, the RTPCR test was the second most preferred mean of Corona test as compared to the TrueNat Test. However, no record was found for the preference of TrueNat Test in Lormi block of Mungeli district (Table 3 and Figure 5).

**Table 3: Preference of COVID-19 Test Kit by Corona patients between three blocks i.e., Mungeli, Patharia and Lormi under Mungeli district of Chhattisgarh, India**

<b>Mungeli Block</b>				
<b>Month of Study /Type of COVID-19 Test</b>	<b>Rapid Antigen Test</b>	<b>TrueNat Test</b>	<b>RTPCR Test</b>	<b>Total</b>
February-2021	26	11	17	54
March-2021	51	7	23	81
April-2021	103	-	37	140
<b>Total</b>	<b>180</b>	<b>18</b>	<b>77</b>	<b>275</b>
<b>Patharia Block</b>				
February-2021	27	5	11	43
March-2021	38	4	9	51
April-2021	62	-	25	87
<b>Total</b>	<b>127</b>	<b>9</b>	<b>45</b>	<b>181</b>
<b>Lormi Block</b>				
February-2021	18	-	8	26
March-2021	27	-	12	39
April-2021	62	-	30	92
<b>Total</b>	<b>107</b>	<b>0</b>	<b>50</b>	<b>157</b>



**Figure 5: Preference of COVID-19 Test Kit by Corona patients between three blocks i.e., Mungeli, Patharia and Lormi under Mungeli district of Chhattisgarh, India**

#### Area wise occurrence of Corona case

In the present study the area wise analysis shows that during this three month (February, March and April 2021), month of April was recorded as the most infectious month of Corona pandemic situation. However, the occurrence of Corona infection was recorded maximum in urban areas as compared to the rural area of Mungeli district of Chhattisgarh state (Table 4 and Figure 6).

**Table 4: Area wise occurrence of Corona patients between three blocks i.e., Mungeli, Patharia and Lormi under Mungeli district of Chhattisgarh, India**

Mungeli Block			
Month of Study /Area	Rural	Urban	Total
February-2021	20	34	54
March-2021	29	52	81
April-2021	63	77	140
<b>Total</b>	<b>112</b>	<b>163</b>	<b>275</b>
Patharia Block			
February-2021	11	32	43
March-2021	18	33	51
April-2021	31	56	87
<b>Total</b>	<b>60</b>	<b>121</b>	<b>181</b>

Lormi Block			
February-2021	9	17	26
March-2021	13	26	39
April-2021	34	58	92
<b>Total</b>	<b>56</b>	<b>101</b>	<b>157</b>

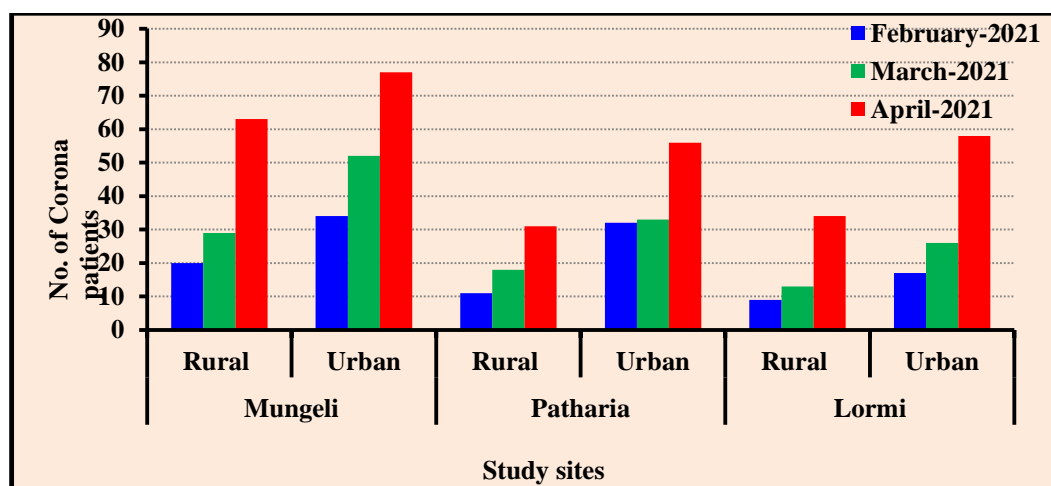


Figure 6: Area wise occurrence of Corona patients between three blocks i.e., Mungeli, Patharia and Lormi under Mungeli district of Chhattisgarh, India.

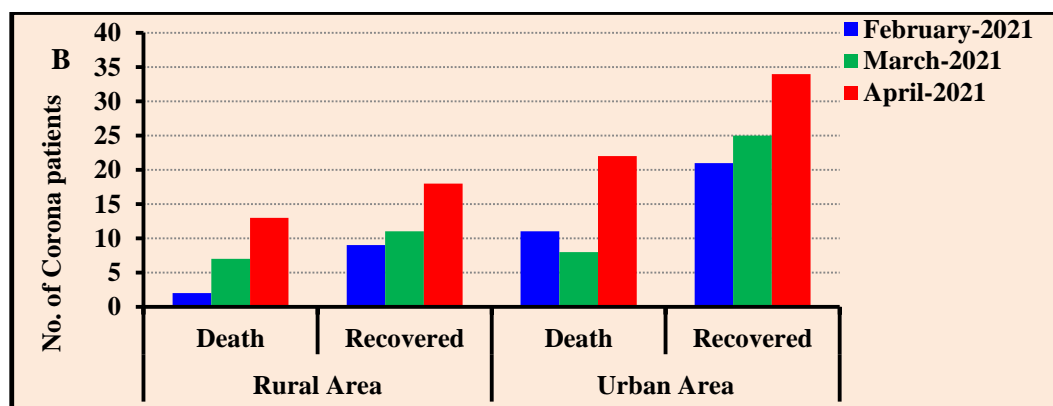
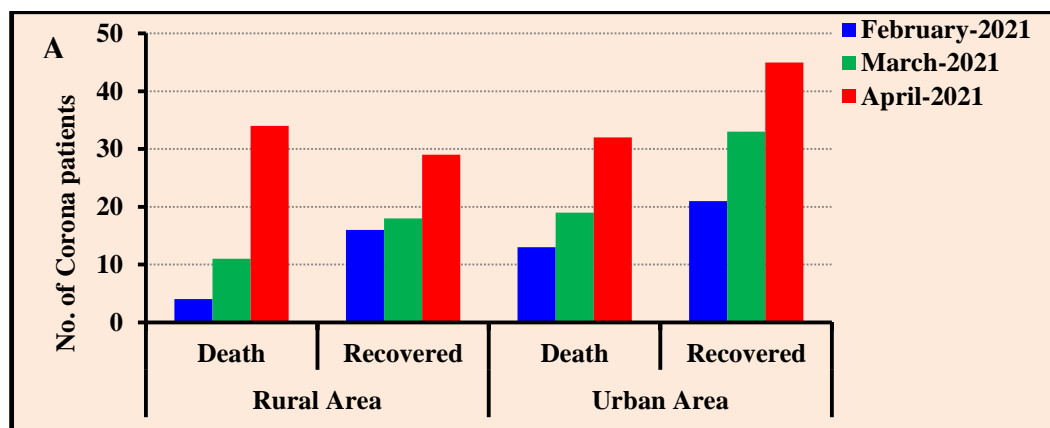
#### Death and recovery rate of Corona patients

The results of death and recovery rate of Corona patients revealed that both the death and health recovery rate of Corona patients was maximum in urban area of Mungeli district for all three block namely Mungeli, Patharia and Lormi. However, the maximum case death were recorded from block Mungeli followed by Patharia and Lormi block respectively (Table 5 and Figure 7A, B and C).

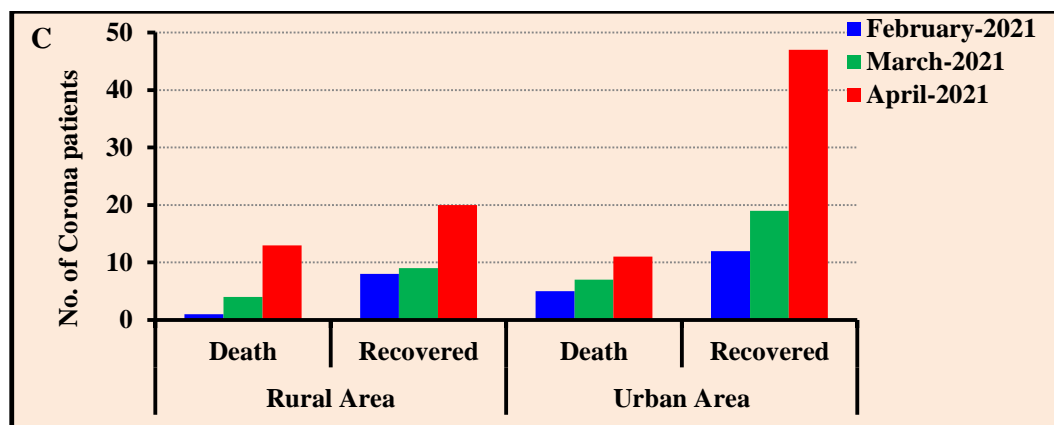
Table 5: Death and recovery rate of Corona patients between three blocks i.e., Mungeli, Patharia and Lormi under Mungeli district of Chhattisgarh, India

Mungeli Block					Total
Month of Study	Death Rate		Recovery Rate		
	Rural	Urban	Rural	Urban	
February-2021	4	16	13	21	54
March-2021	11	18	19	33	81

April-2021	34	29	32	45	140
<b>Total</b>	<b>49</b>	<b>63</b>	<b>64</b>	<b>99</b>	<b>275</b>
<b>Patharia Block</b>					
February-2021	2	9	11	21	43
March-2021	7	11	8	25	51
April-2021	13	18	22	34	87
<b>Total</b>	<b>22</b>	<b>38</b>	<b>41</b>	<b>80</b>	<b>181</b>
<b>Lormi Block</b>					
February-2021	1	8	5	12	26
March-2021	4	9	7	19	39
April-2021	13	20	11	47	91
<b>Total</b>	<b>18</b>	<b>37</b>	<b>24</b>	<b>78</b>	<b>157</b>







**Figure 9: Death and recovery rate of Corona patients in Mungeli Chhattisgarh: A. Mungeli block, B. Patharia and C. Lormi**

### Conclusion:

Although, the present study revealed that like the many part of country district Mungeli, Chhattisgarh is presently witnessing a rapid surge in the number of COVID-19 cases. Although the nationwide lockdown has been able to decelerate the spread, the country's ever-increasing population, remarkably high population density and poor socioeconomic conditions are major barriers in India's battle against COVID-19. However, the overall low case-fatality rate is reassuring. The Government of India and the health care providers have been relentless in their efforts. The citizens must also help support the fight against the pandemic by adhering to government advisories of containment and social distancing.

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# COVID-19: IMPACTS ON HUMAN HEALTH, ENVIRONMENT, EDUCATION SYSTEM AND SOCIOECONOMY

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## **Introduction:**

At the end of 2019, World Health Organization (WHO) reported a new disease in china as pandemic coronavirus COVID-19 (1). COVID-19 belongs to a group of acute respiratory disorders, which was reported for the first time in Wuhan Hubei, China. It was a newly found strain of the virus that was unknown to man .(2-4) Meanwhile sequence of the novel virus genome showed similarities to SARC-CoV from 2002-2003 outbreak and Later, it was named severe acute respiratory syndrome coronavirus type 2 ( SARS-CoV-2) by the International Committee on Taxonomy of Viruses because of its resemblance to SARS Coronavirus.(5) Novel SARC-CoV-2 virus was quickly tramissible, spread over 200 countries and infecting more than 40 million people and claiming over a million lives to date (6). Ultimately, this virus can leads to respiratory infection and patients showed symptoms similar to ppneumonia.

In this review article we have summarised the influence of COVID-19 on health, as well as some alternative nutrients that can help infected people strengthen their immune systems.On other hands,we discussed the advantages and disadvantages of COVID-19 in terms of the environment (water,air,waste management and energy consumption),as well as the of the pandemic on the human psyche,The education system and the global economy.We also have proposed recommendations to migrate various adverse consequences of the. Finally we have mentioned some bibliographic hypothesis of the influence of climate on the spread of virus.

## **Impact of COVID-19 on Health**

The novel coronavirus pandemic is the biggest public health crisis the world has faced in more than a century. Highly contagious and infectious SARS-CoV-2 causes bioaerosols that transport pathogenic microorganisms, thus affecting public health [7]. Clinical symptoms of COVID-19 are respiratory or cardiovascular complications [8]. Bouhanick et al. (2020) assume that infected diabetic patients are more at risk of severe pneumonia with an advanced proinflammatory and prothrombotic state [9]. According to Li *et al.* (2020), cardiovascular

disease is also a risk factor for the progression and prognosis of COVID-19 [10]. The latter, when infected with the disease, may present with severe pneumonia. Indeed, the release of enzymes linked to tissue damage exposes the patient to a greater risk of cytokines by causing a hypercoagulable state [10]. The research team of Segars et al. (2020) describes the state of coronaviruses and their impacts on human reproduction, in particular the behavior of male and female gametes [11]. According to Saqrane and El Mhammedi (2020), SARS-CoV-2, which is a virus belonging to the large coronavirus, is responsible for precise respiratory distress [12].

### **Nutritional Support for COVID-19 Patients:**

Good nutrition is central to the regulation of immunity for patients infected with COVID-19. The right choice of foods helps to balance the immune system and optimize its function. In addition, an optimal nutritional diet can positively control oxidative stress. For this reason, it is recommended to choose a predominantly vegetable diet rich in antioxidants, to privilege foods with a low glycemic load, to prefer cooking foods with gentle steam, to favor organic food without contaminants, to practice intermittent fasting, and to take care of the hygiene of life (practice physical activities, avoid the consumption of alcoholic beverages and tobacco, meditate, and think positively).summarizes some of the foods recommended by several researchers and their positive effects on the immune mechanism.

### **Impact of COVID-19 on Environment:**

#### **Impact of COVID-19 on Water Quality**

Population growth and the increase in agroindustrial activities are creating increasing pressure on the planet's freshwater reserves [13,14]. Indeed, these activities generate a great diversity of pollutants that flow into the water cycle, jeopardizing the fragile natural balance that has allowed life to develop on earth [15]. From an environmental point of view, the aquatic environment is the favorite site for the reception of very complex human and industrial waste [16]. This waste generates more and more pollution, threatening the environment and human health [17,18]. All countries in the world are concerned with safeguarding freshwater resources, either because they lack water or because they pollute it [19]. The disparity between the needs and the availability of water requires imagining new means of transport and treatment to increase the availability of resources [20]. Protecting water resources has become an even more complicated challenge due to the COVID-19 pandemic which has negatively impacted water quality: First, there is a great possibility of transmitting and detecting ribonucleic acid of SARS-

CoV-2 in wastewater through the stools of people infected with this virus [21]. Second, the high consumption of water and the high use of detergents in the period of COVID-19 allowed the transmission of several organic and metallic compounds in domestic waters and consequently the degradation of the water quality. For this reason, decision makers recommended to control new harmful species present in water during the period of COVID-19 and to carry out strategies for the sustainable management of water resources.

### **Impact of COVID-19 on Air Quality**

Despite the harmful effects of COVID-19, it also has positive indirect effects on the environment, including improving air quality by reducing greenhouse gas emissions such as sulfur dioxide, nitrogen oxides, and particulate matter resulting from anthropogenic human activity such as waste incineration and fuel combustion [22,23]. Several studies suggest that industrial limitations following the COVID-19 health crisis are the main causes of reduction in ambient air pollutants except for ozone [24]. Indeed, the increase in ozone concentration could be linked either to the decrease in ambient nitrogen oxides in urban areas in which volatile organic compounds are limited or to the reported reductions in airborne particles which are responsible for solar activity [25-29]. In addition, during sanitary containment, fewer ambient suspended particles would constitute a less-efficient sink for hydroperoxy radicals, thus increasing the production of ozone-induced by proxy radicals [30-32]. During the short period of confinement, the shutdown of several industries leads to a reduction in the large quantities of atmospheric pollutants resulting from the combustion of carbon, in particular carbon oxides, sulfur oxides, nitrogen oxides, particles in suspension, and heavy metals. Wang and Su (2020) show that nitrogen oxides react with other chemicals to form acid rain [33]. During the lockdown, air quality in all countries of the world has improved remarkably thanks to the strict restriction and adoption of quarantine measures and traffic control.

### **Impact of COVID-19 on Waste Management**

The spread of the health crisis of the COVID-19 pandemic has caused an increase in the use of single-use protective equipment posing massive pressure and significant challenges in the waste management sector [34]. The daily lifestyle and eating habits of the majority of people have undergone a drastic change due to the consumption of food during this pandemic period [35-38]. Furthermore, this epidemic is leading to the emergence of other additional sources of waste which cause complexities in the management of municipal solid waste for governments

and organizations that have collected and sorted the waste [39-41]. Frequent use of personal use products and panic shopping is reported to trigger high environmental contamination generated by plastic waste [42]. This latter waste is associated with the need to package requests for the distribution and take-out of food or medical use [43 44]. Some researchers have found that most people mix COVID-19 protective gear with household waste, which can cause the virus to spread [45]. In addition, during this health crisis, the world has seen a great increase in the amount of biomedical waste generated such as human tissues, body fluids, cotton swabs, bandages, needle syringes, blood bags, and disposable materials (masks, gloves, gowns, hair covers, etc.) [46]. Generally, for good management of solid waste, it would be preferable to recommend (1) carrying out statistical studies on the rate of waste production while covering the different sources of production including hospitals and laboratories [47,48], (2) separation of the different types of waste at the source to put potentially infected waste in hermetically sealed bags and to recycle uncontaminated waste using safe practices as improper sorting could lead to increased costs of their management [49,50], and (3) the implementation of special regulations on the statistical data of medical waste collected during the confinement period [51].

### **Impact of COVID-19 on Human Psychology**

The rapid spread of the COVID-19 pandemic has led to a high death rate and, therefore, negatively impacts mental health, thus causing social concerns due to government restrictions (confinement, curfew, etc.) [52,53]. Therefore, the symptoms of distress, depression, posttraumatic stress disorder, anxiety, frustration, and suicide could stem from the length of the duration of the sanitary measures taken to control the virus [54,55]. To overcome these psychological problems, it is recommended to train psychologists and social workers in the management of the effects of pandemics and health emergencies [56,57] and to sensitize patients to consult psychologists to reduce the risk of contagion [58,59].

### **Impact of COVID-19 on the Education System**

During the COVID-19 period, government officials and policymakers have closed universities and public and private schools to control the spread of the virus by replacing the traditional teaching method with teaching online by maintaining the use of interactive educational tools including platforms for the creation of skills development courses and programs [60,61]. These tools have a host of benefits that stimulate student learning during this critical time [62]. First of all, these remote educational means allowed us to avoid the White

Year and its economic and social repercussions. In addition, these distance courses are more flexible and more suitable for students with physical disabilities as they only require reduced mobility [63]. Finally, the spirit of engagement and self-exploratory learning could gradually develop through this new educational technology [64]. However, distance education pedagogy is not without its drawbacks [65,66]: First, some low-income schools have not been able to gain access to online education solutions despite efforts and commitments to address the learning loss. Second, the technophobia, the unavailability, and the lack of follow-up and supervision by some parents in this period make learning more complicated in children, especially for those who have difficulty adapting to the new educational environment, and/or their critical economic and social situation does not allow them to dispose of and purchase online learning devices. Third, poor Internet connectivity will hamper communication between teachers and their students. To improve the quality of education, we recommend (1) developing new policies to support the entry of young graduates into the labor market and avoid unemployment, (2) improving the connection speed and the audiovisual quality of the platforms used, (3) prerecording course videos for later use, (4) educating the parents of students about the use of parental controls on technological devices, (5) examining the plagiarism of responses from students and/or candidates assessed remotely, and (6) free provision of electronic and technical equipment and resources for people with limited individual incomes.

### **Socioeconomic Impact of COVID-19**

The global health crisis of COVID-19 has imposed social isolation where citizens of different countries are prohibited from going out and carrying out their usual activities, thus harming the global economic situation [60]. The consequences of the health restrictions suddenly put in place are the reduction in tourist activity, the weakening of industrial deliverability, the fall in demand from abroad, the dismissal of people, and the reduction of the human budget [67]. To alleviate the economic impact of the pandemic, we recommend (1) building trust among citizens by authorities by communicating honestly, (2) improving the quality and access to essential services through the development of digital payments to reach vulnerable populations who work in the informal economy or do not have a bank account, (3) protecting businesses and families from the risk of eviction and bankruptcy, (4) the search for long-term social, economic, and environmental cobenefits as part of their stimulus investments, (5) the creation of jobs for the benefit of the unemployed and young graduates, (6) taking into account the capacity of a project to directly replace failing demand and its impact on import levels or the country's trade

balance, (7) the organization of interventions to strengthen the capacities of societies and economies to face an external shock and to overcome it like the current COVID-19 pandemic and also other forms of disasters' natural factors and the future effects of climate change, (8) support and generalization of green technologies by investing in networks that facilitate the use of renewable energies and electric vehicles or low-tech solutions, such as reforestation or restoration and management of landscapes and watersheds without incurring significant costs for the economy in the decades to come due to the depreciation of assets, and (9) supporting politicians on the road to recovery.

### **Impact of Climate on the Spread of COVID-19**

Several studies confirm the effects of air temperature and humidity on the coronavirus. The researchers were able to establish the existence of a causal link between the climatic conditions and the number of new positive cases and deaths. A study by Mesay Moges Menebo (2020) in Oslo (capital of Norway) states that temperature and precipitation are correlated with the incidence rate of daily cases of COVID-19 at maximum and normal temperatures and positively associated with COVID-19 while precipitation is negatively associated . According to K. H. Chan *et al.* (2011), coronaviruses do not survive in hightemperature countries such as Malaysia, Indonesia, and Thailand, while the spread is intensive in low-temperature countries [90]

### **Conclusions:**

In response to the COVID-19 pandemic, government officials and policymakers have compulsorily implemented lockdown measures that have influenced the environmental and economic situation, as well as human psychology and the educational education system in the whole world. From an environmental perspective, reductions in transport and mobility have reduced greenhouse gas emissions and reduced demand for industrial and commercial energy. In addition, the poor management of waste and the decrease in water quality in this period of COVID-19 are due to the lack of awareness of citizens. The health restrictions suddenly put in place lead to the deterioration of human psychology, the modification of the education system, the reduction of tourist activity, the dismissal of employees, and the decrease in the human budget and the gross domestic product.

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## **COVID-19 AND ONLINE EDUCATION IN INDIA: PROBLEMS AND PROSPECTS IN A DIGITALLY DIVIDED SOCIETY**

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### **Abstract:**

Online education is not totally a new phenomenon, since the advent of Information and Communication Technology it was always there as an option. However, during the pandemic, it became the only one option for education. Educational institutions- being the places of massive gathering-were the first to be locked down and perhaps were the last to be unlocked. A large number of students, teachers and institutions were almost clueless about their future. After few weeks of initial confusion, gradually the whole teaching-learning and evaluation process was shifted to the digital platform and terms like digital learning, online learning, e-resources, online examination etc. became the household words and finally the online teaching-learning became the new normal of education in India. But looking at the vast digital divide in India, it seems quite utopian to assume that all students, teachers and educational institutes across region, class & gender are equally placed in this new digital space. Many questions need to be raised like can online education in a digitally divided society like India ensure the democratic promise of education for all? Would it not marginalize those sections of the population who were already at margin? How prepared are we for this digital shift with poor electricity supply in some geographical regions especially the rural India and jerking internet connectivity? What measures should be taken to distribute benefits of online education equally among different sections of the population in a digitally divided society? The present paper aims at analyzing the problems and prospects of online education in a digitally divided society.

**Keywords:** Information and Communication Technology, Digital Space, E-learning, Digital Divide, Online Learning.

### **Introduction:**

There are many terms which are often used interchangeably like e-learning, ICT based learning, online learning, web-based learning and digital learning. Organization for Economic

Cooperation and Development defined e-learning as the ‘use of information and communication technology to enhance and/or support learning in tertiary education’ (OECD, 2005). European Union defines e-learning as ‘the use of new multimedia technologies and the internet to improve the quality of learning by facilitating access to resources and services as well as remote exchange and collaboration’ (Reding, 2003). Information and communication technology brought major shift in the field of education. However, integration of ICT in the conventional teaching-learning process has gone through many phases. In the early phase, it was mainly used to enhance the quality of teaching-learning process, then gradually it started giving an alternative to conventional teaching-learning method and created new opportunities in the field of education. Online learning can be divided into different types on the basis of integration of ICT in teaching-learning: Adjunct E-learning, Blended E-learning and Completely Online Learning- Synchronous and Asynchronous.

### **Perspectives on Online Education**

A number of studies have been done on pros and cons of online learning. Broadly, there can be two perspectives of looking at and analyzing the phenomenon of online learning: first; Effectivity Perspective & second; Feasibility Perspective.

The effectivity perspective mainly deals with the question that how effective is the online learning in comparison to traditional classroom teaching. Studies have been conducted to explore the potentials of online learning in attaining the goal of quality education where learning will be more creative, learner-centric, self-directed and self-paced. The major arguments in support of online learning are that it promotes self-guided learning (Lin and Hsieh, 2001; Mc Way, 2001) and gives learners more control over learning process and keep them self-motivated (Reeves, 1993; Ryan and Deci, 2000; Farchild *et al.*, 2005). Many empirical studies have been done to know the perception of learners and instructors and to measure the effectivity of online learning. Modes of online learning and its effectivity like synchronous learning, asynchronous learning, blended learning and adjunct e-learning are explored. During the pandemic also studies were conducted to understand and analyze the perception of the learners for online learning (Muthuprasad *et al.*, 2021). Further, comparative studies of different online learning platforms in terms of student engagement, personalized learning and active learning are also conducted (Pena, Tello and Camera, 2011). On the basis of the findings of the studies conducted on effectivity of online learning, it can be said that, in terms of effectivity, it is a mixed baggage of boon and bane. Some of its advantages are:

- Learner-centric
- Cost efficient
- Removes geographical barriers
- Makes education more accessible
- Effective means for life -long learning, adult learning and corporative learning
- Flexibility for both the learner and educator.

On the other hand, it has some downside too in terms of its effectivity:

- Less effective than traditional classroom teaching in terms of immediate clarification, explanation and interpretation.
- May negatively affect socialization of child.
- Converts the role of the teacher to only an instructor and therefore, may weaken teacher-taught relation.
- Limits the possibilities of peer learning
- Increase in screen timing, especially in kids, may have health repercussions.

However, the question of effectivity of online learning cannot be understood in isolation with the question of feasibility. In other words, a very important question, while evaluating the possibilities and prospects of online education, is whether online education is feasible or not. When we talk about the learner, instructor and learning space, all these three are situated in a socio-economic and cultural context and without reflection on that context any study of online learning would be flawed. Socio-economic, ethnic and geographical location of the learner and the instructor determines their place in the digital learning space in a digitally divided society and thereby the distribution of the benefits of online learning.

### **Understanding Digital Divide in India**

Digital divide is basically the gap between those who have access to ICT tools and have skills to operate those devices and those who haven't such access. It has many dimensions like digital divide between developed and developing countries; urban and rural population, rich and poor; men and women and so on. According to Merriam Webster Dictionary, digital divide is the economic, educational, and social inequalities between those who have computers and online access and those who do not. OECD defines digital divide as 'the gap between individuals, households, businesses and geographical areas at different socio-economic levels with regard to both their opportunities to access information and communication technologies and to their use



of the internet for a wide variety of activities' (OECD, 2001). Digital divide can be measured on the basis of availability of computers, mobiles, tablets and other such electronic devices, internet connectivity and skills to operate ICT tools. Digital divide has broadly three dimensions: (1) the 'Access Divide' which refers to access to essential ICT tools (2) the 'Use Divide' which is associated with the difference in the skills to operate these devices and (3) the 'Quality of Use Gap' which relates to the different ways in which people use the internet and difference in their ability in making optimum use of internet (Taylor, 2022).

The debate on digital divide has occupied a center stage since the outbreak of Covid-19 because now the only one way of being connected is digital mode. But this debate started decades back around 1980s when scholars started talking about the gap between 'information rich and information poor' (Crocini, 2002). Now there is a consensus among scholars that in the present age of information revolution, any discourse on social justice and social equality would remain incomplete without addressing the question of digital access and digital equality. Digital divide 'is a threat to social and economic justice as well as to education' (Tarmen, 2003).

In Indian society also there is deep digital divide. Referring to the state of digital divide in India and its implication for education, UNICEF reported that 'online education is not an option for all as only one in four children has access to digital devices, only a quarter of household in India has access to the internet and there is a large rural-urban and gender divide' (UNICEF, 2022). The joint report of UNESCO and UNICEF stated that 'closures have affected millions of learners from preprimary to secondary levels of schooling. The transition from face-to-face to distance learning has shone a spotlight on the vast inequalities within the education system between and within states. Inequalities are seen in the capacity of teachers, learning outcomes, digital infrastructure provided by the government and access to technology. Although a lot of digital content has been generated and transmitted to help children continue to learn from home, there is limited evidence on the extent to which this content reaches children; whether they are engaging with it; and the impact it is having (UNESCO and UNICEF, 2021). It is reflected in increased drop-out rate during pandemic and most of the drop-outs were from those sections who are at the fringes of the digital space who could not afford access to digital learning space as well as tuition fees of schools. In a study conducted by Child Fund India (a Delhi based NGO) across 20 backward districts in 10 Indian States, it was found that about 64 % of children in rural India are at the verge of dropping-out unless provided with additional support (Child Fund India, 2021).

*National Sample Survey on Key Indicators of Household Social Consumption on Education in India (75<sup>th</sup> Round)* reveals the state of deep digital divide in India. According to it, only 4.4% household in rural India and 23.4 % in urban India have computers while 14.9% rural households and 42.0% urban household have internet connectivity. This data also explains the rural-urban digital divide. Regarding the skills to operate ICT tools, the Survey informs that 9.9% rural population and 32.4% urban population can operate computers and 13% rural population and 37.1% urban population can use internet. Highlighting the gender dimension of the digital divide, the Survey reports that 7.0% rural women and 26.9% urban women can operate computers while 8.5% rural women and 30.1% urban women know how to use internet. The survey, further, highlights the regional dimension of digital divide; Delhi is at the top where 34.9% households have computers and Odisha is at the bottom where only 4.3% households have computers. Similarly, 55.7% households in Delhi have internet while only 10.0% household in Odisha have internet facility (NSS 75<sup>th</sup> Round, 2019).

Internet and Mobile Association of India also highlighted the status of digital divide in India in its report of 2019. On regional dimension of digital divide, it reports that ‘At a state level, NCT of Delhi has registered the highest internet penetration followed by Kerala, Jammu & Kashmir, Himanchal Pradesh, Punjab. States in the East, except Assam and North East, have low internet penetration’. It, further, draws attention to the gender divide in the digital space and points out that ‘in today’s increasingly connected world where internet population is increasing every year. We still see a clear gender divide. There are fewer female internet users in India as compared to males...There is a high disparity between male and female internet users which is more evident in rural (India)’ (Internet and Mobile Association of India, 2019).

### **Digital Divide in India and Challenges for Online Education and its Remedies**

The above data makes it very clear that everyone does not have equal access to digital space of learning and there are many who are at the periphery. Those who belong to deprived groups- female students especially from deprived sections, rural students, students coming from lower strata of society and first-generation learners – cannot participate in the digital space of learning unless concrete steps are taken to bridge this digital divide. To illustrate, the National Right to Education Forum informs that girl students are at higher risk of dropping out. It reports that more than 10 million girls are at risk of dropping out. Some of the major challenges for the students of deprived sections in coping with the online learning are:

- They do not have access to internet facility and cannot afford digital devices.

- They lack in basic skills to operate these devices.
- There are also students especially rural students who are not able to charge their mobiles because of inequal access to electricity.
- The families are living in small houses and students in such families hardly get a learning space. When they come to school, it is the responsibility of the school to give them learning space now this whole responsibility has come on students. Unfortunately, every student does not have the luxury of room of one's own because the whole family lives in one room and there are also families who do not have even that one room.

These challenges make it quite clear that all arguments given in support of online learning like it is cost effective, removes geographical barrier and makes education more accessible need a re-analysis in a world with deep digital divide. There is no denial that online learning has immense potential not only in terms of quality of education but also in ensuring accessibility to quality education. But for that concrete step should be taken to bridge the digital divide and to make the digital space democratic where everyone can have equal access. During the pandemic, major steps have been taken by the Government as well as non-Government agencies in India to meet the challenges posed by Covid-19 to education sector and to protect children's right to education. Highlighting these efforts, UNESCO and UNICEF joint report rightly points out:

The Government has taken several steps to reduce the negative impact of COVID-19 on the education sector. The system has been quick to transition to distance learning, teachers have worked hard to adapt to the changing nature of their role, and parents and communities have come together to support their children's learning. India's education sector saw a surge in solutions to support students during the COVID-19 lockdown. They included core remote-learning solutions (traditional tools such as textbooks and home visits, tech-enabled and mass communication solutions such as WhatsApp, YouTube, TV and radio, and blended solutions that combine face-to-face with e-learning) and learning enabling solutions (such as midday meals, sanitation kits and monetary support). The Ministry of Education has also made a strong effort to create a repository of learning content and implement EdTech interventions (in partnership with NGOs) to increase access to digital learning. Notable government e-learning platforms include Digital Infrastructure for Knowledge Sharing (DIKSHA), e-Pathshala, Swayam and the National Repository of Open Educational Resources (NROER)(UNESCO & UNICEF (2021)).

Despite these efforts, it cannot be denied that there are number of children who dropped out because of inequal access to digital space. Therefore, a multi-pronged approach should be adopted to bridge digital divide. Thus, the question of effectivity of online education is integrally associated with the question of its feasibility. The National Education Policy 2020 also emphasizes the need for bridging digital divide to get benefit of online education: ‘benefit of online education cannot be leveraged unless the digital divide is eliminated through the concerted efforts such as the digital India campaign and the availability of affordable computer devices. It is important that the use of technology for online and digital education adequately addresses concerns of equality’ (NEP, 2020). Some of the suggestions for creating an equitable online learning space are:

- Introduction of special schemes for providing the students and teachers from marginalized sections with digital devices. National Education Policy 2020 also proposes ‘the possibility of providing adequate access to SEDG (socio-economic deprived groups) students and teachers through suitable digital devices, such as tablets with pre-loaded content will be considered and developed.’ (NEP, 2020)
- Special internet packages for students and teachers from marginalized sections. Osama Manzer from Digital Empowerment Foundation suggests that there should be some schemes like Pradhanmantri Free Talk Time and Internet Yojna.
- Special digital skill training programmes should be conducted for the students and teachers especially from the deprived sections.
- There should be more rigorous use of Television and Radio for educational programmes to reach the unreached. As NEP promises ‘Given the fact that there still persists a substantive section of the population whose digital access is highly limited, the existing mass media such as television, radio and community radio will be extensively used for the telecast and broadcast’ (NEP, 2020). It is to be noted that concrete steps have been taken by the Government of India in this direction during the pandemic (Jena, 2020).
- There is a need for setting up digitally integrated ecosystems in rural areas with a community wireless network and an information resource centers. More efficient roles should be played by Common Service Centers (CSCs) in villages.
- Wi-fi routers may be deployed for students in the disadvantaged communities with free access.
- Telecom companies should be motivated to offer free Voice and Data Services for deprived section of the population as part of Corporate Social Responsibility.

The above measures can be helpful in coping with the issue of digital divide and would enable the students across region, class and gender to get the benefits of online learning.

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## **THE ROLE AND IMPORTANCE OF HERBAL MEDICINAL PLANT USED FOR THE TREATMENT OF PATIENTS INFECTED WITH COVID-19**

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### **Abstract:**

India is blessed with incredible culture and rich in heritage. India does not require any introduction related to herbal plants it has strong base for Ayurveda, from the ancient period it has traditional herbal medical system. Herbal plants play an important role in preventing and treating of human diseases. People uses plants as a traditional medicine from years and years. Plants have been associated with the development of human civilization around the whole world. However, plants are not only considered as rich sources of photochemical ingredients which enable to have medicinal value. Medicinal plants are a potential source for the development of new herbal drugs. The treatment against COVID-19 is presently lacking. The best way is to strengthen our immunity naturally with the help of medicinal plants/herbs in spite taking chemicals which are very harmful for our immune system. There are other certain ways to boost the 'immune system' such as active lifestyle, physical exercise, healthy diet, relaxation, and sound sleep. Comprehensive scientific studies required to make medicinal plants available as robust medicine to fight against viral diseases like COVID-19. Thus, the aim of this review is to present main herbal products, their source, characteristics, and potential antiviral actions concerning COVID-19 in support of maintaining health in the time of Corona and to understand the knowledge of the medicinal plants. According to the Botanical Survey of India, India is home to more than 8,000 species of medicinal plants. The country has a rich history of traditional healing systems, many of which list the use of these plants.

**Keywords:** Medicinal plants, importance of immunity in Covid 19, phytoantiviral, pharmacological effects, photochemical ingredients

## **Introduction:**

The COVID-19 pandemic is an ongoing global pandemic caused by severe acute syndrome (SARS-CoV-2). This virus was first identified from Chinese city of Wuhan in December 2019, and attempts to contain it there failed, allowing it to spread across the globe. The World Health Organization (WHO) declared a Public Health Emergency of International Concern on 30 January 2020 and a pandemic on 11 March 2020. As on 27 December 2021, the pandemic had caused more than 279 million cases and 5.4 million deaths, making it one of the horrible.

As there is no standard treatment against COVID-19 all preventative measures such as hand cleaning with soap and sanitizer, mouth, and nose coverage with mask during sneezing and coughing are being advised to stop the spread of COVID-19. The observation of the death pattern of COVID-19 patients revealed that early deaths were in older people, probably because of the poor immunity, which promotes faster progress of COVID-19. Therefore, it is significant to boost our immune system. It is important to suggest that people should use some supplements to boost their immune systems. So keeping this in mind now a days, there is a growing demand for natural products with therapeutic activities, including antioxidant activity, which can overcome the harmful effects of free radicals, and low toxicities compared with synthetic antioxidants that are widely used in packaged food products, cosmetics, and drugs. Among the main chemical compounds responsible for the antioxidant activities of medicinal plants, phenolic compounds and flavonoids are the most prominent because of their roles against oxidative stress, antimicrobial activities. These properties have proved 60% of the antimicrobial drugs discovered in the past few decades are of natural origin. Plants materials are used in Ayurvedic methods of the treatment. Generally, they are ecofriendly and without any side effects. Various parts of medicinal plants are popular for their antiviral activities and immunity strengthening capacity. During the time, when the whole world is busy in protecting ourselves from coronavirus, it is necessary to take extra precautions. Therefore, we require a healthy and strong immune system. The best way is to strengthen our immunity naturally with the help of medicinal plants/herbs. Some of the important medicinal plants are as follows that potentially can help in boosting immunity against COVID-19:

## **Importance of Medicinal Plants**

Ayurvedic herbs are time tested for their health and other benefits. The nutritive value that they pack is highly recommended for their healing powers. Known to induce no side effects,



they have a unique aroma and flavor and when consumed regularly, they act as a perfect mechanism to bring about a balanced harmony between mind and body. They rejuvenate the whole system instead of focusing on one specific organ or body part. Some herbal medicine used in COVID-19

### 1. Drumstick tree (*Moringa oleifera*)

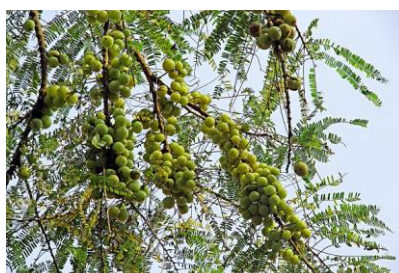
The most important nutrients we require for immunity are Vitamin C, Vitamin A, and protein – all of which are abundant in Moringa. This is a very common Indian vegetable which is rich in antiviral, antifungal, and anti-inflammatory properties. It contains more Vitamin C than oranges. Vitamin C is the chief nutrient that our bodies need to build strong immunity. During COVID-19 pandemic, it should be your go-to herb for immunity strengthening. The pods of trees are cooked as food in various states of India. It also shows a protective effect in the prevention of in vitro glucose-induced cataract.



**Figure 1: Drumstick tree (*Moringa oleifera*)**

### 2. Amla (*Phyllanthus emblica*)

*Phyllanthus emblica* L. (Synonym: Emblica officinalis) is a medium-sized deciduous tree belonging to the family Euphorbiaceae, commonly known as Indian gooseberry, medicinal plants. It detoxifies the entire organ system for better health and immunity. Amla fruits not only contain high amounts of vitamin C (Ascorbic acid) but also contain polyphenols that are known to fight against the development of cancer cells. It is also helpful in managing diabetes and reducing cholesterol levels. A good amount of polyphenols like gallic acid, ellagic acid, different tannins, minerals, vitamins, amino acids, fixed oils, and flavonoids like rutin and quercetin [7].



**Figure 2: Amla (*Phyllanthus emblica*)**

### 3. Ashwagandha (*Withania somnifera*)

Commonly known as ashwagandha, Indian ginseng. Most of the benefits from Ashwagandha are from the root and the leaves. The leaves are most commonly used in teas preparation. The root can be taken in many ways but it's most commonly dried, powdered, and taken as a supplement these days. The extract of Ashwagandha can reduce blood sugar levels, cortisol levels, symptoms of depression, and inflammation and helps in increasing strength, muscle mass, and improve brain function as well. Ashwagandha improves the body's defense against disease by improving the cell-mediated immunity. It also possesses potent antioxidant properties that help protect against cellular damage caused by free radicals. It also shown inhibitory properties against many cancers, (breast, colon, prostate, colon, ovarian, lung, brain), along with their mechanism of actions and pathways involved [8].



Figure 3: Ashwagandha (*Withania somnifera*)

### 4. Giloy/ Guduchi (*Tinospora cordifolia*)



Figure 4: Giloy/ Guduchi (*Tinospora cordifolia*)

Tinospora herb has heart-shaped leaves and is been used and advocated in Indian medicine for ages. Drinking fresh Giloy juice helps to improve immunity. It enhances the activity of macrophages (the cells responsible for fighting foreign bodies as well as

microorganisms) and thus helps in early recovery. Giloy is also popularly known for its anti-inflammatory benefits and helps reduce respiratory problems like frequent cough, cold, tonsils. Giloy powder, Kadha (tea) or tablets can also be used for various skin problems as it helps to remove toxins from the body. It also shows pharmacological properties like immunomodulation, anticancer, hepatoprotective, and hypoglycemic [9].

### **5. Neem (*Azadirachta indica*)**

Neem has attracted worldwide helps boost your immune system while cooling down your body internally. It possesses both anti-bacterial and anti-fungal properties that help keep your skin clean, radiant and healthy. more than 140 compounds have been isolated from different parts of neem. Neem also has blood-purifying properties; boosting both the lymphocytic and cell-mediated immune systems. Regular consumption of Neem capsules can also avert high fever, malaria, viral flu, dengue, and other infectious diseases. More than 70 different terpenoids, or terpenes, have been identified in different parts of the Neem tree. One single Neem terpenoid, beta-caryophyllene, has been shown to have anti-inflammatory, antioxidant, and pain-reducing benefits. Over 300 structurally diverse constituents, onethird of which are limonoids including nimbolide, azadirachtin, and gedunin have been identified as modulators of cell signaling pathways.



**Figure 5: Neem (*Azadirachta indica*)**

### **6. Garlic (*Allium sativum*)**

Garlic is from the onion family- Allium. It is an essential element of most cuisines around the world. Garlic is loaded with so many health benefits if consumed in the right way. Allium sativum is a functional food well-known for its immunomodulatory, antimicrobial, anti-inflammatory, antimutagenic, antitumor properties. Its antiviral efficiency was also demonstrated. It is a rich source of vitamins and minerals such as Vitamin B1, B2, B3, B6, folate, magnesium, phosphorus, sodium, zinc, iron, manganese, calcium among others. Garlic is

an excellent natural source of bioactive sulfur-containing compounds and has promising applications in the development of functional foods or nutraceuticals for the prevention and management of certain diseases.



**Figure 6: Garlic (*Allium sativum*)**

### **7. Tulsi (*Ocimum sanctum*)**

In the traditional system of medicine, different parts of *Ocimum sanctum* have been recommended for the treatment of different diseases. This herb is loaded plenty of with vitamin C, antioxidants, antiseptic and antiviral properties. Tulsi has been used as a natural hand sanitizer due to its anti-microbial activities. One of the most common home remedies for the common cold or sore throat is Tulsi tea. Tulsi can help to strengthen the respiratory system due to the effects it has on the chemical changes in the body. Tulsi has been found to address physical, chemical, metabolic, and psychological stress through a unique combination of pharmacological actions. Also, the crude extract and terpenoid isolated from the leaves of *Ocimum sanctum* has shown promising antiviral properties against H9N2 virus [12].



**Figure 7: Tulsi (*Ocimum sanctum*)**

### **8. Cinnamon (*Cinnamomum verum*)**

Cinnamon has also been used for its medicinal properties for thousands of years. Made from the inner bark of the *Cinnamomum* tree, its use has been dated as far back as ancient Egypt.

Cinnamon is an immune simulator, protecting the body from bacterial or viral attacks. It helps your body fight infections and repair tissue damage. All the antioxidants are super powerful when it comes to bringing those antiinflammatory properties. Cinnamon also gives us manganese, calcium, fiber, and iron. Cinnamon also fights inflammation and helps ward off infections and heal damaged tissue. Containing large amounts of polyphenol, cinnamon outranked “superfoods” like garlic and oregano in a study comparing the antioxidant activity of 26 spices. Many studies have shown that cinnamon shows antimicrobial, antiviral, antifungal, antioxidant, antitumor, antihypertensive, antilipemic, antidiabetic, gastroprotective, and immunomodulatory effects [13].



**Figure 8: Cinnamon (*Cinnamomum verum*)**

### **9. Turmeric (*Curcuma longa*)**

Turmeric is a pungent Asian spice with a fascinating heritage. One of the most notable compounds found in turmeric is curcumin and it also shows antimicrobial and antiviral activity. As well as giving turmeric its saffron coloring, curcumin is extracted from turmeric root and sold as a popular dietary supplement. Turmeric is known for its abundance of antiinflammatory effects. Curcumin is a potent immunomodulatory agent and has been known to be highly effective as a treatment. Curcumin has been shown to inhibit the replication of some types of viruses, including dengue virus, hepatitis B, and Zika virus. The compound has also been found to have several significant biological effects, including antitumor, anti-inflammatory, and antibacterial activities.



**Figure 9: Turmeric (*Curcuma longa*)**

#### **10. Onion (*Allium cepa*)**

Allium is a subfamily of monocotyledonous plants that includes hundreds of species such as garlic, onion, leek, chives, and more. *Allium cepa* is a naturally derived medication to cure nasal congestion and to improve the immune system. Onion contains vitamin C, sulfur, zinc, selenium, and most important quercetin. These potent nutrients make your immune system healthier and stronger. The flavonoid and antioxidant present in quercetin is loaded with antiviral properties. The vegetable is particularly high in vitamin C, a nutrient involved in regulating immune health. Also, the trace mineral selenium which stimulates immune function is found in higher concentrations in onions than in other veggies. Selenium may play a part in the management of viral inflammatory and allergic conditions.



**Figure 10: Onion (*Allium cepa*)**

### 11. Wild carrot (*Daucus maritimus*):

The antiviral activities of extracts from *Daucus maritimus* seeds were investigated against the reverse transcriptase of human immunodeficiency virus (HIV) type 1 and a panel of RNA- dependent RNA polymerases of dengue virus, West Nile virus (WNV) and hepatitis C virus (HCV). The essential oils from flowers and roots of *Daucus carota* L. ssp. *maritimus* were obtained by hydrodistillation and analyzed by a combination of Gas chromatography/Mass spectrometry, and Carbon-nuclear magnetic resonance. The antibacterial effect of them resulted in the inhibition of a series of common human pathogenic bacteria, and of some clinically and environmentally isolated strains with significant MIC and MBC values.



**Figure 11: Wild carrot (*Daucus maritimus*)**

### 12. Menthapiperita (*M. Piperita*)

Peppermint is the oldest herbal remedy for different diseases condition in the world. Dry peppermint has been composed since 1000 BCE, and its importance has been described in ancient Egypt, Greece, and traditional Chinese medicine. Peppermint has essential oil and significant antibacterial and antifungal activity against Gram-negative and Gram-positive bacteria, yeast, and fungi, mainly as a result of the presence of the abundant phytochemicals menthol and menthone. However, to the best of our knowledge, a study done of Saudi Arabia stated that about 78% of non-hospitalized patients used peppermint, compared with only 22% of hospitalized patients without using peppermint supplement, due to COVID-pandemic so that use of peppermint during infection with COVID-19 was associated with lower odds of hospitalization.



Figure 12: *Menthapiperita* (*M. Piperita*)

### 13. Black pepper (*Piper nigrum*)

*Piper nigrum* has been extensively explored for its biological properties and its bio-active Phyto-compounds. It is crammed with antibacterial and anti-inflammatory properties, which keep infections at bay and also provide relief from the discomfort. It is used for both human and veterinary medicine in India for menstrual and ear-nose-throat in human and gastrointestinal disorders. It is also reported with antioxidant effects and help in dealing with some throat ailments.



Figure 13: Black pepper (*Piper nigrum*)

#### The importance of plants as a source of new drugs:

Herbal medicine is widely used everywhere in worldwide. For centuries, the people have turned to natural remedies to cure common ailments such as colds, allergy, upset stomachs and



toothaches and the trend is constantly increasing. Thus, there has been a shift in universal trend from synthetic to herbal medicines, which we can say 'Return to Nature' for the prevention of diseases and ailments. Nature has been a source of medicinal plants. The World Health Organization (WHO) reported that 4 billion people (80% of the world's population) use herbal medicines for some aspect of primary healthcare [18]. Herbal medicine has been recognized by WHO as essential components for primary health care and about 11% of the 252 drugs are derived from plants [19]. Since time immemorial, human civilization has been used several plants as food, medicine, clothing and shelter. Vegetarian foods contain high amounts of various "super-nutrients," such as protective antioxidants, phytochemicals, micronutrients, which promote health and protect from diseases. Plants have several pharmacological roles such as antioxidant, antiviral, anticancer, antimicrobial, antifungal and antiparasitic. Plants have free radical scavenging molecules, including flavonoids, phenolics, anthocynins and vitamins, which show antioxidant like activity. It has been reported that the antioxidant property of phytochemicals may be mitigated the oxidative stress in the biological system. Phytochemicals have been reduced the risk of many human diseases include cardiovascular disease, hepato-renal diseases, diabetes, cancers and neurodegenerative disorders. However, several herbal medicines are being derived directly or indirectly from plants that are considered as an important medicine currently in use for curing various human diseases.

### **Development of Herbal drug and its challenges:**

The development of plant drug started when development of chemistry, isolation, purification, characterization of plant active compounds. Herbal medicine is effective, lesser side effect, and affordable than the medicines bought from an allopathic medicine. Herbal medicines include herbs, herbal materials, herbal preparations, and herbal products that contain different parts of plants or other plant materials as active ingredients. It has been well documented that herbal plants and their derivatives play critical roles in modern drug development. Medicinal plants are the natural resources in developing of new drugs [20].

### **Conclusion:**

The use of herbal medicine is a potential platform for answering various types of COVID-19 virus management. An antiviral drug that is primarily approved by WHO for emergency management was remdesivir. Herbal medicine and its bioactive fractions are potentially beneficial in preventive COVID-19 and as supportive measures. Different valuable

herbal medicine can interfere with COVID-19 pathogenesis by inhibiting SARS-CoV-2 replication and entry to its host cells. Different components of plants biochemical's are the most desirable herbal drink or fruit that can be introduced as effective adjuvant components in COVID-19 management; and also, to reduce fever and cough as the most common complication of COVID-19 via their anti-inflammatory effect. Some herbal products such as *Gymnanthemum*, *amygdalinum*, *Azadirachta indica*, *Nigella sativa*, and *Eurycoma longifolia* can be used. On the other hand, numerous herbal drugs such as *G. glabra*, *Thymus vulgaris*, *Allium sativum*, *Althea officinalis*, and ginseng may become effective in the preventive and supportive management of COVID-19 through boosting the immune system. There are other certain ways to boost the 'immune system' such as active lifestyle, physical exercise, healthy diet, relaxation, and sound sleep. Practically, the medicinal plants play a supplementary role in developing the immune system and fighting deadly viruses including COVID-19

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## **STRENGTHENED THE IMMUNITY SYSTEM BASED ON MACHINE LEARNING VEGETABLES**

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### **Abstract:**

Since 2019 another strain of defilement was found on the planet. It started from bats in Wuhan, China. Coronavirus was accounted as an overall pandemic by the World Prosperity Affiliation and reviewing that the world is wrestling with the unavoidable danger done by this defilement to the mankind. As we understand that this virus is novel, no safe arrangement is available for the treatment and the medicine found is being utilized, giving the window period to our body which is helpful for resisting against Coronavirus. The ensured structure is the relationship of various organs and cells where each individual plays out its development in melodic manner to protect the host from any non-self-particles for example illness, animals, improvements, parasites, and so on. Our body requires a huge blend of typical supplements and minerals similar on a full scale like sugar, protein and fat enhancements to consolidate safe cells. Garlic, spinach and Tomatoes are a segment of old flavors that help the safety. In this proposed technique we have carried out a research on the sythesis of the protected strong properties of miniature supplement and the effect of the supplements in up-liftment of safe design to battle against COVID and other upper respiratory diseases, because prevention is better than cure.

### **Introduction:**

#### **What's Ayurvedic medicine?**

Ayurvedic medicine is one of the most established conventional clinical frameworks on the planet. It originated in India more than 3,000 years ago and aims to prevent disease by keeping the mind, spirit and body in balance. Today, it's a widely practiced form of alternative medicine. In Ayurveda, it's believed that the universe is made up of five elements:

a) Earth b) Air c) Space d) Fire e) Water

These five elements make up the three doshas of the human body called vata, pitta, and kapha. It's believed that diseases develop when these three doshas become imbalanced.

Ayurvedic medicine uses a holistic combination of exercise, diet, and lifestyle changes to prevent disease. Many of the herbs and unprocessed foods traditionally used in Ayurveda can be healthy additions to your diet. Some of these foods may also help you treat thyroid issues. There's no evidence that any particular Ayurvedic medicine can treat Hashimoto's thyroiditis.

It is an immune system infection where your body targets thyroid glands. It often leads to hypothyroidism. Ayurveda encourages the consumption of whole foods like fruits and vegetables. Consuming a healthy diet can help promote overall health and prevent nutrient deficiencies. Some trusted research sources suggest that consuming highly processed foods may increase risk of developing autoimmune diseases, although more research is needed before the link is clear. Ayurvedic medicine for hypothyroidism Ashwagandha is an adaptogenic herb that helps you control your stress levels. It grows naturally in Northern Africa and India. It's one of the key herbs in Ayurveda. A few small studies have found that it may help treat hypothyroidism by lowering levels of your stress hormones. However, more research is needed before it's clear how effective it is. One of the researchers examined the effect of Ashwagandha on 50 people with mild hypothyroidism that didn't reach a clinical level. The researchers gave the participants 600 milligrams of Ashwagandha root daily for 8 weeks. At the end of the study, the participants who took Ashwagandha had significantly improved thyroid hormone levels compared to others. Another study suggests the effect of Ashwagandha on the thyroid hormone levels of people with bipolar disorder. The 8-week study found that patients who took Ashwagandha had significant improvements in their thyroid hormone levels compared to others. However, the researchers concluded that more research is needed due to the limitations of the study. Tomatoes are a phenomenal wellspring of lycopene, a kind of carotene. Lycopene can help resist some types of cancer. Tomatoes are likewise plentiful in nutrient C, one of the top insusceptible boosting supplements. Food sources that help you with lessening aggravation include: Apples, berries, tomatoes, celery, onions, veggies, fruits, yogurt, sauerkraut, fermented tea, salmon, walnuts and chia seeds that contain omega-3 unsaturated fats.

### **Immune System Strengthen methods:**

The food we eat plays a basic role in keeping the body resistant by destroying low carb from food, which assists in controlling elevated glucose and pressing variable. A low carb diet helps block diabetes and focus on a protein rich destroying routine to keep you alive and well by eating up vegetables with Beta carotene. Certain food groupings like mushrooms, tomato, ringer pepper and green vegetables like broccoli, spinach are a way to a way to fight against body

defilements. You can eat supplements rich in omega 3 and 6 unsaturated fats. Some standard check supplements join ginger, gooseberries and turmeric. A segment of these super food varieties are regular beautifications in Indian dishes. There a few flavors that help with boosting like garlic, Basel leaves and faint cumin. Certain seeds and nuts like sunflower seeds, flax seed, pumpkin seeds and melon seeds are stunning wellsprings of protein and supplement E. Probiotics like Yogurt, Yakult are additionally unbelievable sources to restore the making of gut microorganisms, which is gigantic for supplement ingestion by the body. These are adequate decisions at any age. Phenomenal Rest time for 7-8 hours is the best way to deal with assisting your body with healing, lesser rest impacts the advancement of this rhythmic movement season's defilement vaccination. Stay Hydrated by drinking 8-10 glasses of water every day. Hydration will help flush out the toxins from the body and lower the chances of flu. Citrus fruit juices are also a better option.

In addition to a good eating routine we ought to follow a proper daily exercise plan. While the shortcoming may be overpowering, there are not many advances we can follow dependably to assist with diminishing our squeezing factor, stress is known to unfairly impact resistance. Too much squeezing factor passes on the compound identified as cortisol that forestalls your reaction towards actuating environmental factors and makes your body helpless against diseases. Most ideal approach to manage quiet squeezing factor is through idea, it is a tried and endeavoured improvement to quiet the nerves. Tolerating you needs assistance thinking, there two or three channels on you tube that have enlightening assets for help you consider. Go without Smoking, liquor and various meds certain affinities like smoking, vamping, liquor utilization and substance misuse have a brief relationship between's debilitated body watches and respiratory sicknesses. Participating in smoking and vamping is displayed to handicap your lung limit and obliterate the phones covering your respiration groups, these telephones are fundamental to battle pollutions that enter through your nasal openings. Another technique evaluation verifying that people who partake in incredible liquor utilization will in general experience the underhanded effects of ARDS (Extraordinary Respiratory torture issue) which is one of the conditions accomplished by Coronavirus ailment. Practice control, we are subject to any of these, as astonishing withdrawal can comparatively end up being risky.

Most COVID positive cases are imported which afterwards reach to the associations. Put forth an attempt not to be acquainted with the public vehicles and public spots to keep away from any probability of responsiveness. On the off chance that you need to travel, close your nose and mouth with a sterile mask and use liquor based hand sanitizer. Attempt to clean yourself

whenever you touch a surface, as Coronavirus strains stay on the surfaces for few hours. Use your left hand for door handles as these are touched by different individuals. Redesigns and resistance boosting food sources are referred to be a support but there is a specific need for speedy upliftment to your immunity framework to keep it battling fit. In the occasion that that are communicated results are progressed getting the best extent of improvements from your eating plan, talk with your PCP about a supplementation routine to help your resistant framework.

Here are a couple of common foods that can help. C supplement is a specific enhancement that obstructs disease. It goes likely as a bewildering harmful development contravention subject matter expert and gets against harmed induced by oxidative squeezing factor. For certified pollutions like sepsis and respiratory trouble condition, enhanced C treatment has been displayed to further encourage signs in patients. D supplement enhancement upgrades have fragile defensive impact against respiratory diseases. It is better to take a zinc enhancement, particularly for cold and other viral infections in more pre-arranged individuals.

Elderberries are stacked with supplements having minerals like copper, iron, potassium and phosphorus. Elderberries have antiviral and antibacterial properties that help fight against flu and cold. Turmeric constitutes a composite called curcumin which maintains as healthy throat. Garlic has faltering reducing and antiviral properties which upgrades body deterrent. Adjacent to keeping a solid way of life and taking enhancements, the Indian flourishing organization is proposing normal approaches to practice as anticipatory measures to battle Coronavirus. Assistance of AYUSH has suggested that the self-care rules are anticipatory measures to assist well respiratory success. Always drink warm water the whole day. Repeat Pranayama and Yogasana. Drink tea or decoction of Raisin, Cinnamon, Dry Ginger, Faint pepper, Basil and no sugar. As an alternate for sugar jaggery is helpful. Apply Coconut oil, Sesame oil or Ghee to the nostrils. Inhale steam with Caraway seeds and Mint leaves.

Peter Nguyen is an Investigation Scientist at the Wyss Foundation at Harvard School and Luis Soenksen is an Investigation Specialist and Experience Producer at the MIT Jameel Office for man-made brainpower and Healthcare. Our lab at MIT/Harvard is at present based on ways to deal with bring advanced natural circuits, a field known as 'designed science,' out of the lab and into customary development. This drove us to focus in on biosensor-containing wearables. Current modernly open wearables (e.g., FitBit or Apple Watch) recognize physiological signals electronically. In any case, they can't recognize receptiveness to a microorganism or a toxic substance. That is something that right currently requires an entire lab

to manage tests. Our sensors would now have the option to carry that identical testing ability to wearables to perceive and recognize microorganisms (any organisms or contamination) similarly as toxic substances. Essentially, our advancement downsizes an entire examination office onto a wearable piece of clothing.

Exactly when the pandemic hit, we quickly turned our work to cultivating a wearable that could recognize Covid in an unnoticeable, modest, and quick way. Our work for the Covid face cover is unquestionably founded on our past Ebola and Zika paper-based diagnostics. Those tests displayed the freeze-dried advancement yet required a pre-arranged customer to set up a model, apply it to the paper, and instruments to deal with it. For our current work, we expected to focus in on having the advancement act naturally adequately working, with modified test combination, joined model arranging, and insignificant customer intercession. For the face cover, all the customer needs to do to sanction the sensor to begin the assessment is press a catch. These various obstructions were not minor, taking us a long time to plan. A significant issue we encountered was scattering, as the FDCF reactions need water to work. A particularly incredible arrangement the planning in the wearables was arranging the sensors to restrict disappearing while simultaneously staying aware of versatility and movement with the environment, by using exceptionally arranged hydrophobic elastomeric sensor chambers. Also, the face cover sensors used a more erratic multi-reaction design, requiring time deferments to ensure that each freeze-dried reaction occurred in a stepwise manner and was now prepared to run self-rulingly. Every movement and part should be troublesomely worked on so the entire system executed vivaciously. There was a huge load of material improvement as well, to ensure that we had the right movement of water and closeness with the various reagents.

A considerable number individuals go straightforwardly to supplement C after they've caught a bug. That is because it helps work with expanding your safe system. Vitamin C is thought to extend the formation of white platelets, which are basic to doing combating infections. Almost all citrus regular items are high in supplement C. With such an arrangement to investigate, it's easy to add a press of this supplement to any dinner. Standard citrus regular items include: grapefruit, oranges, clementine's, tangerines, lemons and Limes. Since your body doesn't convey or store it, you need step by step supplement C for continued prosperity. Each day Trusted Focal point for most adults is 75 mg for women and 90 mg for men. If you pick supplements, do not take more than 2,000 milligrams a day. Also recollect that while supplement C may help you with recovering a cool speedier, there's no verification yet that it's incredible against the new Coronavirus.



Heparinized blood was obtained by patients of age 14-73 years. Patients suffering from rheumatoid joint disturbance met the American School of Rheumatology 1987 shifted direction of activity criteria. 29 Patients with essential lupus erythematosus fulfilled the 1982 depiction criteria. 30 Patients with basics language condition satisfied the American-European agreement pack criteria. 31 Patients with safe system vesicular bullous skin infection, including pemphigus foliaceus, bullous pemphigoid, dermatitis herpetiformis and pemphigus vulgaris had conventional histologic and clinical disclosures with demonstrative divulgements on direct immune fluorescence of perilesional skin or oral mucosa. 33 Patients with different sclerosis satisfied the 2005 McDonald standards for apostatizing dispatching or key reformist distinctive sclerosis. 34 optional reformist different sclerosis as portrayed utilizing the Lublin and Rein gold criteria. 35 Tissues were gotten secretively from people without obvious hematologic issues, with the cleaned B cells quickly cryo preserved. Cryo preserved rope blood tests were gotten from the Duke School Lacking cell Lab and the Carolinas Line Blood blessing centre. Blood phones additionally fostered a subsequent time utilizing another charming incited cell planning region to get over 99% purities.

The universe is in the hold of COVID situation. General succeeding surveys that can diminish the risk of pollution and paying little mind to isolate are wildly required. The article focuses on the spots of supplement D in lessening danger of respiratory infections, data on the evaluation of transmission of COVID, how supplement D may be a fundamental gauge to reduce hazard. Supplement D can decrease peril of defilements. Those instruments join activating defensins and cathelicidins can isolate and reduce viral replication rates by decreasing provocative cytokines that produce the upsetting result that hurt the covering of the lungs, establishing pneumonia, similarly as making relationship of quieting cytokines. A few observational assessments and clinical game plans articulated that supplement D diminished influenza risk. Affirmation made by supplement D in decreasing peril of Covid states that the delivery occurred in winter. 25-hydroxy vitamin D (25(OH)D) centers reduced, the degree of cases in the Southern Piece of the globe during summer are low, supplement D inadequacy has added to respiratory difficulty issue, and the case-setback rates increased with age. To reduce the risk of contaminating people in hazard from influenza, Covid considers taking 10,000 IU/d of supplement D3 for a month to rapidly raise 25(OH)D obsessions, followed by 5000 IU/d. The goal should be to raise 25(OH)D obsessions more than 40-60 ng/mL (100-150 nmol/L)., Higher improvement D3 pieces might be helpful for treatment of people who become contaminated with Covid.

Iron is a crucial enhancement for the two individuals and pathogenic microorganisms. Because of its ability to exist in one of two oxidation states, iron is an ideal redox impulse for various cell measures including breath and DNA replication. In any case, the redox capacity of iron also adds to its hurtfulness; subsequently, iron concentration and scattering ought to be meticulously controlled. Given the by and large need for iron by essentially all human microorganisms, a huge part of the regular safe system is to confine iron availability to assaulting life forms in a connection named dietary invulnerability. Productive human microorganisms ought to hence have parts to dodge dietary invulnerability to cause contamination. In this review, we talk about rule of iron assimilation in the setting of infection and portray frameworks used by human organisms to overcome iron-holding monitors.

C homeostasis is essential for an adequate limitation of the got structure. Zinc need equivalently as zinc wealth achieve authentic aggravations in safe cell numbers and activities, which can achieve loosened up insufficiency to degradations and progress of especially provocative contaminations. This assessment bases on created by zinc in controlling intracellular hailing pathways in characteristic equivalently as flexible safe cells. Central major nuclear frameworks and targets influenced by changed zinc homeostasis, including kinases, caspases, phosphatases, and phosphodiesterase's, will be highlighted in this article. Also, the exchanging of zinc homeostasis and the redox ingestion in impacting intracellular hailing will be anxious. Key hailing pathways will be depicted inside and out for the different cell sorts of the secured system. In this, effects of practical zinc improvement, happening a couple of moments to minutes will be see from all of the more lethargic kinds of zinc signals, also named as "zinc waves", and late homeostatic zinc flags with respect to conceded changes in intracellular zinc.

Dietary selenium confirmations in various countries, including the Brought together Domain, are lower than worldwide recommendations. No utilitarian aftereffects of these lower affirmations have been seen, though test ponders recommend that they may add to diminished immune limit, extended dangerous development event, and extended shortcoming to viral ailment. Responsive oxygen species (ROS) are often passed on during viral contaminations. Age of these ROS can be both helpful and hindering for some phone limits. While overpowering the phone support shield structure, the overabundance of ROS instigates oxidative squeezing factor. Viral contaminations lead to sicknesses portrayed by an extensive extent of clinical signs, with oxidative squeezing factor being one of their image names. For what it's worth, ROS can, thusly, further foster viral replication inciting an improvement circle. Another colossal breaking point for viral replication and pathogenicity is the remedial status of the host. Viral polluting all the

while builds the premium for micronutrients and causes their misfortune, which prompts a deficiency that can be repaid by micronutrient supplementation. Among the improvements entangled in viral infection, selenium (Se) has a basic occupation in cell support watch, redox hailing and redox homeostasis. By a wide margin the vast majority of regular exercises of selenium is performed through its joining as an excellent amino dangerous selenocysteine in the critical social affair of seleno vitamins. Selenium need, which is the fundamental controller of seleno protein verbalization, has been associated with the pathogenicity several infections. Moreover, a couple seleno protein individuals, including glutathione peroxidases (GPX), thioredoxin reductases (TXNRD) had every one of the reserves of being gigantic in various models of viral replication. At long last, the authentic obvious check of viral seleno vitamins in the genome of molluscum infectious and fowl pox defilements showed the significance of seleno vitamins in viral cycle.

<b>After Covid-19 Food/ Nutrients schedule</b>	
Time	Menu (Break Fast / Lunch/ Dinner).
Morning 6:00 am	2 to 4 Glass of Hot Water / Night Copper Utensils containing water.
Morning 7:30 am	Herbal Tea (Turmeric, Rain Ginger, Pepper, Bishop Weed, Sixes, Holy Basil, Lemon.
Break-Fast 8:30 am	6 to 8 Sprouted Almonds. 1 bowl Papaya/ 2 Wall nuts/ & Tiffin.
Morning 11:00 am	Coconut Water.
After-noon 1:00 pm	1 orange/Apple Micro greens + 1 Bowl Vegetable Salad + Roti/ Rice / Boiled Vegetable / Butter milk.
Evening 4:00 pm	Sprouted-Ground-nut / Sprouted Seeds.
Evening 7:00 pm	Lemon Juice / Black Pepper with Vegetable Soup / 2 Roti/ Boiled Vegetable.
Night 9:30 pm	Golden Milk (Milk + Turmeric + jaggery).

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## **CHANGE IN HEALTH SEEKING BEHAVIOUR OF ELDERLY DURING COVID-19 PANDEMIC IN MUMBAI**

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### **Abstract:**

The advent of a pandemic creates challenges and opportunities for healthcare accessibility, interventions, policy making and overall improvement in healthcare seeking behaviour. This study explored the impact of COVID-19 on healthcare seeking behaviour among elderly residents of Mumbai. The perspectives of doctors working in the different clinics of Mumbai was understood on this matter. During Covid-19 even though the knowledge related to health has improved in terms of access to health information and increased understanding of health issues. Also, healthy lifestyles practices, regular physical exercise and increased consumption of fruits and vegetables were observed during the pandemic. But Covid-19 impacted health seeking behaviour through reduced healthcare utilization for primary health care especially among elderly. Our country was not untouched from this situation. Some of the major questions which come in our mind related to primary health care accessibility during Covid-19 are; how have the primary health care and the role of doctors changed during the Covid-19? How the changes in primary health care impacted the older patients? What were the issues in providing primary care to the elderly patients with complex conditions in the Covid-19? What were the issues and implications of using online consultation for elderly patients and doctors? How has patient isolation impacted patients access to primary care? How has the coordination and communication between patients and doctors in primary care changed during the COVID-19 pandemic? In the search of these questions, this study focused on the perspective of doctors as frontline health workers towards the change in behaviour of elderly patients in seeking primary health care during the COVID-19 pandemic in Mumbai. It was found that doctors have observed a complete shift in the health seeking behaviour of elderly during Covid and also change in the pattern of consultation and the working conditions in providing primary health care during pandemic.

**Keywords:** Ageing, coronavirus, Covid-19, health seeking behaviour, doctors, health care access, experiences during Covid, older adults, health policies.

## **Introduction:**

Primary care is fundamental to a strong healthcare system, ultimately providing safe and timely services in all settings, including outbreaks and emergencies. Providing safe primary care is more challenging for elderly patients with multimorbidity since they are in the most complex condition (Newton *et al.*, 2022). Multimorbidity is the coexistence of two or more chronic health conditions in an individual. Even though multimorbidity is not exclusive to a specific age group, evidences shows that it is higher amongst elderly people aged 65 years and above around the world (Zheng *et al.*, 2021).

Healthcare management for elderly patients requires a collaborative approach to provide closer monitoring and requires good team of doctors. The COVID-19 pandemic has highlighted the challenges of safety of the elderly population as a global health concern. The elderly population were not only at a higher risk of contracting COVID-19 and suffering a worse outcome from it, they also had a risk of neglect of their pre-existing chronic conditions or being lost to follow up (Karijo *et al.*, 2020).

To combat the pandemic and protect people, many countries have introduced strict public health measures, such as social distancing and shielding of complex elderly patients. Countries have adopted a set of policies for primary care as a response to the pandemic. These policies were focussed on shielding and social isolation measures across the country for risk groups. While these policies were designed to enhance the capacity to suppress the pandemic, there has been growing concern regarding unintended consequences (Lund *et al.*, 2021). A notable reduction in the overall number of doctor's appointments has been reported since the beginning of the pandemic. Face-to-face appointments in primary care fell by great numbers, while online consultations recorded a substantial rise. Hospitals reported fewer emergency admissions compared to the previous years (Alboksmaty *et al.*, 2021).

The COVID-19 pandemic had considerable impact on primary health care in India. Doctors took on substantial additional workload as part of epidemic control and fewer patients were seen in the clinics. The reduction in patients seen and treated in clinics led to more online consultations and reduction in medicine prescribing and personal check-ups (Bullen, 2021). Since there was substitution with consultations by phone or app, doctors attributed to the fact that most of their patients were elderly and not willing or able to switch to the online consultation. They were keener for self-treatment, taking traditional medicines rather than going to the doctors or taking online consultations which increased the health risks among elderly many folds (Arthur-Holmes *et al.*, 2020). This study focussed on research questions which included the issues in accessibility to the primary health care among elderly, change in the role of doctors

during the Covid-19, impact of changes in primary health care on the older patients, issues in providing primary care to the elderly patients with complex conditions with the Covid-19, the implications of using online consultation for elderly patients and doctors, impact of isolation on patients access to primary care and the coordination and communication between patients and doctors in primary care changed during the COVID-19 pandemic in Mumbai.

**Study Area and Population:**

The study area for this research study was Mumbai. The clinics from different zones of Mumbai have become the part of this research who has provided primary health care to the elderly patients for covid and non-covid issues. The study has been conducted in only those clinics which were situated within the limits of Mumbai. As the city of Mumbai consists of two distinct regions: Mumbai City district and Mumbai Suburban district. The city district region is also commonly referred to as South Mumbai. Mumbai Suburban district lies to the north of Mumbai City district and comprises all of Mumbai's suburbs. The western part of the Mumbai Suburban district forms the Western Suburbs and the eastern portion forms the Eastern Suburbs. The harbour suburbs lie to the southeast of the Eastern Suburbs. There were in total 8 respondents who were interviewed by the researchers to accomplish the objectives of the research. The purposive sampling was used to select the respondents based on their availability.

**Methodology:**

This study is based on personal interviews of doctors from selected clinics of Mumbai city. The clinics were contacted by the researchers through phone and the purpose of the study were explained to the doctors and their assistants. When the permission was given by the clinic, interviewer reached to the clinic for interview with the doctors. The study was conducted in only those clinics where the approval was granted and those places were left where there was non-cooperation and unavailability. The confidentiality of the respondents and the name of the clinics has been ensured before the interviews were conducted.

**Objectives:**

- To understand the perspective of doctors towards the change in behaviour of elderly patients in seeking primary health care during Covid 19 in Mumbai.
- To assess the change in the role of doctors during Covid 19 in Mumbai.
- To know the implications of using online consultation for elderly patients and doctors during Covid 19 in Mumbai.

- To understand the impact of isolation on the coordination and communication between patients and doctors during Covid 19 in Mumbai.

### **Findings:**

As per the doctors, since the identification of the first case in Wuhan, China, in December 2019 and the increase of coronavirus disease in 2020 in the majority of the countries, the World Health Organization (WHO) declared it as a Public Health Emergency on March 11, 2020, to combat this rise in cases, various directions and guidelines were issued from time to time by different national and international agencies along with the imposition of strict restrictions and lockdowns affecting routine life of each and every person worldwide. There was also dissemination of lots of misinformation and disinformation through social media or otherwise, which had led the people to think to whom to rely on or not. This has led people to experience a lot of emotional disturbances leading to stress, panic, and fear as well as mental health disorders like depression and anxiety. The elderly were the most affected section in any society during the pandemic.

Social media has been blamed for spreading fear and panic among people as media tried to fulfill their agendas by expressing their views and unconfirmed and fake news through social media and spreading fear and anxiety among the common public. From the outset of the pandemic, an alarming number of fake news stories associated with COVID-19 were circulating on social media which led to a panic among the elderly patients and their families. Elderly started avoiding to visit hospitals or opted for self-care. This has made the primary health care more inaccessible for the older patients. Doing the treatment of elderly only through online mode was risky phenomenon for doctors but they had no other option left at the times of Covid 19 due to strictly following up the rules and guidelines given by the Indian government.

Many older adults were changing their health-seeking behaviour by staying at home and depending on informal healthcare such as the use of traditional therapies and over-the-counter medicines for self-treatment or to boost their immune system. Older people were faced with both non-communicable and communicable diseases. These diseases and other health problems included cognitive impairment, hypertension, diabetes, anaemia, chronic respiratory diseases, cancers, heart diseases, kidney problems, skin diseases and so on. During this pandemic, older people, especially those who have chronic non-communicable diseases still required regular care and special attention from their health professionals and informal caregivers to improve their health or manage their illness. However, the outbreak of COVID-19 has filled fear into older people, particularly through the evidence and reports that they have higher fatality rates should



they get infected with the virus. So, they preferred staying at home and get cured rather than meeting to the doctors or going to the hospitals.

Private and government hospitals were involved in treating COVID-19 patients. However, the health personnel who used to treat COVID-19 patients in these health facilities lacked adequate facilities and required training to treat such different infectious disease which was new to the world. Due to lack of proper safety measures healthcare workers themselves were exposed to the virus and thus they have become the source of diffusion of the virus to their families, this was a big news at that point of time and was creating a lot of panic among the patients. This situation coupled with the challenges of accessing healthcare facilities such as long distance to access healthcare, long waiting hours, poor attitude of health workers, transportation cost, unsupportive family or relatives and the fear of exposure to the virus at public healthcare facilities were causing many older adults to stay at home and find the best possible alternative treatment for their illnesses.

Many older adults were also increasing their use of traditional medicine as a means of boosting their immune system and managing their ailments. Traditional medicines were usually bought at herbal shops or markets and sometimes prepared at home. They preferred herbal medicine, called anti covid drinks like “kadha”, to fight against the COVID-19 pandemic. However, the efficacy and safety of the drug remain a subject of national and international discussions and debates especially among the scientific community.

Doctors described how COVID-19 policies directed the elderly focus towards acute illnesses from COVID-19 rather than other health problems. The monitoring of chronic conditions was seen as less of priority by elderly and the fear of covid infection was most dominant. As per the doctors the working conditions in primary health care were also felt by doctors to have changed during the COVID-19 pandemic completely. Online consultations have become the main source of consultation for everyone to follow the social distancing measure, while the number of face-to-face appointments has considerably reduced. But doctors did not seem to mind the change, as they acknowledged the need to reduce the risk of infection, and they also reported that there was a sense of acceptance from the elderly patients. They described how appointments for online consultations became more available and easier to book but for elderly it was not an easy task until and unless anyone else book it for them. Also talking to elderly online was very difficult for both the patient as well doctors. They were unable to explain their issues online comfortably and it was difficult for the doctors to let them understand and prescribe anything. But despite of all the challenges doctors have highlighted that how they have tried their

best to do effective consultations online. They always felt that doing face to face consultation was much better than the online consultation.

Doctors described a need for more resources, Personal Protective Equipment (PPE) and communication appliances, such as desktops and cameras, to maintain best practice. The doctors expressed that primary health care was relatively neglected by concerned authorities and its role in the pandemic response was not valued much. According to them primary health care has been forgotten, especially providing protection equipment which led to the risk on the health care professionals and their family members. This equipment was needed when the doctors were examining the patients personally especially elderly. The fear of contracting COVID-19 in healthcare facilities discouraged elderly patients from communicating with their doctors, they avoided being called into the surgery or hospital. Doctors described such issues as the probable reasons of misdiagnosis, delayed care, missing early signs of disease, and the inability of monitoring and updating medications for elderly patients with complex conditions.

Doctors said that there were a lot of unnecessary clinical risks involved because they were not able to get personal investigations done for patients. There were a lot of things which they kept postponing like blood tests, sonography or X Rays for medication monitoring. Doctors emphasised the value of family, social care, and community in supporting complex elderly patients to help with their mental wellbeing and required for making them reach to the hospitals but it was all missing. Also, living continuously in their houses without going out led some patients think that healthcare services were totally suspended for all non-COVID conditions at the beginning of the pandemic, which was not the case. This condition also led to reduction health care accessibility.

Doctors commented that the policies in our country did not specifically address the needs of complex elderly patients and created a lot of unrest and confusion among them which led to inaccessibility of health care, except for recommendations for a relatively small proportion of highly vulnerable patients. Doctors prioritised some patient groups who needed more attention and special policies could be declared for them specifically by the government such as, those living alone, those who need regular monitoring for their medications, multimorbid patients, elderly in old age homes, patients with chronic medical conditions, patients with dementia and other mental disorders. In terms of communication and coordination doctors reported some difficulties in the use of technology in setting up a new effective online system for elderly. There was a need for a continuous Information Technology (IT) support for making the elderly accessible to new technology which could be helpful for them. But this was all missing in our

country compared to the developed countries and created a uncomfortable situation for elderly people who were unknown to the new technologies.

Doctors were getting everyday pressure of receiving a vast amount of new information, recommendations, and updating policies. The doctors felt responsible to circulate these updates within their teams to ensure best practice, in addition to coordinating with other hospitals who deliver integrated care. Doctors were worried towards their patients rather than themselves. They worried about the impact of the new COVID-19 policies on their ability to engage with patients early to prevent serious complications or deterioration. This has been due to either patient's fears of engaging with healthcare, or a delayed response due to the online consultations. It created a fear of irresponsibility and inappropriate treatment of patients among doctors. They were also stressed about the future of primary care and were concerned regarding the shift to digital consultations like inequality, safety, the quality of care provided to elderly patients in different communities from different socioeconomic classes.

Doctors mentioned that the economic crisis during COVID times may also have dissuaded the patient from seeking timely health care. The mandatory COVID protocols to be followed during hospital-based treatment added up to the expenses incurred. All these led to compromising on the essential health care services for elderly patients with complex health needs. Many older adults due to economic reasons also likely to depend upon on informal healthcare through self-medication or consultation of traditional medicine practitioners for treatment rather than going to trained medical professionals. It was felt by the doctors that older adults should, therefore, be encouraged through COVID-19 sensitization programs to visit hospitals for treatment without the fear of getting infected because this could have saved their lives from serious illnesses and doctors could get the opportunity to perform their duties in much better way.

### **Conclusion:**

Doctors highlighted the need to consider the long-term impact of covid policies and offered suggestions to overcome noticeable gaps in primary care. This pandemic has left a big lesson for each person on this earth from common public to doctors, health care professionals to policy makers to anyone. Everyone has seen the risk of this deadly virus and unprepared situation during the pandemic. This pandemic has shown us the real picture of our health system either it is a developed or developing country. Doctors emphasised that the coordination of services between primary care and social care is key to provide safe patient-centred care to elderly people during any pandemic situation in future too. In terms of implementation, barriers

included the need to share responsibility between healthcare professionals, patients, and decision makers to overcome the challenges. Healthcare professionals should focus on becoming used to the new normal while maintaining best practices. Policy makers need to dedicate extra efforts to make their decisions reflective of changes on the ground and policies must be applicable in real for primary health care practices during pandemics like covid 19. The consumption of herbal medicines or mixtures which have not undergone scientific experiment and approval processes must be discouraged. Governments in different countries must use the COVID-19 crisis as an avenue to improve their public health policies, strengthen their healthcare systems and develop social and health intervention programs to enhance the welfare of older adults.

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## MUCORMYCOSIS: A THREAT TO THE LIFE OF COVID-19 PATIENTS

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### **Introduction:**

Mucormycosis is commonly known as ‘black fungus’ in India, is a fungal infection caused by a group of lower fungi known as moulds. These fungi are widespread saprobes of organic matter and commonly found in the soil, dust, on surfaces of plants, decaying fruits, vegetables and animal manure etc. This group of fungi having about 20 pathogenic species divided into 12 genera. *Rhizopus* is the genus that has been linked to most cases of mucormycosis in the literature (Gomes *et al.*, 2011). The term Phycomycosis or zygomycosis was first described by Paltauf in 1885 and later on these terms are coined as Mucormycosis by American pathologist Baker in 1957 for a severe infection caused by *Rhizopus*. Mucormycosis affects people who have some health problems or having weak immune system to fight against different types of infections. It most commonly affects the sinuses or the lungs after inhaling fungal spores from the air. It can also occur on the skin after a cut, burn, or other type of skin injury.

A wide range of microbial opportunistic infections has been found to be associated with COVID-19 disease (Kubin *et al.*, 2021). Mainly two fungal genera (*Aspergillus* and *Candida*) were reported for co-infection in COVID-19 patients (Song *et al.*, 2020). During COVID-19 pandemic mucormycosis become prevalent in COVID-19 recovered people world-wide. The spores of these opportunistic fungi germinate in people with COVID-19 infection because they have low oxygen level (Montefusco *et al.*, 2021), high glucose level and several other risk factors coupled with continuous hospitalization of the patients.

Mucormycosis is not a common but is a fatal fungal infection that usually affects immunocompromised patients. Mucormycosis is caused by different fungal genera e.g. *Absidia*, *Cunninghamella*, *Mucor*, *Rhizopus* etc. (Sugar, 2000).

### **Mucormycosis and Covid-19:**

Prior to COVID-19 in the year 2019, 388 confirmed of suspected patients of mucormycosis were reported in India. Out of these 18% had *Diabetic ketoacidosis* (DKA) and 57% had uncontrolled Diabetes mellitus (DM) (Prakash *et al.*, 2019). Patel *et al.* (2020) in a similar study on 465 mucormycosis patients has shown that the predisposing factors for mucormycosis in Indians include DM (73.5%) followed by malignancy (9.0%) and organ transplantation (7.7%).

In India, as on 28 June 2021, over 40,845 people have been infected and around 3,129 have died due to mucormycosis. Out of these cases, Most of the 85.5% (34,940) had a history of COVID-19 infection followed by 64.11% (26,187) had diabetes whereas 52.69% (21,523) were on steroids treatments (Mint. June 28 and July 14, 2021).

Increase in mucormycosis in Indian context appears to be an unholy intersection of trinity of diabetes (high prevalence genetically), rampant use of corticosteroid (increases blood glucose and opportunistic fungal infection) and COVID-19 (cytokine storm, lymphopenia, endothelial damage). All efforts should be made to maintain optimal hyperglycemia and only judicious evidence-based use of corticosteroids in patients with COVID-19 is recommended in order to reduce the burden of fatal mucormycosis.

Singh *et al.* (2021) searched the electronic database of PubMed and Google Scholar until May 13, 2021. They reported 101 cases of mucormycosis in people with COVID-19, out of which 82 cases were from India whereas only 19 cases were from the rest of the world. Mucormycosis was predominantly observed in males (78.9%) only, the diabetes and unchecked use of steroids appears to be the reason for increase of mucormycosis cases. Therefore efforts should be made to maintain optimal glucose and only judicious use of corticosteroids in patients with COVID-19.

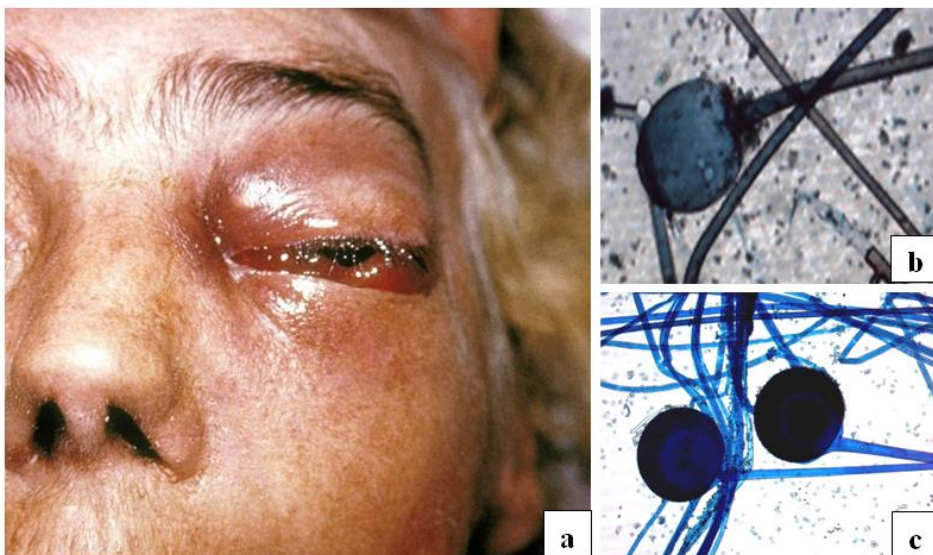
During the 'second wave' different variants of COVID-19 continue to infect the population globally (Kirby, 2021). Deadly rise COVID-19 and its severe complications and specially, the increase of mucormycosis has put the lives of COVID-19 patients further at high threat (Revannavar *et al.*, 2021; Werthman-Ehrenreich, 2021).

There are many views pertaining to the mucormycosis outbreak in India. India has a total of 15.3% of the global diabetic population (Roglic, 2016). Garg *et al.* (2021) noticed that the people with diabetes and also have recovered from Covid-19 are more susceptible to mucormycosis (Garg *et al.*, 2021). Apart from, it has also been found that around 85% of

mucormycosis infected peoples were diabetic or uncontrolled diabetic (Times of India, June 2021).

### Symptoms of mucormycosis:

The symptoms of mucormycosis depend on body part on which fungus is growing (Grossman *et al.*, 2012; Petrikos *et al.*, 2012; Lewis and Kontoyiannis, 2013; Spellberg *et al.*, 2005; Ribes *et al.*, 2000). Fungal infection usually starts from the mouth or nose and spreads in the central nervous system via the eyes (Symptoms of Mucormycosis, 2021). Once fungus deposited in the body, the fungal hyphae (branch like filaments) grows which ultimately invade the blood vessels, causing blood to form clots and surrounding tissue of host die. Other causes of infection include contaminated wound dressings (Grossman *et al.*, 2012). It is advised to contact your healthcare provider if you think that you have symptoms similar to mucormycosis. There are different types of mucormycosis with variety of symptoms.



**Figure 1. a) Periorbital Mucormycosis: Source: Centres for Disease Control and Prevention, United States Department of Health and Human Services.**

**b) Causal agents of Mucormycosis: *Mucor* sp. c) *Rhizopus* sp.**

### Investigations and Management:

The fungal infection surveillance is preferred in critically ill patients. The different types of following investigations are used to identify the presence of fungal infections in critically immunocompromised patients:

- Microscopy and culture
- Serological tests
- Histopathology test
- Real-time PCR
- Antigen-antibody tests.
- Mass spectroscopy techniques to confirm the presence of the *Mucor* fungus.

The European Confederation of Medical Mycology (ECMM) with the Mycoses Study Group Education & Research Consortium (MSG ERC) had developed comprehensive guidelines for the diagnosis and treatment of mucormycosis in 2019 (Cornely *et al.*, 2019).

The Polyenes and azole based drugs are the mostly preferred for the control of mucormycosis. The total duration of antifungal treatment is altered according to the preferences of each patient.

The antifungal therapy should be continued till the patient includes the following observations:

- Patient is relieved from the signs and symptoms of the disease.
- The disappearance of residual radiological symptoms.
- The underlying immunodeficiency is improved.

**Table-1. Five different types of mucormycosis and their symptoms**

Types of Mucormycosis and their symptoms				
Rhinocerebral	Pulmonary	Cutaneous	Gastrointestinal	Disseminated
<ul style="list-style-type: none"> <li>• Also known as sinus &amp; brain mucormycosis</li> <li>• Nasal or sinus</li> <li>• One-sided facial swelling</li> <li>• Congestion</li> <li>• Headache</li> <li>• Black lesions on nasal bridge or upper inside of mouth</li> <li>• Fever</li> </ul>	<ul style="list-style-type: none"> <li>• Lung mucormycosis</li> <li>• Chest pain</li> <li>• Fever</li> <li>• Cough</li> <li>• Shortness of breath</li> </ul>	<ul style="list-style-type: none"> <li>• Skin mucormycosis</li> <li>• Blisters or ulcers in the infected area may turn black</li> <li>• Pain</li> <li>• Warmth</li> <li>• Excessive redness, or swelling around a wound</li> </ul>	<ul style="list-style-type: none"> <li>• Gastrointestinal mucormycosis</li> <li>• Bleeding</li> <li>• Abdominal pain</li> <li>• Nausea and vomiting</li> </ul>	<ul style="list-style-type: none"> <li>• Occurs in people who are already sick from other medical conditions, so it can be difficult to know which symptoms are related to mucormycosis</li> <li>• Patients with disseminated infection in the brain can develop mental status changes or coma.</li> </ul>



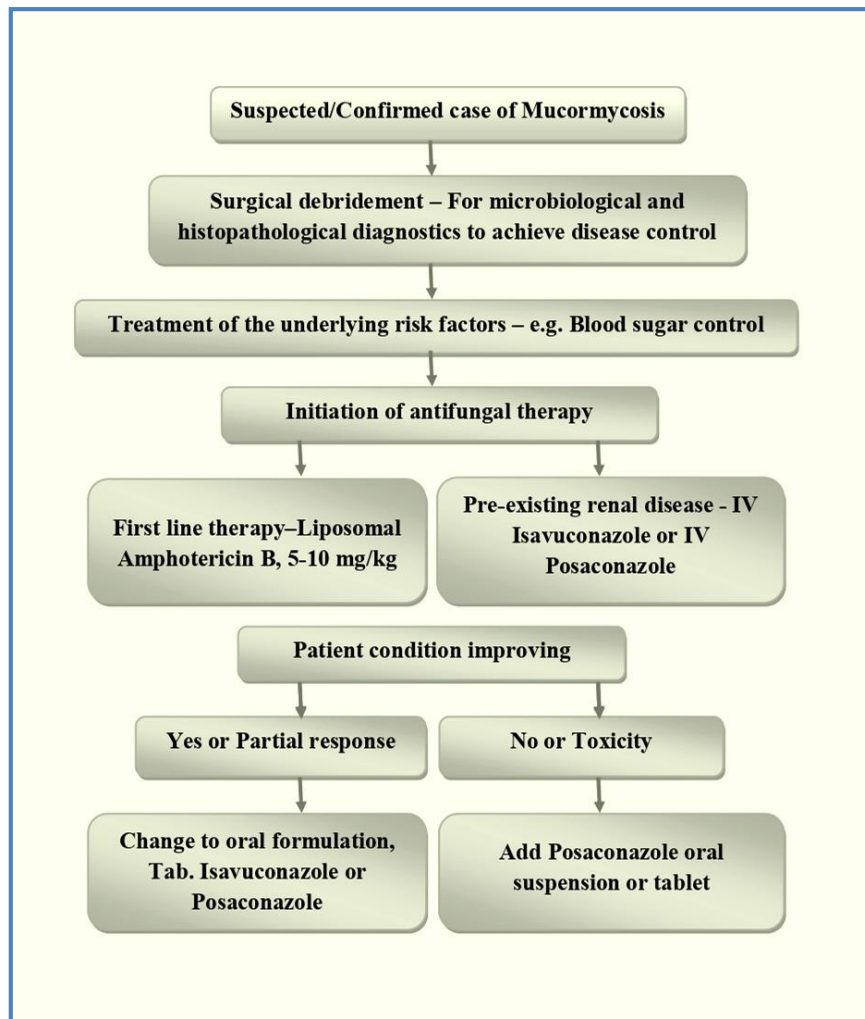


Figure 2: Management of mucormycosis according to ECMM/MSG-ERC

A study revealed that the per-patient liposomal amphotericin + posaconazole drugs treatment for mucormycosis along with hospital stay is costlier as compared to isavuconazole treatment (Bagshaw *et al.*, 2017)

### Prevention and Care:

Indian Council of Medical Research has issued advisory for the screening and management of mucormycosis along with COVID-19. The following preventive measures are suggested by the Indian Council of Medical Research:

#### At the primary care level

- Look for the warning signs and symptoms of mucormycosis.
- Suspect mucormycosis in cases of blocked nose or sinusitis in the context of immunosuppressive conditions and or in COVID-19 patients.
- Blood sugar monitoring in patients with COVID-19 and diabetes mellitus, steroid therapy.

- Taper steroids in post-COVID-19 patients on long-term steroid therapy.
- Refer for appropriate investigation (Potassium hydroxide staining and culture).

### **Mucormycosis management**

- Do appropriate investigations as early as possible (KOH staining and microscopy, culture, MALDI-TOF mass spectrometry) for the detection of fungal infection.
- Initiate treatment for mucormycosis in appropriate time, do not delay the treatment.

In a case study out of 116 cases analyzed, 81.6% cases had diabetes and 86.6% had steroid treatment. It is important to look for signs and symptoms of mucormycosis in COVID-19 patients because treating mucormycosis is very difficult than preventing it, so the doctors should create awareness of mucormycosis in patients with the COVID-19 infection.

### **Precautions for mucormycosis:**

Mucormycosis is not a contagious, so you can't get it from an infected person. But self-care measures are the best way to prevent this type of infection. If you have a weak immune system then it becomes very important to keep yourself safe outdoors. The following are the preventive measures according to Dr. Versha's Health Solutions (<https://drvarsha.com/mucormycosis>):

- **Personal hygiene:** Wash and sanitize hands frequently. Wash face, hands and feet after contact with soil, plants, and rotting fruits-vegetables, wood or possibly contaminated water. Wear mask with gloves and proper footwear while handling such sources. Do the bandaging all wounds until they heal.
- **Clean steam appliances:** the home steamers should be used with distilled/sterilized water, and be properly cleaned and dried before each use.
- **Nose and mouth hygiene:** The nose can be cleaned with sterile saline drops/spray. Brush your teeth twice daily. Rinse mouth after meals and after coming from outside. Gargling with salt water or antiseptic (like betadine) may be done twice daily. Mouth ulcers should be treated timely.
- **Mask hygiene** should be maintained, and one should not wear wet or damp masks. Change disposable masks frequently every 4-6 hours. Cloth masks should be washed after every wear. After removing mask, wash your hands and face well.
- **Blood sugar monitoring:** Blood sugar glucose level should be controlled with medicines in diabetic patients. Blood sugar should be monitored regularly in COVID-19 patients during treatment, hospitalization and up to three months post-discharge/recovery.
- **Checked used of Steroids:** There should be in the minimum dose and duration of steroids in COVID-19 patients. Oral steroids are not to be routinely given to the mildly symptomatic

COVID-19 patients. Injectable steroids should be given in the hospitals along with blood sugar monitoring. The WBC counts should be checked, with constant observation for the appearance of new symptoms.

- **Be vigilant:** Pursue instantly for medical consultation if there is any symptom of mucormycosis.
- **Avoid self-medication:** These medicines should be used under the strict guidance and monitoring of a medical practitioner only. Do not take any medicine without a proper prescription.
- **Intake of hygienic oxygen:** Sterility of industrial O<sub>2</sub> should be strictly ensured before delivering to the medical use. Water used in the humidifiers should be clean, sterile, and changed frequently. The nasal cannula and masks used for oxygen delivery should be cleaned regularly.

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## **COVID-19 AND CHANGING TRENDS OF MARRIAGE IN INDIA**

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### **Abstract:**

The outbreak of the pandemic Covid 19 has had a major impact on the institution of marriage especially in a country like India which prefers to organize lavish wedding ceremonies. The economic slowdown has brought about many changes in the sector of marriages. Crucial elements like spending choices, arrangements done for the wedding, size of the gathering etc. are now to be all taken into consideration by the families. In a nutshell, this research paper will make an effort to study the changing trends of marriages in India owing to Covid19 pandemic.

**Keywords:** Pandemic, Covid19, marriage, economy, changing trends.

### **Introduction:**

Human societies have passed through different stages of evolution before arriving at the present stage. The phenomena with early society present to us a picture, which are not easy at first to understand. This difficulty arises from their strangeness. This gradually demonstrates that the primitive societies were the basic and fundamental units of human society. Before arriving at the present stage, we find the human society going through a process of evolution which can be traced as Stone Age: Eolithic Period, Palaeolithic Period, Mesolithic Period, Neolithic Period, Copper Age, Bronze Age and Iron Age.

In different ages, man had different patterns of surviving and each age had various inventions made by man which characterized the peculiarity of that particular stage. These new discoveries / inventions suggest how man was capable to make these things and thereby marked the progress of his life. The origin of the institution of marriage is the result of a slow evolutionary process. In the primitive times, there was no marriage system, sex relations were promiscuous. In the process of evolution we find that certainty is established in place of uncertainty and order in place of disorder. Institutions were formed for the betterment for society by human beings themselves. Each institution had a specific laid down rules for functioning. These differed from one society to the other. Hence an institution is an organization of norms to achieve some goal or activity that people feel is important. Institutions are structural process through which groups and individuals strive to carry out their activities. Social institutions are

an organized set of beliefs and practices which are followed by people. Five basic institutions followed in complex societies are: - Family, Education, Marriage, Religion, Economy and Polity. Marriages have been a part of all societies at all point of times. But since the past one year the world has witnessed changes in many sectors owing to the COVID19 Pandemic. Like every other sector, the wedding industry has been severely affected by the pandemic. Big fat Indian weddings have now become small intimate gatherings with just a handful of people. Lavish wedding venues are now replaced with small spaces with limited seating. The 1000+ guest list is now trimmed down to less than 30 people. Something which was once considered recession proof has been stalled by the COVID19 pandemic. The wedding industry which feeds a number of other businesses like catering, mehndi artists, florists, photographers are bearing the brunt of pandemic.

**Literature review:**

**Michael J. Rosenfeld, Reuben. J Thomas (2012) – “Searching for a mate: The Rise of the internet as a social intermediary”**

The social impacts of the new technologies claim that the efficiency of internet communication leads to superficial relationships that cannot be compared with those relations that are face-to-face. All in all this article was helpful from the present research as it showed all sections of society - be it heterosexuals, or lesbians being impacted by the gays "Internet Era"

**Sharma Ram Mani, “Marriage in Ancient India” (1993)**

The book gives the reader a proper understanding of Hindu social organization, the study of the system of marriage in ancient India which is a necessity. A study of the origin and development of this aspect of Hindu way of life is what has been attempted in the present book which has been divided into eight chapters. In his views on importance of marriage the author deals with the sacrament of marriage which has been very significant at all times in human societies of all kinds of people particularly the Hindus. It helps to study Hindu marriage as a social institution right from the Vedic period. In the views on origin of marriage the writer talks of the evolutionary theory of marriage and compares it with the Indian views regarding the origin of marriage. Monogamy as a doctrine is also discussed by the author in his views on forms of marriage which was of great help to the researcher from the angel of understanding the research topic in a much broader way.

**Covid-19 and recent trends of marriage in India:**

In the pre covid era, planning a wedding was nothing less than a festival. From innumerable market visits to face to face invites, wedding preparations were an occasion for interactions, gatherings, travel and a lot more. Over the last few months, the way weddings are planned and executed has seen a complete shift. Each aspect of wedding planning is now adapted

to suit the regulations and restrictions in the COVID world. From sanitization protocols to socially distanced seating arrangements, a whole bunch of new trends are now a part of the new normal. Let's throw light upon a few of the many changes that are now a part of these ongoing trends. These are: Open air venues: Most people would want to avoid enclosed spaces with air conditioning. There will be more inclination towards opting for open spaces where it's easier to set up socially distanced seating arrangements. Mobility of the people is much easier in this case and the venue will not appear crowded. Focus on digital: From wedding invites to interactions with planners, digital is the way to go. With many still sceptical about stepping out, interactions on video calls is preferred. In addition to this, a lot of guests would prefer to attend a wedding over video calls rather than attending it physically to avoid risk of health. Invitees are also shared through the WhatsApp along with the link of the wedding ceremony. Home weddings over destination weddings: With fewer people being able to travel, many soon-to-wed couples are leaning towards having smaller intimate weddings in their hometowns. Having closely observed these trends in the last few months, the wedding industry is slowly starting to navigate through the challenges of COVID19. Though wedding celebrations are now conducted on a much smaller scale, it still requires a whole lot of planning and meticulous execution. There are many in the industry who are looking at innovative avenues to support the wedding sector to adapt to the new normal. Online shopping- Indian weddings are known to involve a lot of shopping owing to the many rituals which are a part of the custom. Many brands are offering online shopping discounts to enable the customers to have a wide range to choose from. There's no doubt that weddings in a post covid world are going to be different. The only way for the wedding industry to emerge stronger from the impact is to adapt and innovate. Let's see what is the new normal adopted by the wedding planners.

**Changes adopted to suit the new normal:**

The new reality of Indian weddings has emerged in the era of COVID-19 as 'digital' continues to evolve as the new 'prefix' to wedding planning. The wedding industry post-COVID-19 will have a new reality which will follow new formats keeping in mind health and safety parameters and rethinking the guest experience. With the help of Indian wedding industry expert. Lets try to put together the trends that are currently being followed and also will play a key role in the future of weddings and the industry overall.

**Health and safety measures:** Installation of sanitisation fans similar to mist fans to make sure all the guests walking in are sanitised without manual effort. Planners or venue owners will help couples ensure that sanitization is top of mind before and during every celebration. Temperature reading will be mandatory at the entrances and Hygiene kits will be given to all guests.



**Ceremonies adopt socially-distanced seats:** Since downsizing the guest list for weddings is the new normal, we might see ceremony venues accommodating social distancing with spaced-seating arrangements. Some event planners are known to adopt more creative seating arrangements like theatre seating or circular seating, allowing the guests to have a 360-degree view of the ceremony and couple. Essentially due to social distancing, the physical placement of chairs on each table will reduce to be able to keep a 6 feet distance from one another.

**Hair and makeup:** Trends will also evolve with more focus on eyes and interesting hairstyles in case the bride decides to wear a mask. There will also be a high focus on sanitization since the make-up team works in close proximity to the bride for extended hours with most of the makeup tools being disposable and the team to wear masks, face shields and PPE kits for all appointments.

**Weddings in shifts:** Couples who do not want any change in plans including a full guest list can celebrate as they initially planned, but in shifts. With shift weddings, couples can host their wedding day festivities at their original venue and with their full team of wedding vendors but the guests come in shifts, allowing them to adhere to social-distancing guidelines.

**Food and beverages:** While delectable food is still top of mind for couples, the manner in which dishes are prepared and served will follow stringent safety precautions. Most event planners have confirmed that they are likely to opt for a sit-down plated meal instead of a buffet. This would also mean no long queues and crowds which are a risk. Menus will largely be digital or single use, with greater emphasis on wellness-oriented food sections for healthier meals and a greater level of immunity.

### **Is sologamy the new trend ahead?**

In the first week of June, a 24-year-old woman from Vadodara married herself, notching up a first of its kind in India. Kshama Bindu, a sociology student and blogger who identifies as bisexual, told reporters that her decision to go solo in the marriage which was primarily intended to inspire people ‘who are tired of finding true love.’ Initially, she had planned a traditional temple wedding for herself with all the Vedic marriage rituals but decided to dump the idea after some political leaders raised objections and the priest ditched the bride. Braveheart Kshama went ahead regardless and tied the knot with herself at a private ceremony, attended by friends and family. Not only is that she supposed to have gone on her honeymoon all by herself to Goa. Her parents attended the ceremony online as they were in another city and didn’t prefer to travel owing to the still ongoing pandemic. What is interesting is the questions that this leaves us with. What will be her upcoming life like? Will she hold down the same job? Get a child? Change her city? Join politics? Become a spokesperson for interest groups advocating sologamy? Or just be forgotten given how short our attention spans are? Or still in a few tears time would she prefer to “actually” marry? Only

time will show us if this case happens to pick up trend. Will this prove to be a voice of many other women across India advocating the many advantages of being a bride without a groom.



The long queues of well wishers are gone; instead couples do the rounds and are wished from a distance. Photographers are taken from a distance too. Guest are regularly reminded to stay off the stage, and some planning agencies even offer a service where they appoint monitors to ensure distancing all through the venue. (Photo Courtesy Radiance Events, Lucknow)

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## **REDEFINING EDUCATION POST COVID PANDEMIC: AN OPPORTUNITY FOR A SIGNIFICANT SHIFT IN TEACHING-LEARNING**

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### **Abstract:**

Covid-19 has a wide-ranging worldwide impact that can be seen in practically every field, including health, economics, and education. There have been a plethora of daily reports on the virus's impact on the lives of millions around the world since it was declared a pandemic in March 2020. It acts as a powerful change agent, boosting quick adoption of e-learning in traditionally change-resistant organisations. Both private and international schools were able to transition to online learning using Google Classrooms, Schoology, Seesaw, Blackboard, and Moodle, among other systems. In addition, the students were given introductory online training as well as a for WhatsApp conversation with the technical support staff for any technical assistance they might require. COVID-19 has put school and higher education institutions around the world to the test in terms of their readiness, flexibility, and adaptation in the face of similar global crises. Given the evolving learning environment, calls for changes in teaching methods, and the need to foster creativity and innovation in learning, integrating emerging technology into the education sector is no longer a choice but a must for all teachers and educators.

### **Introduction:**

The influence of the pandemic COVID-19 can be seen in practically every economic area. This has a negative impact on education systems all around the world. It has imposed a worldwide lockdown, which has had a negative influence on students' lives. Covid-19 was declared a pandemic by the World Health Organization (WHO) on March 11, 2020. More than 4.5 million people have been affected by the Coronavirus around the world (WHO). Close to 900 million students have been impacted by educational institution closures, according to UNESCO (UNESCO, 2020). School and college closures have affected over 1.2 billion children and adolescents around the world as a result of Covid-19 Pandemic. Many countries around the world shuttered schools in an attempt to contain the coronavirus epidemic as part of the global campaign to combat COVID-19. According to the United Nations Educational, Scientific, and

Cultural Organization (UNESCO, 2020), over 100 countries have enacted state-wide closures, affecting more than half of the world's student population.

The COVID-19 epidemic has shown us that change is unavoidable. It has acted as a stimulus for educational institutions, schools, and universities to adapt their methodologies and adopt never-before-used platforms and digitalization approaches. The education industry, as well as students, has been attempting to cope with the obstacles posed by the pandemic by taking a different strategy and attempting to use digital approaches.

The Digital Divide is real, but if everyone has access to connectivity and digital tools, digital technologies may be a great unifier. Access to the digital world must be provided to all youngsters. As a result, free broadband connectivity must be made available to all schools (UNESCO, 2020).

Most governments throughout the world have shut down educational foundations in an attempt to halt the spread of the pandemic Covid-19. Governments all around the world are seeking to reduce the rapid impact of the closure of educational institutions, particularly for more vulnerable and dispersed networks, and to stimulate the progression of schooling for everybody using various modern techniques of learning. With mechanical development and headways, the pandemic has been leading the educational area forward. The pandemic has thrown advanced education into disarray.

The spread of the Coronavirus had a negative impact on educational activities all around the world. The coronavirus pandemic had an impact on instructional techniques, resulting in widespread school closures (Wikipedia, 2020). As we abandoned our physical classrooms and went digital, under-ground, Covid-19 forced us into a regime of simultaneous, accelerated digital transition (Passantino, 2021).

### **Impacts of COVID pandemic and education:**

According to McGowan, M. (2020), school closures are divisive, and they can have far-reaching consequences for a significant number of kids in receiving schools. It has an impact on the quality of teaching and learning, as well as academic accomplishment, particularly for students with special needs or learning disabilities.

School closures occur when schools are forced to close due to pandemics, labour strikes, natural disasters, or deliberate attempts to reposition a school or address wrongdoings in a certain context. Due to Covid school closures, additional difficulties have arisen, such as how to transition to online and at-home learning, and how to cook for those who rely on school for food and shelter security (Gupta & Gupta, 2020).

School closures for Covid will place further strain on students, teachers, and parents, particularly those with limited computerised abilities, training, and resources for continued education (Gupta & Gupta, 2020).

By allowing educational foundations to embrace web-based learning and present a virtual learning society, the Covid-19 epidemic taught the entire society about how need is the mother of creation.

Education is negatively impacted by the coronavirus pandemic. Research, academic initiatives, staff productivity, and jobs involving education, among other things, are all impacted by the coronavirus (Gupta & Gupta, 2020).

### **Challenges arise due to COVID pandemic:**

Millions of students have had to study and learn from home due to the Coronavirus outbreak. This is not a novel concept, as the house has historically been the epicentre of learning, especially in informal schooling.

For many educators, learners, and parents, the reality of obtaining formal education from home are highly tough, especially in developing nations where access to, availability of, and usage of technology in education is not prevalent.

Aside from the cost of online education, a variety of other difficulties such as network troubles, insufficient power supply, diversions, and a lack of digital skills, inaccessibility, and availability issues can all obstruct effective home study.

In many nations, unequal access to technology is a major concern; protracted school closures could deprive millions of children, particularly those in poor countries, rural areas, and persons with special needs, of access to education.

During the COVID-19 pandemic school closures, poor digital skills, school policies, digital divide, power outages, unavailability and accessibility, network challenges, insufficient facilities, and a lack of training are among the key obstacles to online education (Gupta & Gupta, 2020).

The Coronavirus epidemic wreaked havoc on the education system, resulting in less educational chances for impoverished students and those living in remote areas (Gupta & Gupta, 2020).

Coronavirus has an impact on academic study, scholarly undertakings, Staff proficient turn of events, and occupations. The lockdowns had a negative impact on instructional activity. Learning disruptions, limited access to learning facilities such as labs, employment losses in the education sector, research roadblocks, and a loss of learning interests among students are only a few of the identified repercussions.

During the COVID-19 lockdown, the impacts of the COVID-19 pandemic on education were devastating, as were the multiple impediments that prevented students and instructors from engaging in online education for seamless learning.

The assessment of students' performance in online contexts, particularly the assessment of practical skills, technical competences, and teaching practicum, continues to be a problem for both instructors and students.

The spread and adoption of technology has been rapid, with a rising number of teachers being able to effectively teach online using online platforms such as Zoom, MS Teams, and others. However, these improvements also bring with them the concomitant challenges of cyber security and privacy concerns.

Due to the COVID-19 pandemic, instructors have been compelled to adopt new technology for giving lectures, which has resulted in pupils understanding and focusing on topics better.

COVID-19 has accelerated the deployment of digital technology in the service industry, which has been hampered by significant constraints.

The evaluation of students' performance in online contexts, particularly the evaluation of practical skills, technical competences, and teaching practicum, continues to be a problem for both instructors and students. As a result, it's critical to use a variety of alternate assessment methodologies as well as applicable online rubrics.

### **Education Post-Covid pandemic:**

The long-term and short-term effects of this COVID epidemic have clearly affected educational policy and practises globally. Institutions will be required to show evidence of equivalent results in order to satisfy government regulators and accrediting agencies. We can once more see how important institutional integrity and accountability are in the post-COVID-19 era (Blankenberger & Williams, 2020).

The information revolution is credited with the advent of Internet-based distant learning. Course materials are now available in digital version in addition to paper.

Students can even use instructional software apps to conduct virtual experiments and simulations. To offer alternate routes for real-world learning experiences like internships and student teaching for students in teacher education, institutions will also need to construct or adapt physical and social technology (Blankenberger & Williams, 2020). On the other hand, internet-based learning allows teachers and students to communicate with each other.

The expansion of the Massive Open Online Course (MOOC) programme has paved the way for the usage of recorded online courses (MOOC) making education easily accessible post COVID.

COVID-19 has resulted in a significant shift in our teaching and research communities. Teachers have now realised the power of leveraging technology to reach out to thousands of kids with ease (Setyowati, Sukmawan, & El-Sulukkiyah, 2021). Because to the COVID-19 pandemic, instructors have been pushed to adopt new technology for presenting lectures, which has resulted in pupils better understanding and focusing on ideas. Instructors are now up to date on the most cutting-edge technologies and platforms available and if not it will be an urgent need for transformation.

Undergraduate students are expected to participate in real-time training sessions with career guidance professionals at appropriate work establishments for the internship component. Educational communication in the post-Covid era will have to become serious about projecting diversity, inclusion, and belonging in the educational scenario.

The people, places, physical technology, social technology, wishes and ideas, catastrophe, and personality make up the higher education ecological system. Changes brought about by COVID-19's effects on these components will set off a chain reaction involving the other components that will continue until a new equilibrium is reached (Blankenberger & Williams, 2020). The increase in online learning will require institutions to change how they use both physical and social technologies, so they must be prepared to do so (Blankenberger & Williams, 2020).

Re-evaluating the purposes of education is very necessary in the new normal of the post-COVID-19 age. The development of readiness. in times of emergencies, diseases, and catastrophes is one of the goals to make the curriculum appropriate, responsive, and relevant.

Using technology in education in a distinctive way can help students become more adaptable and strengthen their collaboration skills. The difficulties of working remotely with their peers create a unique parallel and practise for how inter-professional collaboration can appear in their future employment (Ferrel & Ryan, 2020).

The rate of e-learning uptake and its adaptation in school and other educational institutes is significantly impacted by COVID-19. While digital literacy abilities appeared to be a necessary pre-requisite for instructors teaching online classes, faculty training in instructional design is becoming an increasingly important training requirement and a challenge too.

Multiple issues caused by the coronavirus pandemic in the education sector resulted in less educational possibilities for disadvantaged students and those living in remote areas. Poor digital literacy, school policies, the digital divide, power outages, accessibility and availability

concerns, network problems, insufficient facilities, a lack of training, etc. were determined to be the main barriers to online learning during the COVID-19 pandemic school closures.

Long-term costs are also part of the effect evaluation, which different educational entities, institutions, and the system have yet to determine, especially in the absence of prior learning points to draw on and grow.

### **Conclusion:**

COVID-19's proliferation has been a disaster, and such an occurrence will have far-reaching consequences in a variety of areas of society, not least higher education. The COVID-19 effect has started to affect other facets of students' life and career development. These changes will have an influence on a wide range of policy areas, including higher education, which has been shaken by COVID-19. Policymakers and educators in higher education must prepare for the consequences of this terrible occurrence. In the COVID era and recovery, institutions will need to maintain institutional integrity and accountability, as well as recognise the importance of higher education in furthering social fairness. The COVID-19 epidemic is hastening worldwide digital transformation in education. Educators, students, policymakers, and other stakeholders are now actively working to achieve digital transformation in this sector (Han, 2021).

Global higher education institutions' readiness, adaptability, and flexibility in dealing with similar global crises have been put to the test by COVID-19 (Osman, 2020). All schools have the ideal opportunity with COVID-19 to attempt to alter the method of instruction.

Learners could turn the problems offered by Coronavirus into an opportunity to improve their problem-solving skills and digital capabilities.

Higher education institutions should take steps to provide financial aid to low-income students in order to bridge the gap between teaching and learning, as well as training for academics on various online teaching methodologies.

The education industry is facing significant transformations. The ultimate underlying structure of services is changing. The meanings and aims of services, as well as their routines, are evolving. The COVID-19 pandemic forces educators to look at and adopt distance learning approaches on a far larger scale than they have in the past. To respond to the situation, the educational system must undergo a metamorphosis.

We know from history that crises transform society in a different manner. While it is yet unclear how COVID-19 will alter our society, the global epidemic is spurring and accelerating innovation and progress, particularly in the digital world. Working on the approach as a strategic pedagogy and in terms of an aggregation of tools to ensure online teaching and learning in a sustainable, adaptable, scalable, and innovative manner that ensures effective dissemination of



knowledge to the grass-roots level is part of the implementation of E-Learning practises. Following COVID-19, education systems should emphasise community-driven support networks, employ technology to bridge the digital divide in learning, and pay more attention to SDG 4.7 and its connections to climate concerns.

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## **SOCIO-ECONOMIC IMPACT OF COVID-19 IN INDIA: SYSTEMATIC REVIEW**

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### **Abstract:**

Due to the lockdown done to prevent infection of COVID-19, while on one hand nature breathed freely, environmental pollution was reduced, on the other hand, the pace of development of the economy slowed down. The attack of coronavirus has brought a big problem for the already troubled Indian economy. There are two problems before the world at this time, first to stop the infection of COVID-19, and secondly to bring the economy back on the path of development. The unorganized sector workers have been the most affected due to the lockdown to prevent infection of COVID-19. These workers were forced to return to their homes after walking hundreds of kilometers to live and eat. This created the problem of unemployment in the economy as well as increased the infection of COVID-19. The government has announced a 20 lakh crore relief package to bring the economy back on the path of development, which looks attractive but success depends on its correct implementation. The corona pandemic has hit society, mutuality has been hurt. It is passing for more than one and a half years when neither I have been able to meet in festivals nor I have been able to participate in anyone's sorrow.

Keywords: COVID-19; lockdown; pandemic; corona; systematic review; corona impact.

### **Introduction:**

Our world has changed completely in the last four months. Thousands of people lost their lives. Millions of people are lying ill (Nicola *et al.*, 2020). A new coronavirus has wreaked havoc on all of them. And, the living conditions of those who have survived the outbreak of this virus have also changed completely. This virus first appeared in December 2019 in Wuhan city of China. Since then everything has turned upside down in the world (Gupta *et al.*, 2020).

It started from Wuhan itself, where the entire city was locked down. Such a large number of people died of the virus in Italy that for the first time since the Second World War, such strict restrictions had to be imposed on the movement of people. Pubs, bars, and theaters are closed in the UK capital London. People are locked in their homes. Flights have been canceled around the world. And many relationships have become victims of social distancing. All these steps have been taken so that the new coronavirus infection can be prevented from spreading and the series of deaths due to this can be stopped (Ali *et al.*, 2020).

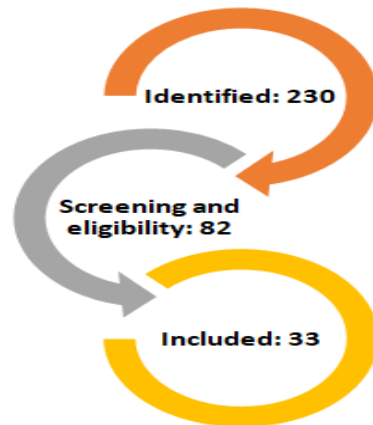
The corona pandemic has left a deep mark on India's economy. The Indian economy, which was shaken by the first wave of Corona, was not even back on track that the second wave of Corona affected it badly. Due to this, the hopes of India's economic growth have started dashing as crores of people lost their jobs in the Corona era and the number of defaulters in bank loans is causing more hurdles in recovering from the financial shock of the Kovid-19 pandemic. Economists are downgrading their estimates as a category of data (Ali *et al.*, 2020). Economists say that the increase in check bounce rates to the sale of pledged gold jewelry reflects the extent of the economic damage caused by the devastating second wave of the coronavirus disease.

Even today, despite the availability of a vaccine for COVID-19, social distancing as recommended by health experts is essential to prevent infection (Bonotti *et al.*, 2021). Given the social distancing norms and the need for a collective effort to adopt sanitation, the success of their adoption by different communities may vary (Kumar *et al.*, 2022). As is known from prior research on collective coordination, it may prove difficult for unequal communities to agree on a common norm and enforce socially beneficial behavior (Mulugeta *et al.*, 2021). Existing evidence suggests that individuals who belong to normal groups are more empathetic and more caring for their group members than outsiders (Kumar and Gautam, 2021). Furthermore, due to greater interaction in homogeneous communities, their level of social competence is higher because they have higher levels of correct social behavior, trust, and cooperation, which facilitates community coordination (Martin *et al.*, 2020). Given the highly contagious nature of COVID-19, flouting social distancing norms can put the entire community in the grip of it, which could undermine the government's efforts to contain the pandemic. This article is based on my research which asks whether those areas that are religious, social, and economic in general, are more vulnerable to COVID-19 infection than other areas (Mofijur *et al.*, 2021).

### **Material and Method:**

Multiple studies have been conducted on the detrimental impacts of a pandemic or epidemic or natural disaster on a nation's economy (Kumar *et al.*, 2019). The study was done through secondary data-based, the data was assessed through electronic data platforms like Pubmed, SpringerLink, Scopus, and ScienceDirect during June 2022. Research article included in the study in the English language published between 2020 to 2022 duration.

**Article search strategies:** After applying searching strategies by using keywords COVID impact; social impact; Economic impact; COVID-19 impact; lockdown impact and Coronavirus effects, we have found 230 articles. The 82 articles remained after screening for the eligibility check, overall 33 research articles were included in the study.



**Figure 1: Process of included research articles**

**Inclusion/exclusion criteria:** Inclusion criteria for refereed study samples included original research articles published in a research journal. Other article types such as conference abstracts, communications, commentaries, editorials, brief reports, position, and hypothesis-generating statements were excluded. Non-refereed publications were also excluded.

**Results and Discussion:**

Coronavirus has spoiled the condition of the economy of not only India but of the world. According to the latest report of the World Bank, India's economy is going to have a big impact due to the Coronavirus. India's economic growth rate will drop drastically due to Corona. There is a nationwide lockdown due to Coronavirus (Agnihotri, 2021). All factories, offices, malls, businesses, etc. are all closed. The economic growth rate has been affected due to the impact of domestic supply and demand (Agnihotri, 2020). At the same time, due to increased risk, there is a possibility of delay in the recovery of domestic investment. In such a situation, the economy can reach difficult times. The report advises the government to emphasize the need for fiscal and monetary policy support. To deal with the challenge, India will have to take more effective steps as soon as possible to prevent the spread of this epidemic. Along with this, attention will also have to be paid to temporary employment generation programs at the local level. The World Bank has warned that due to this epidemic, not only India but the whole of South Asia can lose the benefits of poverty alleviation. The International Labor Organization had said that the coronavirus was not just a global health crisis, but it has also become a major labor market and economic crisis that will affect people on a large scale.

## **Social impact**

The world is undergoing a process that some have called “civilization”, or the unraveling of the manifold, far-reaching medical, economic, and social impacts of a global health emergency (Rasul *et al.*, 2021) There is no dearth of analyses of the many health and economic dimensions of this first massive global civil emergency of the 21st century (Rasheed, *et al.*, 2021). This brief examines the social aspect of the pandemic through two perspectives: one is that of a representative patient; and the second, that of a medical doctor. The aim is to portray the impact of COVID-19 on patients and healthcare providers—both of whom are components of a wider community that is reeling under the weight of an unprecedented health crisis that has taken a massive toll on lives and livelihoods across the globe (Agnihotri, 2020).

### **The irreparable damage to social relationships by the pandemic:**

Distances in relationships increased due to social distancing, and humans will soon conquer Corona, which is proving to be the most powerful human enemy on earth (Martin and Mishra 2020). But along with the curiosity about the post-Corona world and its new systems in the minds of humanity facing a crisis, a question is also arising as to the irreparable damage this pandemic has caused to our social relationships (Agnihotri and Singh, 2021). How will there be compensation and what will the post-crisis society be like? Science is also helpless in front of this attack on nature, so the principle of social distancing is being implemented (Agnihotri, 2022). Because of this separation, humanity is moving in the direction where the limits have come to the doors of our homes. The nature of human beings has been to go near the sick and show mercy to them, but this coronavirus has attacked even the best of human nature (Ram *et al.*, 2022).

People are not coming near even in happiness and sorrow, people used to gather on occasions of happiness and sorrow. On both these occasions, relatives living abroad used to gather together and become partners of happiness and sorrow. Today, to know the well-being of corona sufferers, far from going to the affected person, even after his death, the close people are not going near the dead body of the deceased (Poudel, and Subedi 2021).

### **Fragmented society:**

There are thousands of castes and sub-castes of different religions in India. The number of tribes mentioned in the constitution is also more than seven hundred, which have hundreds of sub-caste branches and all of them have different festivals with different rituals. If we look at the list of holidays of the Government of India, then 36 major festivals are mentioned in it. But the corona pandemic has snatched away from people's loved ones and friends, as well as the gaiety of festivals and the beliefs hidden behind them (Kumar and Gautam, 2022).

PreetiBhoj-BrahmBhoj also got infected, due to the danger of infection in the hospitality of marriage ceremonies, PreetiBhoj also disappeared along with the processions. The dead bodies disappeared during the funeral (Nikhil, 2021), but the thirteenth and the funeral rites also got stuck in the containment zone. Along with sharing happiness and sorrow, the spirit of community and cooperation is also getting infected by Corona.

**Lonely life:**

The pandemic has forced the man to be monogamous. The man was a social organism BC Greek philosopher Aristotle rightly said that "man is a social organism", so whenever this crisis is over, people will feel more in need of social connection (Saji *et al.*, 2020).

A society without man and the existence of man without society cannot be imagined. Animals also have their society (Soni *et al.*, 2021). In time immemorial, when man was also like a wild animal, then he too must have needed a group for protection and food from other living beings. After that, if the process of development progressed, then the human herd would have changed into tribes and with the development of civilization, man would have secured himself in every respect by accepting the subordination of a powerful and intelligent king. By improving, that sequence has reached democracy today (Agnihotri, 2022). Therefore, it is to be hoped that after this crisis, the remaining humanity will once again stand up in full force and face the next challenges by restructuring its social fabric according to the demand of the times.

**Denied the funeral:**

Out of the 16 sacraments of Hindu Dharma, cremation is considered to be the last rite and some other rites may or may not be accepted by anyone, but cremation without these rites is considered a downfall. The children of some of the deceased fled leaving their parents' bodies unattended in the hospital.

While going near the dead body, even close relatives are not going to console the family of the deceased on the occasion of gummy. People are not even cracking near the house of the deceased because of fear. The grieving family of the deceased is feeling alone and helpless. There is no one to console such families. Untouchability is happening with the patients while they are alive, but even after death, it has become difficult to get four shoulders to carry their body. In Uttar Pradesh and Bihar, thousands of bodies were thrown into the river Ganges without cremation. In some places, the bodies of Hindus were also buried (Chaturvedi, *et al.*, 2021).

**In the field of education:**

At the end of April, when the lockdown was implemented in most countries of the world, schools were completely closed, due to which the education of about 90 percent of the world's

students was disrupted and more than 1.5 billion school students of the world were affected (Kumar and Gautam, 2022).

Poor students have been most affected by this obstacle in education due to coronavirus and most of the students cannot access the mediums of online education, due to this the possibility of many students especially girl students not going back to school has increased (Ghosh *et al.*, 2020). As of November 2020, 572 million students from 30 countries have been affected by this pandemic, which is 33% of the students enrolled worldwide (Siddiqui *et al.*, 2020).

### **Increase in gender violence:**

The situation of gender violence against children has also worsened due to the lockdown and closure of schools. Many countries have registered an increase in the cases of domestic violence and gender violence (Ghosh *et al.*, 2020).

While crimes against children are increasing, on the one hand, services related to the prevention of violence against children and women have also been disrupted in most countries (Kumar *et al.*, 2020).

### **Economic impact**

The World Bank and rating agencies initially projected India's growth for FY21 with the lowest figures seen in three decades since India's economic liberalization in the 1990s. It is mentioned in the report that this epidemic has come at a time when the Indian economy was already facing a slowdown due to pressure on the financial sector. Due to the coronavirus, further pressure has increased on this. However, India's GDP estimates were further downgraded by negative figures after the economic package was announced in mid-May. It was a sign of a deep recession. On 26 May, CRISIL announced that it would be India's worst recession since independence (Jabaris *et al.*, 2021).

Globally, the number of children living in multidimensional poverty has increased by 15% in 2020, adding 150 million children due to the pandemic. The definition of multidimensional poverty includes all the deprivations/deficiencies experienced by the people in daily life such as poor health, lack of education, low standard of living, poor quality of work, the threat of violence, etc (Syed *et al.*, 2021).

### **Huge Increase in unemployment:**

An estimated 14 crore people lost jobs during the lockdown while wages were cut for many others. More than 45% of households across the country have reported a decline in income as compared to the previous year. During the first 21 days of complete lockdown, the Indian economy was expected to lose more than 32,000 crores every day. Under complete lockdown, less than a quarter of India's \$2.8 trillion economic structure was functional. Workers and daily

wage workers in the informal sector are the people most at risk. Large numbers of farmers across the country who grow perishable fruits and vegetables also faced uncertainty. Just before the pandemic, the government projected the economy to be \$5 to \$2.8 trillion by 2024, despite low growth rates and low demand. The target was to convert to a trillion (Rawat *et al.*, 2021).

**Women facing a financial crisis:**

Gopinath said in the Dr. Hansa Mehta Memorial Lecture, “We are meeting at a time when the global health and economic crisis threatens to wipe out the many years of hard-earned economic and social benefits for women. "She said that women have been most affected by this epidemic (Rawat *et al.*, 2021). A lot of women work in sectors like restaurants and hotels. The condition of these areas has worsened the most due to the lockdown. On the occasion of International Women's Day (Neelam, 2020), this lecture was organized digitally by the Permanent Mission of India to the United Nations and the United Nations Academic Impact (UNAI).

**Businesses and industries have been affected:**

Due to the nationwide lockdown due to Coronavirus, many government businesses and industries have been affected. The economic growth rate has been affected due to the impact of domestic supply and demand (Agnihotri, 2021) At the same time, due to increased risk, the recovery in domestic investment is also likely to be delayed. According to the World Bank, not only India but the whole of South Asia can lose the benefits of poverty alleviation due to this epidemic. The International Labor Union has said that the coronavirus has not only been a global health crisis, but it has also become a major labor market and economic crisis that will affect people on a large scale. The biggest impact of the lockdown has been on the informal sector and 50 percent of the GDP of our economy comes from the informal sector, so these sectors are not able to work during the lockdown, and they are unable to buy raw materials and manufactured goods in the market. They are unable to sell due to which their earnings have stopped. Coronavirus is spreading faster in India than anywhere else in the world, India currently has more than 36 lakh cases and more than 65 thousand deaths. .Which has led to a major loss of employment due to labor shortage in India. Can't be sooner. Some say that the economy could see a contraction of about 10 percent in the year through March 2021. To make the domestic industry more self-reliant (Pal *et al.*, 2020).

**Urban vs. Rural Women's Challenges**

Many families in villages depend on money sent home by permanent or seasonal migrants. In such a situation, there is a direct impact on the migrants returning home and their families due to the fall in income (Kumar *et al.*, 2020). A survey conducted last year (between



June and August 2020) showed that on return to their villages, there was an average decline of up to 85 percent in the income of migrant workers. The deposit savings of such families went on decreasing. In many cases, families faced difficulties in repaying their existing loans. Not only this, but to fulfill their basic needs, they also had to spread their hands in front of others. The burden of debt increased on women to maintain the migrant members of the family returning from the cities to the villages(Sharifi, *et al.*, 2020). In the second wave, two new terms emerged: women widowed by COVID-19 and children orphaned by COVID-19. There has been an increase in the number of women widowed due to COVID-19 in rural areas (Chopra *et al.*, 2020).

Women in rural areas have to face even more challenges than in cities. They are facing difficulties in registering themselves on the online vaccination portal (Dubey *et al.*, 2020). The poor infrastructure of health facilities and inequalities on the digital front has made the problem worse. Not only this, women working in the unorganized sector had to completely exit the labor market to take care of their sick families (Goel *et al.*, 2021). Their unemployment rate reached double digits again in May 2021 after May 2020. According to a report by the World Bank, more than 12 million people in India have reached the condition of poverty. Its injury to both urban and rural women is increasing (Tisdell *et al.*, 2020).

### **Conclusion:**

The travel and tourism sector has been particularly affected. According to estimates of the European Union's tourism industry, one billion euros is being lost every month due to the epidemic. More than two million seafarers are employed in the shipping sector and employment opportunities in this sector have also been affected. Many countries have issued advisories against traveling on cruise ships, resulting in many cruise companies stopping their activities. Due to this, about 2.5 lakh sailors working in the cruise sector have been affected. The auto industry is also facing difficulties due to disruption in economic activities as employees have been asked to stay at home. This has had a significant impact on the supply chain and factories have been shut down. While our findings are unable to demonstrate causality between the impact of these COVID-19-related changes and worries, negative affect, and anhedonia, nonetheless, the findings highlight the urgent need for government policymakers to take concrete steps to mitigate potentially adverse effects of the pandemic on the mental health of Indian adolescents.

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## **COVID 19: IMPACT AND RESPONSES**

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### **Abstract:**

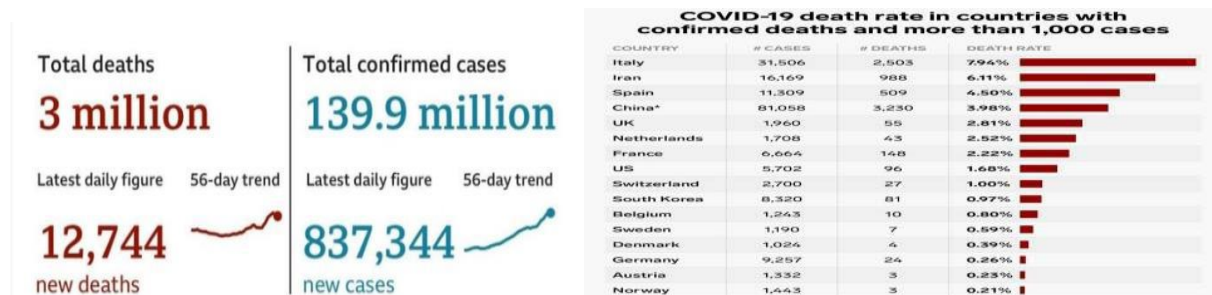
This pandemic make situations most crucial and fatal for human race in which lot of people lost their life and employment with wages income enterprises as well as most of the people lost their relatives families and friends that was too much fatal in such a situation WHO NTD has made very crucial role for surviving the human beings and human race helping with financial help global transportation food supply in scarcity mental health as well as sanitations and medical help are provided by the global organizations WHO. Covid-19 impact and responses were mainly good from society people's government organization and global society.

### **Introduction:**

The Covid 19 program from WHO and NTD Neglected tropical diseases, the organization mostly works in the affected area for covid-19 specially in developing countries it works for consequences of covid-19 morbidity death and recrudances and transmission of NTD Pandemic. WHO and global partner NTD work globally for Covid affected areas there they provide amenities and supply of tools for help in a virus affected areas providing medicines equipment and financial help to the poor. The impact of Covid 19 millions affected, the communication with counties to countries and people to people via news government rules and circulation, camps various seminar webinar other meetings online meetings debate discussion make meeting, seminar making, made awareness among the peoples, in India among 690 million people affected by the covid-19 and every year Increased by 132 million by the end of the year. Globally near about half of the workforce are affected it is about 3.3 billion with losing their livelihood. Most of the daily wages and wage earners laborers agriculturist small venture and household work as well as the services provider are affected mostly by the covid-19.

## Main body of paper:

The Covid 19 & its social economic effect is the matters of the discussion but how the government has had seriously handled and made the arrangements to control it and how the people are saved from its various amenities is matter of praise and finance minister has also declared some financial help to the poor with money as well as the equipment , provided the wages also for their family health the impact of covid-19 was very crucial and fatal but still the government has posted their health army for controlling the covid-19 it was very pleased praise able and very nice because the impact was too much , bad , & lots of people death occurred some affected some peoples lost their job some people lost their families some people lost their businesses everywhere there is a drama of death and poverty and the responses of the peoples was very high everyone was expecting helping government helping each other's and trying to cope it up from such incidents it include mainly affected food chain system many workers many agriculture could not sell their produce in the market and the many family could not get the food systems from the domestic market as well as stores in these situations all was closed many families indulged in starvation.



## Impact and Responses:

The impact of covid-19 made UNCTAD inspire for global help for food chain system supply they made solution over it and assessment of the immediate impact of covid-19, making lot of maritime supply chain and trade over the first half of 2020 which was very helpful for the global countries for foods and basic facilities and services as well as ingredients, most of the people at the globe live in low income and middle-income countries LMIC's which people have very crucial psychological effect and they were devastated totally they were suffered from psychological health disorder distress and mental issues government targeted to cope up from the covid-19 first so that they will survive and stand up from the covid-19 impact. And the responses from the all section of the people society gave very good school education of the poor people's children's affected most, there was closed down school colleges in lockdown closed also, the

educational system in the future was in unexpected crisis for poor if no education no job again . The food supply making process was problem by the pandemic in such situation lot of direct selling took place door to door also. e learning online learning online classes meeting discussion seminar webinar live stream took place which made very better communication between teacher as well to the common man and the student the message gave the people to respond the covid-19 action orders and implementation. The online education was very helpful in covid-19 situation the academic research was too much affected on which the developments depends social protection to world, universal health coverage and income support in the informal economy support where initiated in covid-19 as like child allowances healthy school meal shelter and employment were good responses from government as well as society, financial relief and Government help for businessman and entrepreneur with loan financial package subsidy waving etc. these were the Covid 19 impact and responses.

### **Conclusion:**

Whatever the situation maybe by the covid-19 but the impact and reasons and response from the globe and society was very helpful and good it finished the gap between poor and rich and became brother hood in such situation everyone fighting with Covid 19 and helping each other with employment financial help medical help foods transportation money e-employment office services agriculture services supply chain food scarcity mental support for those family who lost their lives and relatives many social organization came forth for surgery relief the covid-19 give relation give lesson brotherhood and global family and relatives of each other.

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## COVID-19 – A BOON OR BANE FOR INDIAN TELECOMMUNICATION INDUSTRY

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### Abstract:

Despite the interruptions brought on by this epidemic, telecommunications as a whole have profited from industry growth patterns and rising digital platform use. The unanticipated increase in digital connection and the move towards digitalization on a global scale offer telecom operators new and untapped opportunities. Despite the interruptions brought on by this epidemic, telecommunications as a whole have profited from industry growth patterns and rising digital platform use. This article explores various aspects of telecommunication companies' viz-a-viz the challenges and opportunities during Covid-19. The unanticipated increase in digital connection and the worldwide move into digitalization offer telecom carriers new and untapped opportunities. With the increasing adoption of enterprise 5G and the evolution of edge computing, carriers will have to bring together various features and partners to solve their opportunities.

**Keywords:** Telecommunication Industry, Covid-19, Mobile data, Internet users in India, 5G

### Introduction:

While the international market keeps on to struggle with the distress and lingering effects of the latest coronavirus (COVID-19) pandemic, "Work from home" and "social distancing" have happen to catchphrase in today's corporate scene, with the telecom business acting as the unnoticed force propelling this change (Iyengar *et al.*, 2020). Telecom technologies, such as remote working, video conferencing, and streaming services like Netflix, have swiftly emerged as critical business facilitators during this lockdown. This has brought attention to the telecom industry today (Iyengar *et al.*, 2020). The administration has also highlighted the significance of maintaining a robust communications network during this lockdown. As consumption of streaming content grows, so does the number of subscription services and support models designed to satisfy increasingly cost-conscious consumers (Nambisan, 2017). Providers are strongly encouraged to adopt new strategies and agile practices to develop, integrate, and deliver

content as consumers try out entertainment options (Markides, 2006). Telecom companies continue to look forward to 2021 as other industries provide the basis for recovery and prosperity. By leveraging the potential of cutting-edge wireless technologies like 5G, carriers have the chance to create a new future for consumers and companies. The transition to next-generation networking has the potential to alter how the sector functions, provide it a competitive edge, and generate new possibilities for innovation (Ng, & Wakenshaw, 2017). Consequently, a number of observers now think that the telecom sector may emerge as the economic slowdown's poster child, in contrast to the manufacturing and other industries that have almost come to a stop (Iyengar *et al.*, 2020). However, the greater reliance on telecom networks and other COVID-19-related regulations have created new issues for the telecom industry, as will be discussed below.

**Obstacles to the telecom industry's ability to operate:** This is crucial since on-the-ground employees must continue to have accessibility to towers for servicing, to detect possible threats, and to refuel (for towers using diesel gensets).

**Infrastructure pressure and rising demand:** Given India's reliance on wireless traffic, cellular infrastructure is under more strain as service demand keeps rising.

**Impact on Hardware and Other System Manufacturing:** According to sources, the global supply chain disruption would have an effect on producers of mobile phones and network equipment by increasing costs and decreasing availability.

**Security:** Employees communicate sensitive data over unsafe networks as businesses shift to a remote workforce, and with each online tool they use, the network's complexity and susceptibility problems increase. Teams in charge of network operations and security operations must work together to guard against security risks that take advantage of unusual operating methods while also maximising the performance of a network that can be physically situated anywhere.

**Financial Bifurcation:** The entire economy is suffering from the financial recession brought on by COVID-19, which also affects telecom companies. Due to COVID-19, the values of several TMT businesses have fallen by a third in the previous three months, making them desirable M&A targets.

### **Indian Telecommunication Industry and Covid-19**

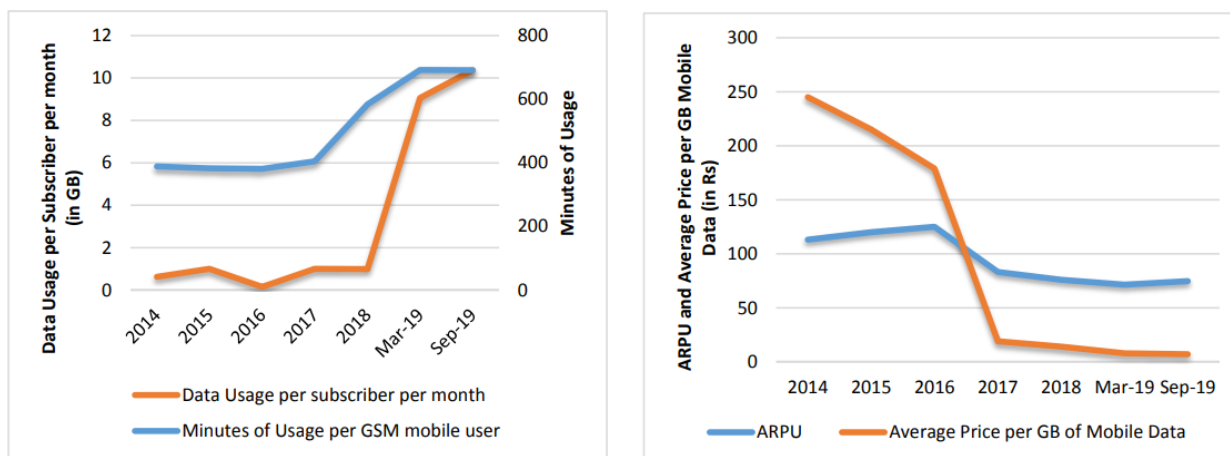
Today, India has recorded strong growth over the last decade in the world's telecom industry; With 1.16 billion subscribers, India is the second-largest telecoms market. India's mobile economy is growing, according to a research created by the GSM Association (GSMA) and the Boston Consulting Group (BCG). With an average daily use of 5 hours on smartphones,

Indian customers are among the top data consumers. It will contribute significantly to India's Gross Domestic Product (GDP). This segment is projected to add from around 6.5% to 8% of India's GDP in 2022. In 2019, India became the second market in terms of app downloads, surpassing the United States.

Some of the telecom service providers are:

1. **Bharti Airtel limited:** Headquartered in New Delhi, with operations in 18 countries, Airtel is a dominant player on the international scene. All three of the leading mobile service industries are surpassed by Airtel.
2. **Jio:** Reliance The newest company to use exclusively VOLTE to support phone service on its 4G network is Jio. With more than 389 million members as of the most recent update through December 31, 2019, Jio is ranked as the third-largest mobile operator in the world and has the biggest mobile network in India. It is headquartered in Maharashtra,
3. **BSNL (Bharat Sanchar Nigam Limited):** This one is a government company in the telecom industry. Its head office is in New Delhi. For the best communication in India's rural and urban locations, BSNL offers wide network coverage.

Many carriers have benefited from the surge in data and voice traffic from broadband to mobiles to data centre operators (Oiestad & Bugge, 2014). As a result, the telecommunications sector is performing better than other infrastructure sub-departments. The telecommunications sector, which contrasts with many different industries, was recognized as a necessary service and was generally exempt from the significant Covid-19 related restrictions on home command and quarantine requirements. Some carriers have been strengthened by relying on video conferencing for more people to hold work meetings at home due to the short-term surge in data traffic and increased broadband services. The increased traffic has increased our reliance on connectivity and digital services. As a result, the telecommunications sector remained non-circular compared to the S&P 500 crisis. 742.84 million people use wireless Internet, compared to 22.26 million who use wired Internet.



**Figure 1 - Evolution of Data Usage and Minutes of Usage**

**Figure 2 - Evolution of ARPU (average revenue per user) and Data Prices**

**Source: ICRIER's calculation based on TRAI Performance Indicators Report.**

The telecommunications market can be broadly classified in three categories: wireless, wired and internet services. The country's total subscriber base was 187.9 million in February 2021. Tele-density increased from 18.23% in FY16 to 87.26% in FY21, indicating the potential for significant growth in rural demand.

The Indian government's liberal and reformative policies have played an essential role with brawny buyer demand in the speedy escalation of India's telecom division (Markides, 2006). The administration has made it possible for telecom equipment to easily enter the market, for customers to acquire telecom services at reasonable costs, and for a responsible regulatory structure to be in place (McGrath, 2010). One of the top five fastest-growing nations in the United States for producing employment opportunities is this industry owing to ease in FDI restrictions. Some of the Major projects laid by Government of India are;

- Production Linked Incentive (PLI) Schemes under the Atmanirbhar Bharat Abhiyan— schemes worth INR 12,195 crore for the production of telecommunications and connectivity products
- Increasing internet sales: From 2015 to 2020, the mobile value-added services market is predicted to increase at a CAGR of 18.5 percent, reaching US \$23.0 billion by 2022.
- Bharat net project: Optical fibre connections were installed to 163,000 gramme panchayats as part of the Bharat Net Project.
- Prime Minister Wi-Fi Access Network Interface (PM-WANI): The Prime Minister Wi-Fi Access Network Interface (PM-WANI) offers free public Wi-Fi through Public Data

Offices (PDOs) all throughout the nation to support the growth of broadband connections.

### **What Organizations can do in order to seize this opportunity?**

Critical Issues in the Telecommunication, Media and Entertainment Industry which should be considered in 2021 are

**Focus on Customer Needs:** Update Streamers need to move on, not simply focus on cost and content by making their relationships with their customers more nuanced. Improving retention requires addressing customer challenges and tastes through content pane tiered pricing, personalized services, and social experiences.

**Safety of employees:** Ensure the security of workers who must remain on-site by regularly revising and disseminating risk-reduction policies.

**Prioritize cyber safe:** To transfer people to remote work while retaining productivity, give priority to cyber-secure remote technology capabilities.

**To reduce call center volumes utilize** analytics to determine which consumers are most likely to be impacted, and create proactive communication strategies to keep them aware of any changes to policies or service interruptions.

**Convergence and remix of entertainment experiences:** The Covid-19 pandemic has boosted motivation to try consumer entertainment options. The hard-line that existed between the content channel and the delivery channel is getting blurry. The co-evolution of entertainment and technology is accelerating the provision of new services to consumers and the acceleration of entertainment bundles, requiring new plan and lithe approach for businesses and creators.

**Repositioning to Make Money from Advanced Wireless Networks** - Consumer and enterprise embracing of superior wireless technologies such as 5G is still in its infancy, but the transition to next-generation networks is clearly underway. At the heart of telecommunications providers is deciding how to leverage these new technologies.

### **Summary**

India is the second-largest telecommunications market in the world. In February 2021, India's total subscriber base was 187.9 million. The industry primarily offers cheaper pricing, wider availability, expanded 3G and 4G coverage with the release of Mobile Number Portability (MNP), evolving subscriber consumption patterns and a beneficial regulatory environment.

In the coming five years, 500 million new Internet users will be added in India to create new business opportunities as mobile phone penetration increases and data costs fall. According to a

Zenith Media study, India is expected to grow annually between 2020 and 2023 and become the fastest growing telecommunications advertising market.

The following factors fuel the path which leads to this increased demand.

- Robust Demand: Tele-density of rural subscribers reached 58.61% in February 2020 and 59.48% in February 2021, indicating the potential for growth in rural demand.
- Increased investment: US\$ 8 billion was assigned to the communications department in 2021-22. 56% of this amount will be used for income expenditures, and the remaining 44% will be allocated for capital expenditures. Based on the federal budget 2021-22, the government has issued USD 1.9 billion of telecommunications infrastructure.
- Policy support: Federal Cabinet approved a Production Link Incentive (PLI) plan of \$1.65 billion for telecom and networking products in the telecom sector.
- Attractive Opportunities: India, 5G Subscriptions, to be 350 Million by 2026. It accounts for 27% of all mobile subscriptions. PLI has also attracted the participation of some global players that manufacture mobile devices and components.
- The government emphasized strengthening India's domestic telecommunications manufacturing capacity. Efforts are also underway to develop a base network for the deployment of 5G technology in India.

The Covid-19 outbreak has further demonstrated and highlighted the significance of the telecom sector in the global economy. It is crucial for tele-companies to maintain economic operations throughout the pandemic and link the community with greater values (Iyengar *et al.*, 2020). It also demonstrates the need of using cutting-edge technology, such as 5G and AI, to create platforms and solutions that can aid in the battle against pandemics. As a result of the COVID-19 dilemma, this presents telecoms with several challenges as well as numerous service opportunity openings. All industries have been impacted by the Covid-19 epidemic, including unquestionably the telecom sector. However, it has increased their reliance on digital tools and services. The lockdown's restrictions have also boosted network traffic. Consequently, the telecom sector will have a promising future. However, the telecom sector needs to keep them informed for the promising future. To keep up with the times, they must offer their customers fresh items and technological advancements (Foss & Saebi, 2017). Due to the network's increased traffic, they must upgrade its infrastructure. The telecom sector must transition from 4G to 5G, which will give the client a strong internet connection and enable speedy internet access.

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## **ECONOMIC IMPACT OF COVID19 ON AGRICULTURE, FOOD SECURITY AND LIVELIHOOD IN INDIA**

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### **Abstract:**

The sheer extent of the Covid-19 pandemic and its crippling effect on the entire economy gave cold creeps. Suddenly the fragile, one-of-a-kind arrangement through which the daily wagers and the migrant workers were surviving broke down with the imposition of the lockdown, and we had a novel disaster on our hands. In such a hanging-by-thread situation, the adversely affected poor had to rely on the government machinery for sustenance. The International Labour Organization (ILO) projected that 400 million of these informal workers were at risk of falling deeper into poverty during the pandemic crisis. However, the national lockdown announced on March 25 2020, tremendously affected informal sectors, agriculture sector and other allied sectors more than 50% of the workforce in India are employed in these sectors. COVID-19 was also disrupted some activities in agriculture and supply chains. Preliminary reports showed that the non-availability of migrant labour was interrupted some harvesting activities, particularly in north-west India where wheat and pulses are being harvested. Food security and livelihood are critical components of rural and sustainable development, affecting the livelihoods of millions of people in developing nations. Nevertheless, consumers are often paying more, reports show that during the lockdown the closure of hotels, restaurants, sweet shops, and tea shops is already depressing milk sales affecting the livelihood of the farmer. Moreover, poultry farmers also have been badly hit due to misinformation, particularly on social media, that chickens are carriers of COVID-19. Here, present paper mainly focuses upon the likely impacts on agriculture, supply chains, food, and nutrition security, as an integral part of rural livelihoods. Therefore, the disruption in the agricultural sector risking food security and will have far-reaching impacts on other developing countries also.

**Keywords:** COVID-19 Pandemic, Agriculture, Food Security, Informal workers and Livelihood.



## **Introduction:**

India has witnessed moments of extreme crises like natural calamities such as floods and droughts, earthquakes and landslides, security threats (both external as well as internal), deadly diseases, communal riots and so on. However, the COVID-19 was unforeseen and unprecedented in many ways. It not only caught the federal government off guard, but the sheer extent of the disease and its effect on the entire economy gave cold creeps to even the most optimistic of observers (Kumar *et al.*, 2021). The pandemic brought to fore the most vulnerable side of India's political economy which was hitherto hidden under the cover of rising GDP and per capita income. The International Monetary Fund (IMF) estimates that in 2020 the global economy contracted by 3.3 percent (IMF, 2021). This has pushed an estimated 97 million more people into poverty (IMF, 2021; Gerszon *et al.*, 2021). Per capita income losses are particularly acute in emerging and developing countries, where the fiscal and institutional capacity to respond to the crisis is highly constrained (IMF, 2021; Bundervoet *et al.*, 2021). The events that unfolded because of the spread of the pandemic were nothing less than a spectacle: millions stranded with transportation at a halt, the alarmed crowd rushing for food and essentials, curfews imposed, lacs of migrants walking hundreds of miles back to home, and millions of enterprises face an existential threat. Nearly half of the world's (3.3 billion) workforce are at risk of losing their livelihoods.

For two reasons, India's economic shock was likely to be much more severe. First, prior to COVID-19, the economy was already slowing, exacerbating pre-existing issues such as unemployment, low incomes, rural distress, malnutrition, and widespread inequality. Second, India's vast informal sector is especially vulnerable. Out of the national total 465 million workers, around 91% (422 million) were informal workers in 2017-18 (Dev, 2020). Lacking regular salaries or incomes, these agriculture, migrant, and other informal workers would be hardest hit during the lockdown period.

India's first response to the pandemic came with the imposition of the world's largest coronavirus lockdown, when the Prime Minister of India, on 24 March 2020, instructed 1.3 billion Indians to stay home (Singh *et al.*, 2020). This lockdown, which was initially set for 21 days but was later extended and conditionally lifted, effectively halted the livelihoods of 90 percent of India's workforce, who work in the informal sector. The International Labour Organization (ILO) projected that 400 millions of these informal workers were at risk of falling deeper into poverty during the pandemic crisis (ILO, 2020). As on August 02, 2021, more than 4.2 million people have officially lost their lives to COVID-19 worldwide, with millions more suffering from long-term and debilitating health consequences. Beyond the coronavirus's devastating health impacts, efforts to contain the spread of the virus are exacting a massive

economic and social cost. The International Labour Organization (ILO, 2021) estimates that in 2020, 8.8 percent of total working hours were lost. Informal workers and small-scale enterprises have been particularly hard hit. In a survey of 4,520 businesses in 45 countries worldwide, 80 percent of microenterprises and 70 percent of small firms reported facing significant financial difficulties because of the pandemic (ILO, 2020). Informal workers – who constitute a large part of the rural workforce – are particularly vulnerable and are found to be 3 times more likely than formal wage earners and 1.6 times more likely than self-employed and informal workers to have lost their job because of the pandemic (ILO, 2021). The impacts of job-market disruptions have been particularly pronounced for women, who have seen employment rates drop by five percent in 2020, compared to 3.9 percent among men (ILO, 2021). Along with a disproportionate loss of employment, women have overwhelmingly shouldered the burden of care and home-schooling during lockdowns.

Though India's first response to the pandemic through a total lockdown was swift, it was not only about controlling the spread of the disease but also about ensuring livelihood and food security to the large informal workforce devoid of any social security net. Lauding India's immediate response to the pandemic, the World Economic Forum Chief also stressed the significance of protecting the life and livelihood of the poor and informal workers to avoid a humanitarian crisis (The Hindu, October 25, 2020). 'Humanitarian crisis' is what we struggled with, because suddenly the fragile, one-of-a-kind arrangement through which the daily wagers and the migrant workers were surviving broke down with the imposition of the lockdown and we had a novel disaster on our hands.

The COVID -19 itself did frighten, but the plight of these workers in the unorganized sector and other economically vulnerable groups evoked murkier nightmares. Many scholars drew attention to the pandemic crisis as the point of time to save the lives of those who lost their livelihood through food assistance and employment assurance or livelihood recovery (Ghosh, 2020; Ray and Subramanian, 2020; Lahoti *et al.*, 2020; Stranded Workers Action Network [SWAN], 2020). The lockdown induced supply chain disruptions and food inflation reflected the proximity between life and death of the poor: 'I hope the prices come down soon; else there is only one way for poor people like us: we will die' (Inani, 2021). In such a hanging-by-thread situation, the adversely affected poor had to, in some instances, entirely rely on state government machinery for sustenance.

The pandemic has been affecting the entire food system and has laid bare its fragility. Border closures, trade restrictions and confinement measures have been preventing farmers from accessing markets, including for buying inputs and selling their produce, and agricultural workers from harvesting crops, thus disrupting domestic and international food supply chains,

and reducing access to healthy, safe, and diverse diets. The pandemic has decimated jobs and placed millions of livelihoods at risk. As breadwinners lose jobs, fall ill, and die, the food security and nutrition of millions of women and men are under threat, with those in low-income countries, particularly the most marginalized populations, which include small-scale farmers and indigenous peoples, being hardest hit.

As the restrictions imposed due to the lockdown are being lifted, it is an opportune moment to analyse the impact of COVID-19 on different sectors of the economy. Several reports have pointed towards the possibility of contraction of Indian GDP in 2020-21. This was a worrisome indication, since a higher GDP contributes immensely towards achieving better living standards, reduced poverty as well as improvement in other socio-economic indicators. While other sectors are reported to be under significant stress, it is important to analyse the impact on agricultural and allied sectors which provide livelihood to majority of the population in India.

### **Why Agriculture Sector Matters?**

Indian agriculture which is considered as the backbone of Indian economy because of India's rural population is 68.84% of the total population, and their livelihood depends upon the agriculture who work hard to cultivate crops irrespective of the weather conditions and then further supply them to *mandis*/markets. Indian agricultural sector faces challenges such as low rainfall leading to severe droughts. In some parts, there is a flood, price fluctuations in crops which cause distress leading to rising debts. However, somehow due to long-term exposure to these problems, they have learned how to tackle these problems, but they were not ready for a sudden shock like the challenge (COVID-19), which made a devastating effect on rural livelihood and Indian economy. However, the national lockdown announced on March 25, 2020, tremendously affected informal sectors, agriculture sector and other allied sectors more than 50% of the workforce in India are employed in these sectors. Among them, 85% of farmers belong to the small and marginal category whose source of livelihood depends upon farming, whereas as fishery sector employs over 14 million people and among more than nine million fishers, out of which 80% are small scale fish farmers. This lockdown has completely entrenched the economy causing mass unemployment. However, according to FY 2019–20 (Indian Agriculture and Allied Industries Report, March 2020), agriculture and allied sectors contributed about 2.1% growth in Gross Value Added (GVA). The agricultural and allied sector carries immense importance for the Indian economy. It contributes nearly one-sixth to the Indian national income and provides employment to nearly 50% of the workforce. It is fundamental for ensuring food security of the nation and influences the growth of secondary and tertiary sector of the economy through its forward and backward linkages. The performance of agricultural sector greatly influences achievements on many other fronts. For instance, World Development Report 2008 released by

World Bank emphasizes that growth in agriculture is, on average, at least twice as effective in reducing poverty as growth outside agriculture. Agricultural growth reduces poverty directly, by raising farm incomes, and indirectly, through generating employment and reducing food prices. In other words, a thriving agricultural sector is a boon for most sectors of the Indian economy.

### **Economic Impact of COVID-19 on Indian Agriculture**

During the lockdown, the agriculture sector had functioned smoothly. Government of India has taken all necessary measures to ensure smooth operation of agriculture related activities. Farming and allied activities were exempted from the lockdown. Seed, pesticide, fertilizer etc. dealers / shops and other input related activities were allowed to open / free for making inputs available to the farmers. Inter and intra state movement of farm machinery specially combine harvesters was facilitated. As a result of the various steps taken by the Department, both harvesting activities of the rabi crop and sowing activities of summer crop took place in a systematic manner. However, no income assessment report which estimates the impact of COVID-19 on the income of small and marginal farmers due to nation-wide lockdown was available.

Agriculture and Allied Sectors registered a growth of 3.4% during 2020-21 even as the overall economic growth declined by -7.2% during the same period. Growth rate of agriculture and allied sectors during the last 5 years are given below.

**Table 1: Growth of Agriculture and Allied Sectors (2011-12 prices)**

<b>Year</b>	<b>Growth (%)</b>
2016-17	6.8
2017-18*	6.6
2018-19 #	2.6
2019-20@	4.3
2020-21**	3.4

Source: Central Statistics Office (CSO) M/o Statistics & PI

\*\* As per First Advance Estimates of National Income, 2020-21 released on 7th January 2021

\* Third Revised Estimates, # Second Revised Estimate, @As per the First Revised Estimates for 2019-20 released on 29th January, 2021

COVID-19 was also disrupted some activities in agriculture and supply chains. Preliminary reports showed that the non-availability of migrant labour was interrupted some harvesting activities, particularly in north-west India where wheat and pulses are being harvested. There are disruptions in supply chains because of transportation problems and other issues. Prices had declined for wheat, vegetables, and other crops, yet consumers are often paying more. Media reports showed that the closure of hotels, restaurants, sweet shops, and tea shops during the lockdown depressed milk sales. Meanwhile, poultry farmers had been badly hit due to misinformation, particularly on social media, that chicken are the carriers of COVID-19.

### **Magnitude of Change of Production at the State level:**

The magnitude of impact on various sub-sectors had been discussed in following paragraphs:

- a. **Agriculture:** In the agriculture subsector, most of the states had witnessed a decline in production. States like Chhattisgarh (13%) and Himachal Pradesh (15%) had witnessed a sharp decline in agriculture production. However, some large agricultural states like Telangana (23% increase), Punjab (5%), Rajasthan (4.4%) and Gujarat (6.7%) had shown an increase in agricultural production which may be attributed to the fact that rabi season had witnessed a bumper crop production and harvesting of the crops had been completed in many of the states before the onset of the pandemic and the lockdown (Table 2).
- b. **Horticulture:** Horticulture being a perishable crop was adversely affected during the lockdown even though there was no restriction on sale of fruits and vegetables in the market, except ban on operations of rural *haats*. All states except Gujarat (5%), Rajasthan (2.5%) and Karnataka (1.7%) had witnessed a decrease in production in the horticulture sector. Amongst the larger states, Himachal Pradesh, Chhattisgarh, and Tamil Nadu faced the highest decline of 18%, 17.9% and 13.9% respectively (Table 2).
- c. **Poultry:** Poultry sector was most strongly impacted in all states (except Arunachal Pradesh where production was reported to increase by 15%) with production declining by a significant amount. The decline in production levels was the sharpest in the states of Haryana (33.3%), Madhya Pradesh (26.6%) and Uttar Pradesh with 24.7% (Table 2). The fall in the production levels in poultry could be directly attributed to the lower demand for poultry products due to the widespread fear prevailing that COVID-19 virus may spread through the poultry birds.

**Table 2: State-wise Impact on production of agriculture and Allied Sector (Per cent)**

State/ U.T.	Agriculture	Horticulture	Poultry	Dairy	Fisheries	Pig/Sheep/ Goat
Andaman & Nicobar	-21.7	-15.0	-15.0	-20.0	-55.0	-25.0
Andhra Pradesh	-2.0	-7.5	-15.9	-0.8	-21.7	-1.0
Arunachal Pradesh	0.0	0.0	15.0	-5.0	5.0	25.0
Assam	-4.2	-2.3	-2.3	-9.0	-1.0	-3.3
Bihar	-5.3	-7.6	-29.9	-10.0	-10.2	-7.2
Chhattisgarh	-12.9	-17.9	-21.1	-11.5	-10.4	-5.9
Dadra Nagar Haveli	0.0	0.0	0.0	0.0	0.0	0.0
Daman & Diu	0.0	0.0	0.0	0.0	0.0	0.0
Goa	0.0	-5.0	0.0	0.0	-15.0	0.0
Gujarat	6.7	5.0	-1.4	4.2	-6.5	-6.7
Haryana	-0.7	-1.8	-33.3	-5.8	-13.0	-17.0
Himachal Pradesh	-15.0	-18.0	-12.0	-5.0	-21.3	-13.3
Jammu & Kashmir	0.6	-3.8	-8.3	4.0	-12.1	5.0
Jharkhand	-6.7	-8.9	-29.7	-13.0	-9.4	-13.2
Karnataka	4.2	1.7	-15.5	-6.8	-16.5	-11.4
Kerala	-7.2	-8.0	0.7	-8.3	-6.3	-8.3
Madhya Pradesh	-0.1	-4.3	-26.6	-9.5	-22.7	-16.3
Maharashtra	-7.6	-11.7	-20.2	-9.0	-23.5	-10.0
Manipur	-15.0	-15.0	-20.0	-16.7	-13.3	-20.0
Meghalaya	-5.0	-5.0	-6.4	-2.1	-7.5	-6.7
Mizoram	-13.3	-8.3	-15.0	-15.0	-8.3	-9.0
Nagaland	0.0	0.0	-25.0	0.0	0.0	-25.0
Odisha	-7.5	-13.3	-21.5	-4.4	-1.5	0.7
Puducherry	0.0	0.0	0.0	0.0	-55.0	-55.0
Punjab	5.0	-1.2	-23.4	2.1	-20.0	-15.0
Rajasthan	4.4	2.5	-12.0	1.0	-20.0	2.1
Sikkim	0.0	0.0	0.0	0.0	0.0	0.0
Tamil Nadu	-8.6	-13.9	-9.7	-6.3	-21.8	-3.2
Telangana	23.3	0.0	5.0	2.5	7.0	10.0
Tripura	-5.0	0.0	-23.3	-15.0	0.0	0.0
Uttar Pradesh	0.0	-0.5	-24.7	-5.8	-11.3	-7.6
Uttarakhand	0.6	-4.1	-8.6	0.7	-3.6	0.0
West Bengal	-1.4	-2.5	-14.4	-11.9	-10.8	-13.2

Source: NABARD (Impact Assessment of COVID-19 and Rural Economy)

- d. **Dairy:** The dairy sector was one of the least adversely affected sectors after crop production as the demand for the dairy products was relatively stable and the supply chain also did not face large scale disruption during the lockdown. At the all-India level, the overall dairy production declined by 6.6%, but this decline was of similar small magnitude across most major states. The States of West Bengal (11.9%), Jharkhand (13%) and Chhattisgarh with 11.5% (Table 2) reported the largest decline in the dairy sector mainly due to decline in demand for milk and milk products as most of the restaurants, sweet shops remained closed during April 2020.
- e. **Fisheries:** The full range of activities required to deliver fish and fish products from production to the final consumer is subject to indirect impacts of the pandemic through changing consumer demands, market access or logistical problems related to transportation and border restrictions. This has led to serious disruptions in the fisheries supply chain. All states except Telangana (increase of 7%) witnessed a decline in fisheries production. Amongst the larger states, those which faced the biggest decline were Maharashtra (23.5%), Madhya Pradesh (22.7%) and Andhra Pradesh with 21.7% (Table 2).
- f. **Pig/Sheep/Goat:** This sector had also been impacted adversely by the pandemic, but to a much lesser extent. One of the reasons for this was that in some regions there has been an increase in Pig/Sheep/Goat consumption as it is being considered a safer alternative to poultry. Telangana and Arunachal Pradesh have seen an increase in production levels by 10% and 25%, respectively. Rest of the states have seen a decline in the production levels with Nagaland (25%), Haryana (17%) and Madhya Pradesh (16.3%) reporting the highest decline (Table 2).

Here are some measures required to keep the agricultural sector and supply chains working smoothly:

1. The government had correctly issued lockdown guidelines that exempted farm operations and supply chains. But implementation problems leading to labour shortages and falling prices should be rectified.
2. Keeping supply chains functioning well is crucial to food security. It should be noted that 2 to 3 million deaths in the Bengal famine of 1943 were due to food supply disruptions—not a lack of food availability.
3. Farm populations must be protected from the coronavirus to the extent possible by testing and practicing social distancing.

4. Farmers must have continued access to markets. This can be a mix of private markets and government procurement.
5. Small poultry and dairy farmers need more targeted help, as their pandemic-related input supply and market-access problems are urgent.
6. Farmers and agricultural workers should be included in the government's assistance package and any social protection programs addressing the crisis.
7. As lockdown measures have increased, demand has risen for home delivery of groceries and E-commerce. This trend should be encouraged and promoted.
8. The government should promote trade by avoiding export bans and import restrictions

### **Impact on Food security**

Food security is comprised of four dimensions i.e., access, availability, utilization, and stability. Through its effects on household income and food markets, including markets for nutrient rich fruits, vegetables and proteins, the COVID-19 crisis adversely affects food security along its multiple dimensions. The State of Food Security and Nutrition in the World (2021) estimates that between 720 and 811 million people in the world faced hunger in 2020. This represents an increase of between 118 and 161 million more people who were facing hunger in 2020 than in 2019. Yet, questions remain about the extent to which the pandemic has increased food insecurity in rural places. On the one hand, high levels of poverty and pre-COVID-19 food insecurity makes rural populations, particularly in rural and traditional food system countries, highly vulnerable to adverse changes in food prices and incomes. On the other hand, in these countries, many food consumers are also food producers, and local food supply chains tend to be short. These factors may mitigate some of the adverse effects of the pandemic on rural food insecurity.

The survey suggests that disruption in supply chain (induced by the lockdown) possibly caused a slide in consumption expenditure and reduction in diets. Another survey of vegetable producers across four states in India found reduced access to nutrient dense foods. It was also found that over 60% of households experienced some form of dietary disruption. While 80% of households managed to maintain their staple consumption, approximately 50% of households had to reduce their consumption of fruit, dairy and other animal sourced foods (Harris *et al.*, 2020). Decreased intake in terms of quantity and diversity could leave some of the more vulnerable populations in the country at-risk of contracting not just COVID-19 but other diseases as well (Jayawardena and Misra, 2020). Overall, 30% of all households showed at least one sign



of food insecurity during the lockdown, an estimate which declined to 15% in September 2020. It is important to note that food insecurity in India has high baseline levels. Data from the State of Food Security and Nutrition in the World report showed that 31.6% of India's population suffered from moderate to severe food insecurity in 2017-2019. The most commonly sign of food insecurity was limiting of portion sizes: approximately 26% of the households reportedly experienced reducing their meal size during a given week in the lockdown in May 2020. During this time, 6% of households also ran out of food or reported a member being hungry and not eating; 3% went without eating for a whole day.

Food shortage persisted almost 3 months after the lockdown was lifted—and despite increased PDS support announced by the government under the *Pradhan Mantri Gareeb Kalyan Ann Yojana*. While the proportion of households showing signs of food insecurity declined post-lockdown, almost 33% of households that reported reducing portion sizes during the lockdown continued to report this reduction in September 2020.

### **Impact on Livelihood**

Due to the lockdown, all the respondents of the survey reported a loss of livelihood or discharge from work by the employer. Fourteen out of the eighteen respondents were casual labourers, of which seven could not even find a single day of work throughout the lockdown (Ngullie, 2021). The self-employed too were severely affected. For example, Srinivas's family from Telangana state that sells milk by rearing buffaloes could not attract a single buyer who could pay in cash but credit on deferred payment. Such cases prevailed among many self-employed households and having exhausted their savings from the pandemic-induced macroeconomic shock. One of the women, from Nalgonda district, Telangana state Priyanka, asserted that the government should assure employment and financial allowance to labourers—'the pillar of the economy'; she opined that the government could have established manufacturing units in rural areas to address the shortage of basic sanitation and medical types of equipment while providing employment avenues. It is imperative to understand the share of food expenditure in poor households to understand the pandemic impact on food access or food security. As per the latest available National Sample Survey Office (NSSO) data, on an average, the household food expenditure is 43% and 53% in urban and rural India, respectively (NSSO, 2011, pp. A-792). From a comparative viewpoint, French households spent only 13.2% on food and non-alcoholic beverages in 2017 (Eurostat, 2018). It reflects the disparity in the economic impact on food access as these figures prove Engel's law—the poorer the households, the higher the total expenditures on food.

## **Conclusion:**

The pandemic led crisis has wreaked havoc on both the Indian and global agricultural system. A global food security crisis is in potentially looming that cannot be countered without understanding the impacts of COVID-19 on the agricultural system, especially of the developing countries. A host of food exporting nations viz., Kazakhstan, Myanmar, Russia, and Vietnam have imposed cereal trade restrictions like bans, quotas, and licensing (GTA, 2020) which are distorting the global food supply. Disruptions in supply and/or value chains leads to food wastage unleashing volatility in prices and having implications to food and nutritional security. For instance, Bangladesh witnessed a significant level of food wastage in perishables like milk and vegetables, and reduced consumption of non-vegetarian items like poultry products and fish – a major source of protein – owing to misinformation concerning the spread of COVID-19 (Termeer *et al.*, 2020a). India too has witnessed a steep reduction in consumption of poultry meat for some time due to the same reason causing enormous income loss to poultry farmers. The poverty rate has increased by 9% during the lockdown period in Ethiopia, and a survey of 3107 households revealed income loss for 38% of casual labourers while 90% reported food affordability as a major concern (de Roo and de Boef, 2020).

Initial investigation in India shows that restriction on movement, transportation problems and reverse labour migration have disrupted domestic supply chains which ultimately contributed to rises in wholesale and retail prices of a few commodities like pulses, wheat flour, milk and vegetables. Although buffer stock of food grains and harvest from previous crops restricted any immediate fallout but was not sufficient when three-fourths of the consumers reported price hikes in the essential commodities. India – as per the Nomura Food Vulnerability Index (ranked 44) – has been placed as less vulnerable to large price swings than its neighbouring countries like Bangladesh (12), Philippines (23), Pakistan (32) and Hong Kong (42) (Subbaraman and Loo, 2020). Trade distortions in major rice exporters like Thailand and Vietnam increased prices in global markets adversely impacting African countries relying largely on food imports (Sers and Mughal, 2020). Although India has emerged as self-sufficient and a net exporter of food in recent years, the pandemic led chain of events has variously affected the domestic agricultural systems specifically production, marketing and consumption. More than 90% of consumers across all the regions have changed their shopping behaviour. As the pandemic continues to threaten the global food system, the role of state becomes much more pertinent. In order to protect and safeguard the livelihoods of millions of people associated with the agricultural system, the state should increase spending on social safety nets immediately and

take up other short and medium term strategies. Raising revenue by offloading excess buffer stock and increased credit to the agriculture sector should be the top priority for post-pandemic economy restoration.

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## **IMPACT OF COVID ON FACTORS AFFECTING DINING OUT PREFERENCES OF CONSUMERS**

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### **Abstract:**

The restaurant business has faced an unprecedented difficulty as a result of the COVID-19 outbreak. Community lockdowns, social distancing, stay-at-home ordering, travel and mobility limitations and other COVID-19-flattening techniques have caused major changes in the operation of restaurants. The goal of this chapter is to investigate the factors that impact changes in consumers' dining preferences following the pandemic.

COVID-19 pandemic environment has; to an extent influenced food habits and immunity consciousness of people influencing their food intake and purchase decisions. Consumers are eating and buying more food, implying an impression of a less healthful diet. People have started placing premium on fresh food and handcrafted dishes. Furthermore, it's been seen that they have reduced their travels to marketplaces in favor of using delivery services and online buying platforms. Because of the infection fear, consumers have more faith in eating at home. During the first year of pandemic, consumers were unable to enjoy in-dining experiences, either completely or partially, due to lockdown or severe limits on in-dining food services. Many consumers were and are hesitant to dine out in a limited food service setting, even in the lack of legislative prohibitions on in-dining food service, because of the risk of COVID-19 transmission. Many people predict that new pandemic norms, such as the prevalence of intact services, fewer encounters with service providers (e.g., service by robotics), and some cleaning and sanitization procedures, are going to be same even after the pandemic.

This chapter tries to answer if there have been any changes in consumer's preference over their concerns regarding safety and hygiene followed in restaurants and transparency in operations. This chapter intends to ascertain if preference of consumers of Ahmedabad for dining out has changed due to pandemic and it ascertains to find out various factors affecting consumers' return to restaurants post pandemic.

**Keywords:** Dining Out, Safety, Hygiene, Sanitation facility, Social distancing and Seating arrangements, Food preference

## **Introduction:**

In the world of hustle-bustle, people today opt for dining out to avoid the chores of buying vegetables, cutting, cooking serving them and washing the dishes at home. Rather people look out to dine in restaurants or go for street food with a wide variety of options to eat. The time of 1960s made it a trend for casual family dining and chain restaurants. Dining out has never gone out of trend since then. In simple meaning, dining out is to have a meal away from home. Dining out can be both informal and a normal way. Various important client meetings, locking of deals and informal meeting like going on to dinner or a lunch with friends and family dining out has always been a preference for the customers. India is a country of diversity, the diversity can also be found in cuisines which can be easily enjoyed by anyone while dining out. As the saying by Mark Twain goes true “Part of the secret of a success in life is to eat what you like and let the food fight it out inside”.

Not only limited to these factors, India especially is considered to be a country where food is available readily and at minimum cost, but people also depend on dining out daily. People who travel daily or the students who are away from home for most of the time highly depend on dining out for lunch. Additionally, people who reside in paying guest or away from home are the targeted customers of the dining-out places. Nuclear families are becoming more common, and the growing family earnings in India are accelerating consumption and having a direct impact on food spending. Dining out used to be a treat, but with an increase in the number of alternatives and a method to get quick meals, entertainment, social gatherings, and family outings, dining out has become more common these days.

People's dining habits, the hospitality business, and people's inclination for dining out were all normal and increasing day by day until the year 2019. Family, famous restaurant, suggest, and supper was frequently used phrases with eating linked yet the year 2020 was a downhill roller coaster ride when the whole hospitality business was turning into losses. COVID-19 pandemic, or coronavirus, has a significant influence on customer dining habits and preferences. The terms associated with meals shifted from tasty, lovely, and effortlessly to striving and careful.

The examination of customers' dining-out demand network for 2019 data revealed discourses centered on reservations, famous restaurants, meals, orders, and coffee. However, for 2020 data, discourses were established around delivery, pricing, order, take-out, and social distance. In brief, as the epidemic spread, new search terms evolved such as delivery, takeout, and social distance. Furthermore, compared to before the COVID-19 pandemic, a decreasing

tendency in positive emotions and an increasing trend in negative emotions were noticed following the emergence of the COVID-19 pandemic; especially, dread was discovered to be the fear emotion. Since the pandemic, consumers have put a higher emphasis on locations that do not endanger their health and provide non-contact eating services rather than food flavor or environment. Restaurants were compelled to close in early 2020 as a result of the lockdown policy. Furthermore, customers exhibited a propensity to shun other individuals in public. Because of the social distancing strategy, jurisdictions urged or forced such enterprises to focus on delivery services or to lower sitting capacities even after they reopened.

But, due to COVID-19, the decision of consumers of choosing an outlet to dine out depends on other factors too like: hygienic maintenance, sanitation facility, social distancing and seating arrangements.

There are many types of research conducted especially amid the COVID-19 pandemic to understand the hospitality industry's performance and how the consumers are reacting to the new normal. People are not completely avoiding to get out and eating but many factors are influencing their decision when they chose to dine out. The third-party delivery apps and cooking and ready to eat food available in the market are just some of the threat that is identified in the hospitality industry. Families now have more spare cash as a result of more women working outside the home and a busy lifestyle. According to the McKinsey Global Institute (2005) report, India would become the fifth-biggest consumer market as income and living standards rise.

Thus to study furthermore on the consumer's preference for dining out amid the pandemic in a state like Gujarat, where people are considered to be foodies we choose to study the factors influencing the consumer's preference in choosing the dining out space.

## **Literature Review**

The very first case of COVID-19 was diagnosed in December 2019. The wave of COVID-19 spread like a wildfire and took root in a pandemic. With the horrific wave, this pandemic impacted 210 nations and areas throughout the world. On January 30, 2020, the World Health Organization (WHO) declared the COVID-19 pandemic a public health emergency of worldwide concern, urging all countries to work together and help one another to avoid the disease's rapid spread (Celik and Dane, 2020).

Due to the COVID-19 global pandemic on March 11, 2020, national lockdowns, social distancing, stay-at-home orders, and mobility restrictions were imposed. This resulted in

dwindling demand for hospitality businesses (Bartik *et al.*, 2020). The entire world was affected, but the tourist and hospitality industries were particularly hard struck.

**People's intentions and beliefs:**

COVID-19 has had a considerable influence on people's emotions, implying that it has had indisputable implications for personal satisfaction and accomplishment (Jeong and Lee, 2021). People's choices are frequently influenced by their sentiments about the impending results in their decision-making processes. Positive expected feelings, relating to an individual's successful attempt at accomplishing a goal, and negative anticipated emotions, referring to an individual's incapacity to achieve their aim, have been classified into two distinct groups, positioned as opposites. There has been a significant increase in negative emotions, such as anxiety and depression, during the pandemic: studies show that consumers are concerned about their health, as well as the health of their families and loved ones, and are concerned about their ability to provide for their basic needs, as well as their loss of freedom.

**Consumer behavior on dining out:**

Consumers are nowadays rational and their choices depend on multiple factors. Some of them can be notably busier lifestyles, disposable incomes, and odd dietary preferences (Goyal and Singh, 2017). Some of them are busier lifestyles, disposable incomes and quirky food choices. The analysis, based on a rich household survey for 2005, conducted jointly by the University of Maryland and the National Council of Applied Economic Research, broadly confirms the important role of urbanization, demographic changes, expansion of the middle class and its growing affluence in eating out (Gaiha *et al.*, 2009). In recent years the Indian hospitably industry is undergoing rapid changes, reflecting several underlying developments (Anitharaj, 2018).

**Dining habits of Indians- Pre and post Pandemic:**

COVID-19 wreaked havoc on the hospitality industry, including hotels, restaurants, and bars. In early 2020, for example, restaurants were forced to close due to the lockdown policy. Furthermore, customers exhibited a proclivity to avoid other people in public. The forecast for the future of restaurants is catastrophic (Celik *et al.*, 2020). Experts estimate that over half of restaurants will not survive. Therefore, a strategic move to maintain consumer demand during the crisis is critically important (Wei *et al.*, 2021)

According to research done in the United States, eight out of ten consumers changed their dietary habits as a result of the epidemic or the ensuing lockdown. A rise in handmade meals, cereals, and legumes, as well as a decrease in fresh fish, packaged bakery items, and alcohol



intake, were found in a study of 3533 Italian respondents concentrating on diet, eating habits, and lifestyle (Mascherini *et al.*, 2021)

### **Effect of the pandemic on dining out:**

In general, people have strong motivation to engage in social and physical interaction. However, the COVID-19 pandemic dramatically forced the whole world to live in a new normal. A pandemic historically generates fear of other people based on the perceived threat of pathogens (Janssen *et al.*, 2021). People also tend to have subjective impressions (rather than objective views on actual phenomena) of the disease threat. Therefore, it is important to understand how the perceived threat of COVID-19 affects various behaviors, including the preference for restaurants (Yang *et al.*, 2020).

Brazilians' assessments showed that the COVID-19 pandemic environment (evaluated in May 2020) had influenced their food intake and purchase decisions (Perin and Tardin, 2020). Respondents said they are eating and buying more food, implying an impression of a less healthful diet, particularly among women. On the other side, they place a premium on fresh food and handcrafted dishes. Furthermore, they have reduced their travels to marketplaces in favor of using delivery services and online buying platforms (Aksoydan, 2020). During this time, basic animal, vegetable, and bread items, as well as cost-effective packaging and products, are chosen.

### **External factors affecting consumer's choice of dining out amid the pandemic:**

Consumers have faith in eating at home. COVID-19 has caused and will continue to cause significant changes in the foodservice industry's customers. First, during the pandemic, consumers were unable to enjoy in-dining experiences, either completely or partially, due to lockdown or severe limits on in-dining food services (Janssen *et al.*, 2021). Many consumers were and are hesitant to dine out in a limited food service setting, even in the lack of legislative prohibitions on in-dining food service, because of the risk of COVID-19 transmission (Hassen *et al.*, 2021)

The virus has been spreading worldwide since December 2019, and the World Health Organization declared a pandemic on March 11<sup>th</sup>, 2020. Changes in the aftermath of a pandemic finally, food service researchers should consider whether the previously described elements will persist after the epidemic has passed. Many people predict that new pandemic norms, such as the prevalence of intact services, fewer encounters with service providers (e.g., service by robotics), and some cleaning and sanitization procedures, will persist even after the pandemic is over (Mehta *et al.*, 2020)

### An overview of consumers' habits on dining out– current scenario:

COVID-19 caused havoc on the hospitality business, and adjusting to the new normal is take some time. There has been a race as restaurants strive to navigate what they hope is the final stretch before the pent-up reward (Mehta *et al.*, 2020). The restaurant industry, which was on the edge of recovery following the pandemic's second surge, was hit the hardest by the pandemic's second surge.

Furthermore, home delivery apps are the latest way to purchase food online, which is growing in popularity. Restaurants located in malls will face the biggest setback with a decreased number of people visiting the malls (Sanjeevi, 2020). Second, restaurants have to deal with the financial ramifications of abiding by the Standard Operating Protocols (SOP) (Khan, 2020).

### Material and Methods:

The purpose of this chapter is to study the consumer preference for dining out post-pandemic and to find whether there has been any change in the preference towards dining-out of the people after covid-19 along with finding the major factors that have been changed after the pandemic. The research method used is descriptive as this research states various factors that impact the dining preference of the consumers after the post-pandemic. The data was collected from 390 respondents from Ahmedabad city in which 40.8 % were males, 58.6% were females and 0.6 % were of other gender. Major part of the respondents was in the age group 18-29 having 43.4% and the lowest responses were recorded from the age group above 70 years at 3.4 %.

40% of the respondents said that COVID has impacted their lifestyles while 23.4% of the people disagreed that COVID have impacted their lifestyles and the rest were neutral on this. On being asked about the frequency of their eating out after COVID-19, the following fig: 1 shows that 6.9% of the people often go out.

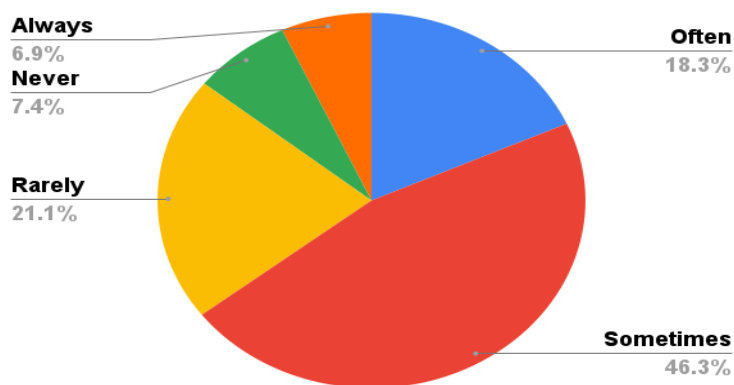
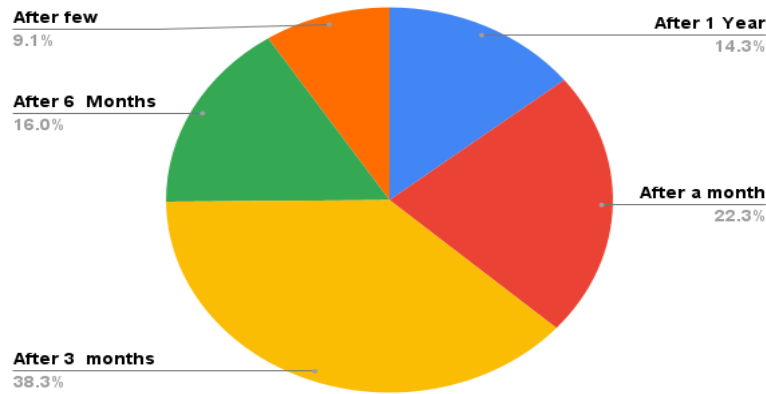


Figure 1

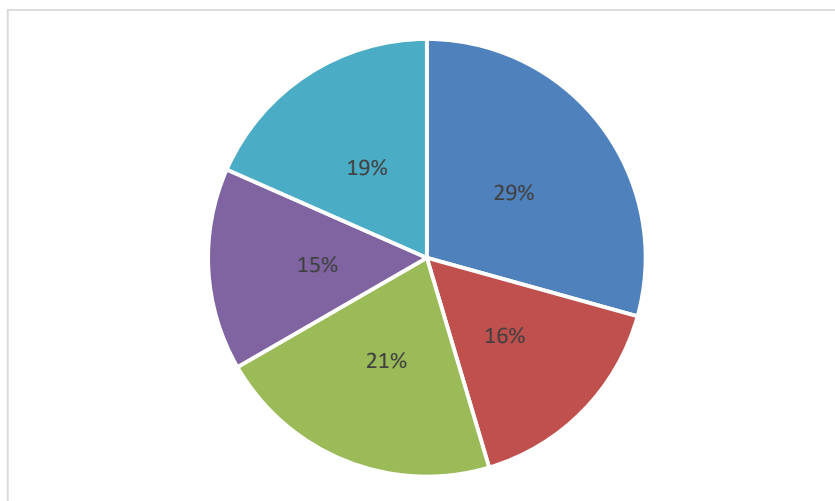
46.3% said that they sometimes went outside for dinner after COVID and near to that 7.4 % of people said that they never prefer to dine out after COVID. Also, to understand the impact of COVID, respondents were asked about the length of time they took to return back to normal dining out routine.



**Figure 2**

Fig. 2 shows that a major part which is 38.3% said that after three months of COVID 19 they started to dine out and the least part which was 9.1% said that they went to dine out after a few weeks only. Seeing this we can infer that after almost one month of COVID 19, people started to return to their pre- pandemic habits. Consumers were also asked about the type of food they prefer to eat when they dine out on which 66% respondents said they prefer to eat hot food as cold food or junk food might affect their throat leading to infection.

The study also revealed the reasons behind restrained visits post-pandemic. Fig 3 shows the major reasons as responded by people.



**Figure 3**

They are safety practices (29%), hygiene (21%), food preferences (19%), social distancing (16%) and sanitation facility (15%). We can see that safety practices were the highest considered by the respondents after COVID on dining out. Gender and age group are also studied with the factors using cross tab analysis to find a significant difference in preferences of females over males. Age groups were also analyzed over these factors to conclude that the age group of 18-29 are the most enthusiastic group ready to dine out with the factors in consideration.

When asked people that which place they prefer to dine out after COVID 19, around 72.6% said that they visited restaurants and only 27.4% of people said that they visited to eat street foods after COVID 19. Post COVID restrictions were lifted, 42.9% of people responded that they do care about social distancing and 22.9% of people said they do not consider this as an important factor after COVID 19.

As per the survey when asked the respondents about the rating factor for the cleanliness and sanitation facility then majority of the respondents stood neutral which indicates they are not rigid and concerned for the cleanliness. As per the survey when asked the respondents about the importance of wearing masks and gloves then dominant respondents were not concerned or stood neutral about it which was 37.6% of the total population.

### **Conclusion:**

The study concludes that there have been many factors affecting the consumer's preference for dining out post-pandemic. The study fills the gap in existing literature by studying consumer preferences on dining out after the pandemic in Ahmedabad city. The study concludes that majority of the people prefer hot food when they eat out to avoid any throat infection or irritation. Also, most people prefer to go to restaurants rather than eat at street food stalls. COVID has impacted the lifestyle of the people but people are ready to eat out to normalize the routine.

The major factors that impact the dining out preference of consumers are: safety practices, hygiene, food preferences, social distancing and sanitation facility. Majority of the users found safety and hygiene as the most important factor influencing their visit to restaurant. It took 3 months for respondents belonging to age group 30-45 to return to their pre pandemic habit of dining out. Post COVID-19 maximum respondents preferred restaurants over street stalls. It was found that both male and female feels neutral about the importance of hygiene and safety after the pandemic. The study also revealed that there is significant relationship between gender and safety practices as females prefer more safety practices to be followed. Females

preferred more clean places when they planned to dine out post COVID. Age group of 18-29 started to dine outside considering all the hygiene and safety factors post pandemic after three months of pandemic which is sooner as compared to other age groups.

In conclusion, after COVID, most of the people reduced to dine out but keen to be back to normal life taking care of factors and it took them 1 to 3 months to be back. Also after the pandemic cleanliness and hygiene has been the important factor to be considered by the customers to dine out after the pandemic. Maintaining social distancing has been a factor of major concern to the people. Wearing masks and gloves by the staff members has not been an important concern to the people.

By this research, it was concluded that people of Ahmedabad consider significant factors which has affected their decision to dine out.

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## **IMPACT OF COVID-19 ON HIGHER EDUCATION**

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### **Abstract:**

Covid-19 is a deadly disease caused by Corona virus which originated in China and started spreading across the world. As on 26<sup>th</sup> August 2020, WHO dashboard reported that India stood 3<sup>rd</sup> most affected country in the world by Covid-19. To prevent the spreading of Covid-19, all the economic and educational activities were shut down worldwide and strict lockdown was imposed in all the countries of the world. Due to this, all students were deprived of education. This forced all the institutions to find some other option to educate the students without getting in contact physically to each other as well as with teachers. Online education is such a system of education that has been quite successful during the period of lockdown. The present study is an effort to highlight the student's response regarding online education as per QS survey, students interest in online education system, crisis management and challenges faced by universities and initiatives taken by them to face the consequences of the pandemic, importance of online learning during Covid-19 and various factors that have impacted the quality of learning.

**Keywords:** Covid-19, Higher Education, E-learning, Online education, quality of education, QS survey etc.

### **Introduction:**

The onset of Covid-19 has brought huge setbacks for various sectors such as production, service, farming, education etc. According to WHO, about 2.5 million people were infected by Corona virus across the world by the end of the year 2020 and approximately 1 million deaths were reported. Such circumstances have largely affected the higher education system throughout the world as almost all educational institutions remained closed for one year or more. This study has explored the various impacts of Covid-19 on higher education and the QS survey report. Since the beginning of the year 2020, this pandemic has brought significant changes in education system.



Most of the colleges and universities have adopted online education rather than conventional methods of teaching. It was essential that a pandemic should not be allowed to stop the education at any circumstances. Hence online classes were started to provide continuous education to the students by most of the colleges and universities worldwide. However, they all lacked appropriate infrastructure, support system and proper guidelines for this purpose.

### **Student's response to Covid-19 regarding abroad education**

Different measures taken by the governments to fight Covid-19 have largely affected the higher education system worldwide. Several steps have been taken collectively by all the governments to prevent the spread of Corona virus which include travel restrictions, curfews, social distancing, isolation, quarantines, closure of campuses and borders etc. However, these measures not only helped prevent the spread of Corona virus, but also badly affected the educational activities and education sector in all.

A number of surveys have been conducted by QS for monitoring the mindsets of students pursuing higher education and for interpreting the results in order to support the higher education sector during the crisis. QS started taking surveys since mid-February in the year 2020 including 11000 international higher education students and 400 higher education professionals. The results of the survey concluded that most of the higher education students have changed their mind to not go abroad for pursuing their higher studies. The main reason behind this is the fear of the spread of pandemic again in near future.

Most students are finding themselves unable to plan their travel abroad for higher education because of the state of ambiguity and are facing melancholy which is leading them towards higher stress levels.

The survey was aimed at finding the impact of Covid-19 on the prospective students who wished to study in other countries. Respondents expressed their views on how the pandemic has impacted their plants to study abroad where most of the countries have restricted international travelling.

Most of the higher education universities and colleges had their campuses closed during the pandemic which created huge problems for the student prospects to get a visa for education in Covid-19 period.

During Corona crisis, online education has adversely impacted the writing skills of students. According to a survey on the students of class 4<sup>th</sup> to class 10<sup>th</sup> conducted by NCERT, about 55% of students have accepted that their writing skills have been diminished during the

Corona period, while 45% students accepted that their handwriting has worsened during this period.

This survey has been conducted on 10,000 students studying in government and private schools from March 2021 to February 2022. Since the schools remained continuously closed for several months, the students, especially of lower classes were heavily impacted. During this period, about 70% students stopped making notes which adversely affected their writing skills as well as their handwriting.

Since in the online education system, the students are provided the notes and study material already prepared by their teachers, they didn't need to make notes on their own. Apart from this, mostly the teachers or educators provide their students the study material in the form of PDF, which students mostly read on their mobile phones, laptops and computers or after taking their printouts.

### **Increase in online learning and student's interest**

When the prospective higher education students who wished to study abroad were asked whether they are willing and interested to attend their higher education classes online due to Covid-19, about 42% of them expressed their views that online education is not effective for them, while the rest of the students said that online education system is not a major problem for them.

### **Educational Institution's response to Covid-19**

Most of the universities had to shut down their campuses and were compelled to start online classes instead of carrying on the physical classes to prevent the spread of corona virus. In order to determine the understanding level of higher education students about this global health emergency, QS is conducting and aimed at revealing the supporting level of universities and educational institutions during such unexpected circumstances created by Corona virus.

### **Challenges faced by Educational Institutions**

Most of the educational institutions are struggling hard to find a way out of this crisis while running their classes continuously. This is because they want to make sure that their students could get enough employment opportunities and so that a proper communication is established between the faculties and the students. During the survey, several questions were asked to the faculty members of various colleges and universities to gain knowledge about the problems faced by them during the Covid-19 pandemic.

The faculty members revealed that for the safety and security of students and all the faculty members, appropriate measures are being taken for smooth running of academic work

and other operations of institutions. The biggest challenges faced were converting traditional education to e-learning and in conducting practical course and training. Various types of problems in continuous planning, communications and state of unexpected circumstances were also faced by the institutions.

Another challenge faced by the institutions was to develop the educational advancements with new solutions such as going online, financial problems of some students, expenses on Covid-19 related requirements and maintaining the arrival of foreign students in India.

### **Techniques adopted by universities to combat Covid-19 onset**

Because of lockdown, most of the universities brought their 50% courses online. Furthermore, scheduled dates of about 1/5<sup>th</sup> of courses were delayed until the next semester. 17% of next intake application deadlines and 16% of offer acceptance for the next intake were also changed. Between the year 2020-2021, 13% offers were deferred by the universities.

### **Online measures taken by universities**

Several educational technology companies such as iTeachworld, Rafr, Aula, Intergreat have provided some aids to the universities to overcome the pandemic situation which included remote teaching outfits and free online platforms.

CEO and founder of iTeachworld Jean Pierre Guittard revealed that in some students in some areas of some countries faced the problem of internet bandwidth which affected them and it was experienced by some teachers as well. The educators were forced to change the teaching models from lecture listen to interactive due to Corona virus and they adopted with the way as needed.

### **Crisis management by universities**

More than 300 academicians and university professionals were taken under the survey conducted by QS, and it was revealed that 73% of them had plans for crisis management, 25% had no plans while 2% of them were not sure about having a proper crisis management plan.

Apparently the majority of the institutions knew the importance of crisis management and started to implement their plans and found them effective. 85% of the surveyed institutions had applied various crisis management plans according to the spread of corona virus. It was more important with the continuing this pandemic.

### **Importance of online learning in crisis management during Covid-19**

Several respondents disclosed the importance of online learning during the spread of corona virus. Some of the approaches stated by QS to crisis management during Covid-19 are as following:

- International cooperation and collaboration
- Good university leadership
- Active and preventive measures
- Flexible deadlines and examination dates
- Proper communication from universities and managers
- Strict hygiene initiatives

A report from UNESCO in the year 2020 revealed that the schools and higher education institutions were shut in 185 countries which disturbed more than 1.542 billion students worldwide which is a whopping 90% of total registered students.

Though in few countries after a decrease in corona cases and deaths, quarantine measures were lifted, but even then in most of the countries the educational institutions remained closed upsetting about 73% of total registered students across the world.

The International Association of Universities (IAU) introduced IAU global survey on the impact of Covid-19 on higher education around the globe in order to better understand the trouble created by Covid-19 on schools and higher education institutions and to examine the first steps taken by higher education institutions across the world while responding to the fast spreading pandemic. This survey was conducted in an online format from 25<sup>th</sup> March to 17<sup>th</sup> April 2020. A total of 576 responses and feedback from 424 universities and other higher education institutions were recorded from 109 countries along with Hong Kong and Macao. Following were the outcome of the responses:

- Out of the QS survey respondents, 20% were faculty members, 16% were the HODs and 17% were the heads of the institutions.
- In the survey, 59% respondents revealed that entire academic activity of the higher educational institutions were closed. However, in Africa, 77% of them remained closed in the same period.
- The survey revealed that 91% of the higher education institutions had proper infrastructure in order to communicate with their staff and students about Covid-19. However, it was a challenge to do so.
- About 80% of respondents felt that Covid-19 will have an effect on the registered numbers for the next academic year. Almost 50% of the respondents believed that the effect of this pandemic will affect all types of students across the world. Respondents from the higher

educational institutions especially the self financed ones felt that the pandemic is going to cause huge economic setback for most of the students.

- Top management and staff of more than 65% of the higher educational institutions were accessed by general public and government officers in the context of public policy development relating to circumstances caused by the pandemic.
- About 50% of the respondents indicated that Ministry of Education will maintain the institutions for alleviating the disruption caused by corona virus. The most common provision was to provide help to the students in completing the current academic year.
- About 65% of the higher educational institutions reported that the pandemic was going to have a variety of effects. 50% of them reported that the pandemic weakened the partnerships, while less than 20% of them reported that it strengthened them. On the other hand, more than 30% of them revealed that the pandemic has brought them new opportunities with other partner institutions.
- In all higher educational institutions the process of teaching and learning has been affected by the spread of Covid-19 and the following lockdown. However, more than 65% of the institutions reported that online and distance mode of education had replaced the classroom teaching. This change has also brought some of the most challenging situations for the students as well as for the educators. Lack of pedagogies for distance and online learning along with the lack of technical infrastructure and capabilities are some of the basic problems.
- Though the educators expressed that online or distance teaching and learning has created some important ways and opportunities for more flexible teaching-learning possibilities, discover merged or hybrid teaching-learning and to mix synchronous and asynchronous teaching-learning methods.
- Covid-19 has affected global student mobility in higher educational institutions by about 90%. Though the effect on mobility varied from institution to institution, but overall it was negative in all ways.
- It was promising that a large number of institutions have implemented appropriate strategies to alleviate the impact of Covid-19. They also revealed that the pandemic has augmented the virtual mobility or collective online learning as a change to physical mobility of the students. Online or distance learning has prevented the spreading of the pandemic.

- 50% of the higher educational institutions decided to conduct their examinations as scheduled but through new procedures and new ways. However, 80% of higher educational institutions in Europe decided to conduct the exams while 61% of exams were cancelled or postponed in Africa due to the pandemic.
- The results of the research concluded that 80% of the educational institutions were affected by the pandemic. The most common impact of Covid-19 was the ban on international travel and cancellation or delay of scientific conferences and seminars. More than half of the universities and higher educational institutions were at risk of delaying more than 52% of the scientific projects.
- About 40% of universities and higher educational institutions were engaged in researches related to corona virus and impacts of Covid-19, but almost all of them contributed to the present public policy development. 75% of them contributed to public procedures either through their researchers or through the institutional leadership. 75% of such institutions are also considered as vital shareholders for improvement of public policies by their governments according to their capability in research.
- The pandemic affected the community engagement initiatives of most of the higher educational institutions. In about half of them, the effect of Covid-19 was positive and the crisis increased the community engagement of these HEIs, while in less than 33% institutions the effect of corona virus was negative as it decreased the community engagement activities there.
- The impact of Covid-19 is not uniform everywhere. The level of community engagement has increased in the USA while it mostly decreased in the countries of Asia-Pacific region.
- More than 50 percent of the higher educational institutions had taken community engagement activities in the context of the pandemic. The activities varied from institution to institution.

### **Factors influencing the quality of online learning**

Duraku and Hoxha (2020) found that the recent concept of online or distance education has become part of most of the educational institutions across the globe. The methods and steps of technology usage that helps achieve quality of online learning are different and depend on a number of factors that are related to different parties engaged in executing the modern format of online and distance education along with assimilating technology into education system before closing of schools as a preventive measure for stopping the spread of corona virus and the pandemic.

Honey *et al.* (2000) concluded that the past studies were aimed on finding the factors that influence the opportunities and ways of educational systems in mixing of technology into learning suggested that, in order to get positive results in the combination of teaching technology, it is vital to understand various interactions that exist between learners, teachers and technology.

Huang *et al.* (2020) in their research concluded that since the teaching method shifted from physical mode to online and distance mode, it integrated the method of flexible learning teachers' perception on teaching methodology, which have influenced the method of technology cooperation in the classroom. They are also anticipated to have an effect on the successful implementation of online learning. The educators had the view that the teaching methodologies used in online education must include the intention of stimulating students in learning and courses should be framed with the objective of motivating their individual needs.

Lurvnik (2020) expressed the view that during the lockdown period, the use of technology is globally considered as the most vital alternative to sustain the educational system. Though there have been a number of challenges in implementing online education, several advantages also have been found with it. Quick progress in the field of digital education is one of them, which would otherwise take years.

Yokozeiki (2020) in a study revealed that remote learning or online education has been considered very effective for lecturers and students to make them stronger, more innovative and creative.

UNESCO (2020) reported that the problem of social isolation, parent's concern and other special factors are expected to be influenced by the unpreparedness to help their children in the process of online learning. Other difficulties faced by the children are lack of access to the required technology, Internet, special educational needs and economic problems. On the other hand, in home isolation, the distress of teachers was related to their capabilities of doing online learning due to the level of their knowledge and capabilities in access to the technology and its usage.

This report also indicated that during Covid-19, the level of stress has increased due to the shifting of teaching to online format across the world. The education sector mitigated the impact of Covid-19 by various measures such as by improving alertness while opening of educational institutions, use of distance learning to minimize the loss of learning and use of education resources to support the general response.

Note and Systems (2020) revealed that problems caused by Corona virus include technical issues, connectivity problem of internet, monetary issues, fear of pandemic etc. It is expected that due to the crisis caused by Covid-19, the students graduating in the year 2020 or 2021 will have to face problems in repayment of their loans and university credits in a miserable labor market. The work prospects of qualified young people are undetermined. Students completing their graduation in 2020 or 2021 will have to face more difficulties in finding a suitable and well-paid job as compared to their seniors. Based on their economic conditions, they can be ready to earn less than they might have without the onset of Covid-19.

UNESCO survey of UNITWIN Chairs (2020) revealed that the students had to make extra efforts to adjust to new methods of learning and instructions. In spite of continuous focusing in the field of education, the instructors have to undergo huge stress at their work.

Latercera (2020) concluded that a number of instructors who do not had any past experience with distance education and their foundations lacked sufficient opportunities to prepare enough have appropriated all the correspondence media available to create "Corona teaching" as a process of changing the conventional classes into virtual ones without changing the educational plant or the philosophy of education. Such a sudden change in methodology with various mechanical and instructional alternatives along with precarious expectations brought some problematic outcomes and frustration because of variation in the methodology to the learners as well as educators.

Higher Education Institutions may or may not have enough mature effective education system it is not easy for them to amplify their teaching methods to the necessary proportions without taking the help of external technological supports. For all these institutions, having vital innovative and specialized framework to help virtual courses for all undergraduate and postgraduate students, but it is entirely different to provide specialized and mechanical requirements for the most part for all courses in a limited time span. The basic concern of the government instruction strategies was to do everything conceivable to ensure the classes which has developed three unique fronts which are stages, instructor preparation and computerized contents (Covid-19 and Higher Education: Today and Tomorrow, 2020).

## **Conclusion:**

The study covered the literature review on QS survey based on impact of Covid-19 on higher education, challenges faced by educational institutions, universities and students' attitude towards abroad higher education. Universities across the world were closed and the institutions



moved towards online teaching learning process. On the other hand, the mindset of students towards higher education abroad has diminished due to fear of infection. Apart from this, major challenges faced by the students in learning included the problems related to practical courses and training. In India, where classroom teaching is the only method since more than a century, online classes have now become a new method in the process of teaching and learning. This has made difficult for the teachers to grab the attention of their students and the personal touch is being missed by teachers with the students. Another challenge is lack of guidelines and policies across the country regarding online education. Hence, new policies and guidelines have to be framed for online classes by the government and universities to cope up with the problems mentioned above.

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## **THE EFFECT OF STRESS ON COLLEGE STUDENTS DURING COVID 19 PANDEMIC**

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### **“The effect of stress on College students during Covid-19 Pandemic”**

The deadly Pandemic is on the verge of getting over. It is one of its kinds in the history of the mankind. The Pandemic may end in a while, our lives may get back to normal gradually but the life would never be same again. It has made a lasting impact worldwide which would be felt for generations to come. Pandemic led to replacement of physical activities with online activities. Closing of colleges and universities has led to online learning and online examinations which caused a new shift to the students. College life is one of the most exhilarating and unforgettable experience in an adolescent’s life. It is in college that they enjoy the lively environment, the companion of friends, and the various academic and co-curricular activities, which enhances and prepares the adolescents for adulthood. According to WHO; due to this pandemic outbreak, a lot of students developed psychological problems such as irritability, anxiety, frustration to name a few that affected not only their academics but their overall personality as it kept them away from their peers, reduced physical activity which are in fact the key aspects shaping their personality. Post pandemic shift is also very difficult to adapt.

Covid-19 pandemic has shaken up everyone’s mental health and this study is an attempt to highlight the effect of Pandemic and the new normal on college students. The effect is divided into two categories; physical and emotional. This study also analyses if there is any difference in coping activities adopted by male and female students. The core aim is to identify the factors causing stress and how to cope up with the same.

**Keywords:** Pandemic, College students, new normal, stress

### **Introduction:**

The Novel Coronavirus apparently started spreading in China during December 2019 before moving to other parts of the world. The outbreak was first announced by the “Health

Commission of Hubei Province”, China. However, India confirmed its first case of coronavirus on 30<sup>th</sup> January 2020 in Kerala when a university student from Wuhan travelled back to the state. As the number of confirmed Covid-19 cases reached 500, the Prime Minister of India asked the people to observe a Janata curfew on 22<sup>nd</sup> March 2020 whereby everyone was asked to obey 14-hour curfew with exceptions for people of “essential services” such as police, medical services, media, firefighters, etc. However, sighting its severity, on 24<sup>th</sup> March 2020 the Prime Minister of India, Mr. Narendra Modi declared a nationwide lockdown for 21 days thereby limiting the movement of entire 1.38 billion population of India. This led to closing of schools, universities, offices, places of worship, etc.

This new pandemic condition was fearful and stressful for everyone due to mortality rate of Covid-19 and associated factors like economic instability, unemployment, stress, anxiety etc. Pandemic is not just medical condition, it also affected the population in social, emotional and psychological ways.

#### **Effect of Covid-19 pandemic on college students:**

According to WHO; due to this pandemic outbreak, a lot of students developed psychological problems that affected learner’s not only academically but their overall personality. The Country switched its education system from in-person to virtual learning to control the spread of corona virus. The pandemic and lockdown across the globe kept students away from their peers, cutting down physical activity depriving them of their key aspects of growing up thereby impacting their physical and mental health. The Online mode of learning brought with itself new set of challenges for the students and it was practically not very easy for students to adapt to the same. Affordability, Accessibility, technical knowledge of the technology to be used, connectivity became major hurdles for the students during the Pandemic.

Some common effects of pandemic that could be commonly noticed on students are;

- There has been increase in signs of irritability and mood-swings, anxiety and stress levels
- Excessive eating to cope with frustration, stress, depression etc
- Excess usage of social media which resulted in negative feelings such as low confidence, comparison, enviousness, body image issues etc.
- Sitting at home all day has made them extremely sluggish and unproductive
- Increase in dependence on video games, mobile phones have resulted in negative impact on health of students like eye problems, headaches, body pain etc
- Increase in negative thoughts or overthinking leading to suicidal intentions

- There has been disruption in normal routines leading to poor sleep regimes, poor eating habits etc.
- Online learning has resulted in, not better understanding of concepts thereby failing in exams causing academic stress
- Pandemic has resulted in financial issues for everyone. Students having financial trouble at home were not able to concentrate on studies or were constantly worried about the same

### **Literature review**

1. Avijit, Arpita, & Ridwan, 2021 through their study intended to evaluate the emerging reasons for psychological distress among university students of UG level in Dhaka and the attitude of students regarding online learning throughout pandemic. The sample size was 180 UG students and 9 in-depth interviews of students. Based on Kessler k-10 distress scale, the study found that 12% had severe psychological distress, 20% had moderate, 40% had mild and 16% had no distress.
2. Tanvi Nagar, 2021 in her study attempts to understand the coping strategies commonly adopted by students. This study also examines 3 different coping strategies: problem solving, seeking social support and avoidance adopted by college students during the pandemic. 98 students were selected based on random stratified sampling and snowball sampling techniques from Delhi public school. The findings of the study showed that during the pandemic students adopted higher avoidance coping strategy than problem solving and seeking social support.
3. Lalli Singh & Devangi Desai, 2021 in their study aimed at determining the impact of Covid-19 pandemic on the physical activity and mental health of physiotherapy college students and also to know the correlation between physical activity and mental health considering Covid-19 pandemic. A survey was undertaken of 214 students. Prevalence of both physical activity and mental health was calculated and presented in the form of frequency distribution and Spearman's correlation. The findings revealed physical activity as 79% mild, 17% moderate and 4% severe while mental health status was 30% mild, 32% moderate and 11% severe. It also showed weak positive correlation between physical activity and mental health.
4. Meenakshi & Mona, 2021 in their study stated that the objective of the current questionnaire-based study was to find out the perceived stress levels during lockdown among students. This survey was undertaken among 1<sup>st</sup> to final year of dental college in Nasik in the first phase of lockdown. The results showed that students from all the 4 years reported being stressed and

academic factors were one of the most important stressors. Delay in academic activities, uncertainties of the disease and impending exams were the main causes of anxiety and stress.

5. Zhuang Liu, *et al.*, 2021 identified that the purpose of this study was to explore the association between perceived stress and depression among medical students and the mediating role of insomnia in relationship with Covid-19 pandemic in China. A cross-sectional survey was conducted from March to April 2020 in medical universities. Levels of perceived stress, insomnia and depression were measured using PSS, Insomnia Severity Index and Patient Health Questionnaire. The findings revealed that perceived stress was significantly associated with depression. There was a link between perceived stress and depression and it was mediated by Insomnia.
6. Kunal, Dinesh, & Nidhi, 2021 in their study stated that in order to explore the impact of pandemic on the lives of students, this study conducted a survey of total 1182 students from various educational institutes in Delhi- NCR. The study identified following as the impact of pandemic: sleeping habits, subsequent effect on weight, social life, mental health, daily fitness routine etc. The researchers also found that in order to deal with stress and anxiety, participants adopted different coping mechanisms and also sought help from their near ones

### **Research Gap:**

The above literature review clearly shows that many studies have been done to find out the causes and effect of stress on the students during Pandemic. However, a precise study on the students of DAKU belt in Thane district which is a suburban belt, based on gender has not been done so far. The current study will, thus, help in evaluating whether the College students in this area also suffered from the same kind of stress and it will also help in analyzing whether the coping mechanisms adopted by students differ on the basis of their gender. It will thus, help the parents and the College administrators to deal with the situation more effectively.

### **Objectives of the study**

- To identify the factors responsible for stress in college students.
- To study the effect of stress on college students.
- To analyze whether there is a difference in the coping mechanisms adopted by male and female students.

### **Research Design**

This research is conducted to evaluate the causes and effects of Stress during Pandemic on the College students and also to suggest the coping mechanisms to be adopted to combat the

effect of stress. It also tries to evaluate whether there exists any difference between the coping mechanisms adopted by students based on their gender. The study involves both primary and secondary data. The Primary data is collected from 110 students (55 males and 55 females) through a structured questionnaire administered online to students of different colleges from DAKU belt (Dombivli, Ambarnath, Kalyan, Ulhasnagar belt of Thane district).

Besides this, the secondary data available in the form of reports, research papers, etc are used extensively to substantiate the findings of the study. The data collected is analyzed using graphs, charts, etc and One way Anova is used to draw the inferences from the data.

**Hypothesis**

**H0:** Students were not physically and emotionally affected due to stress during Pandemic.

**H1:** Students were physically and emotionally affected due to stress during Pandemic.

**H0:** The coping activities adopted by male and female students are similar.

**H1:** There is significant difference in coping activities adopted by male and female students.

**Data Analysis and Interpretation**

**Hypothesis 1:**

**H0:** Stress did not have physical and emotional effect on college students during pandemic.

**H1:** Stress did have physical and emotional effect on college students during pandemic.

In testing this hypothesis, One way Anova is used and the analysis is divided into two parts; one with physical effects and the other with emotional effects.

**A. Stress and physical effects are taken into consideration:**

**Table: 4.1**

Anova single factor

Summary

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
Stress	110	126	1.145455	0.125438
Weight gain/loss	110	148	1.345455	0.22819
High blood pressure	110	174	1.581818	0.245538
Hair loss	110	182	1.654545	0.22819
Increased heart rate	110	188	1.709091	0.208173
Upset stomach	110	190	1.727273	0.200167

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	29.81818	5	5.963636	28.9568	₹ 0.00	2.227804
Within Groups	134.6909	654	0.205949			
Total	164.5091	659				

*P-value < 0.05*

Since P-value is less than 0.05, the Null hypothesis is rejected and the **Alternate hypothesis is accepted.**

**Interpretation:**

The above analysis is done on the basis of stress and physical effects. The dependent variables are Weight gain/ loss, High blood pressure, Hair loss, increased heart rate and Upset stomach which are physical effects of stress. Here in the above table as from the primary source, it is significant at 5% level i.e., p-value < 0.05. So, we reject the Null hypothesis (H0) and accept the Alternate hypothesis (H1). **Hence it can be concluded that, Stress during Pandemic had effected the physical health of the College students.**

**B. Stress and emotional effects are taken into consideration:**

**Table: 4.2**

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Stress	110	126	1.145455	0.125438
Irritability or anger	110	160	1.454545	0.250209
Anxiety or depression	110	166	1.509091	0.25221
Change in sleeping pattern	110	170	1.545455	0.250209
Feeling isolated	110	172	1.563636	0.248207
Sadness or moodiness	110	188	1.709091	0.208173



ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	19.44848	5	3.889697	17.48905	₹ 0.00	2.227804
Within Groups	145.4545	654	0.222408			
Total	164.903	659				

*P-value < 0.05*

Since P-value is less than 0.05, the Null hypothesis is rejected and the **Alternate hypothesis is accepted.**

**Interpretation:**

The above analysis is done on the basis on the basis of stress and emotional effects. The dependent variables are Irritability or anger outbursts, Anxiety or depression, Change in sleeping pattern, Feeling isolated and Sadness or moodiness which are emotional effects of stress. Here in the above table as from the primary source, it is significant at 5% level i.e., p-value < 0.05. So, we reject the Null hypothesis (H0) and accept the Alternate hypothesis (H1). Hence it can be concluded that, **Stress during pandemic impacted the Students emotional or mental health.** Therefore, **stress did had both physical and emotional effect on college students during pandemic.**

**Hypothesis 2:**

**H0 :** There is no significant difference in coping activities adopted by male and female students.

**H1 :** There is significant difference in coping activities adopted by male and female students.

**Table: 4.3**

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Gender	110	174	1.581818	0.245538
Physical activities	110	147	1.336364	0.225271
Self-care	110	163	1.481818	0.25196
Recreational activities	110	170	1.545455	0.250209
Staying connected	110	172	1.563636	0.248207

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	4.389091	4	1.097273	4.492658	₹ 0.00	2.388289
Within Groups	133.1091	545	0.244237			
Total	137.4982	549				

*P-value < 0.05*

Since P-value is less than 0.05, the Null hypothesis is rejected and **the Alternate hypothesis is accepted.**

**Interpretation:**

The above analysis is done on the basis of gender and coping activities. The dependent variables are Physical activities, Self-care, Recreational activities and Staying connected. Here in the above table as from the primary source, it is significant at 5% level i.e., p-value < 0.05. So, we reject the Null hypothesis (H0) and accept the Alternate hypothesis (H1). **Hence it can be concluded that, there is significant difference in coping activities adopted by male and female students.**

**Conclusion:**

The outburst of Covid-19 has been a bolt from the blue in 2020 which affected every aspect of life. Stress has always been a part of students’ life. Students found difficulty the most during this period in keeping their minds well-balanced. There has been rise in anxiety and depression leading to suicidal intentions in students. Helplessness, loneliness, frustration, insecurities, pessimistic thoughts, uncontrollable anger etc sums up the student’s mental health during lockdown.

In this study, it is revealed that the factors causing stress varies from student to student. Academic or Career stress is the most stress causing factors which can result in poor performance thereby dropping the confidence of students. Continuous news about the virus or deaths and fear of spread were also the factors causing stress in students. Some of them also lost their loved ones which can be very depressing and difficult to overcome.

Stress had both physical and emotional effects on students during pandemic. Physical effects such as weight gain or loss, high blood pressure, increased heart rate etc can be a very huge threat in future. Emotional effects are something which we tend to ignore most of the times

but it is a silent killer. Students going through anxiety and depression need to take proper help from professionals before it is too late.

Coping mechanisms acts as medicine on the wound. Coping methods doesn't have to be expensive or luxurious, it can be as simple as doing yoga, going for a run, dancing your stress away, listening to your favourite genre of music, reading your favourite book, conversing with your friends, spending quality time with family, going for a short drive etc. It can be anything you like, excites you, interests you, basically anything that makes you feel alive at the moment. Coping activities can also differ from person to person, but having the urge to participate in such coping methods is important.

Stress of getting back to normal is a newly added stress which is causing trouble to a lot of students. They are getting confused and zoned out. They are missing the balance between virtual and offline learning leading them to poor performance in exams, work etc. It is also affecting their personal life. There is disruption in their routines, rise in social anxiousness, failing in adjusting to the new environment after pandemic, inactive or being sluggish posing a challenge for students.

We are now living in this world of sudden changes and unpredictability. So, the least we can do is take care of our physical and mental health equally. Not letting negative thoughts take over our lives and spreading positivity and love wherever we go is the best possible way to live our life.

### **Recommendations and Suggestions**

The study showed clearly that there is a great impact of stress upon the physical and emotional well-being of the students. However, the stress can be combated to a certain extent using the coping strategies which are grouped into four categories:

#### **For students:**

- **Physical activities:** such as walking, jogging, exercising, dancing, etc has dual benefits. They not only keep one physically healthy but also stimulates the brain and can help in coping with the stress better
- **Recreational activities:** such as watching movies, going for an outing/ long drive, listening music or simply playing indoor games can refresh the mind and body and make free time more interesting and enjoyable.
- **Self-care:** If we look at the other side of the Pandemic, we all may agree that it was indeed a blessing in disguise as it gave all of us time to pause and reflect upon our life styles, upon our routines. People realized that a lot of stress can be avoided if we indulge

into a little of self-care. Activities like meditation, improving eating and sleeping patterns, reading, spending quality time with family can go a long way in effectively dealing with any kind of stress that one may have.

- **Staying connected:** Pandemic also made us realize the importance of our family and friends, the need to be in touch and around especially during the uncertain times like Pandemic. Catching up old friends even online makes us nostalgic, spending leisure time with family, tuning into live streamed events or simply catching around friends and relatives over call or messages tends to provide a kind of security and assurance of being together to face uncertain times like Pandemic.

**For college administrators:**

- There should be development of more “student friendly” campus environment.
- Arranging workshops or seminars on importance of mental health and making students aware about various coping techniques.
- Regular check-ups on mental health of students and arranging counselling session for the distressed students
- Arranging sessions of mentoring and career development programmes.
- Inclusion of stress management education in the curriculum.
- Fun events, cultural programmes, annual functions, college fests, creative games etc should be encouraged with active participation of students.

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# **UNEMPLOYMENT IN INDIA AFTERMATH OF COVID-19 PANDEMIC: AN ANALYSIS**

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## **Abstract:**

Starting in late-2019, the Covid-19 global pandemic has been impacting the whole world. According to BBC Report, 2021 COVID-19 pandemic has so far infected around 240 million people and caused more than 4.8 million deaths across almost 200 countries of the world. Based on an IMF estimate, the global economy shrank by 4.4% in 2020 due to Covid-19, and in the India alone, the unemployment rate hit a yearly total of 7.11% in 2020 from 5.27 % in 2019. National Survey of Informal Workers in May, 2020 revealed that in India 78% of the informal workforce had lost their livelihoods due to the lockdown, with 90 % urban unemployment and 72% rural unemployment. The Indian economy started to grow gradually in 2021, contributing to a slight fall in unemployment rate. This paper aims to study the current status of unemployment in India aftermath of COVID-19 pandemic. This study also tries to assess the government action towards the generation of employment opportunities in the country.

## **Introduction:**

India's economy is under threat with rising unemployment. India is not creating enough jobs. Despite abundant cheap labour, India is not part of many global supply chains. Starting in late-2019, the Covid-19 global pandemic has been impacting the world. According to BBC Report, 2021, COVID-19 pandemic has so far infected around 240 million people and caused more than 4.8 million deaths across almost 200 countries. The economic fallout from this pandemic is equally devastating. Based on an IMF estimate, the global economy shrank by 4.4% in 2020 due to Covid-19, and in the India alone, the unemployment rate hit a yearly total of 7.11% in 2020 from 5.27 % in 2019. The economic downturn caused by the pandemic has also led many companies all over the world to shut their business and make workers unemployed.

In India a huge number of workers are forced to remain jobless both in rural and urban areas is true beyond dispute after the covid-19 hit. National Survey of Informal Workers in May,



2020 revealed that 78% of the informal workforce had lost their livelihoods due to the lockdown, with 90 % urban unemployment and 72% rural unemployment. Formal sector is providing employment to a few workers. The rest of workers are engaged in agriculture as wage labourers or self-employed in informal sector or seek employment in the service sector. Bulk of them was employed in the informal Small Scale Industry sector which is seriously plagued with the problem of industrial sickness. Despite all talk about helping Small Scale units, the fact remains that mortality rate among the Small Scale Industry units has been high, and more and more of bank credit gets sunk in these units. But this is also true that SSI sector is the principal source of employment and has the capacity to absorb a very large chunk of the labour force.

But the informal sector is mainly self-employed sector in which due to lack of capital, skill and technology, most of the employment continues to be low level employment. There is a need to strengthen the resource base of this sector both in terms of capital and technology and skill formation so that productive employment yields a higher level of income. Obsessed with the policies of privatisation, liberalisation and globalisation of the economy, the entire focus of the economic policies is on the corporate sector. The trickle down approach is destined to failure to solve the problems of poverty and unemployment. The solution of the unemployment problem requires a paradigm shift in our country.

### **Objective:**

This paper aims to study the current status of unemployment in India aftermath of COVID-19. This study also tries to assess the government action towards the generation of employment opportunities in the country.

### **Methodology:**

This paper is a literature based study investigating the current status of unemployment in India. We also relied on secondary data from various books, journals, government reports and authentic websites. For analysing the data Microsoft Excel and SPSS is used.

### **Discussion:**

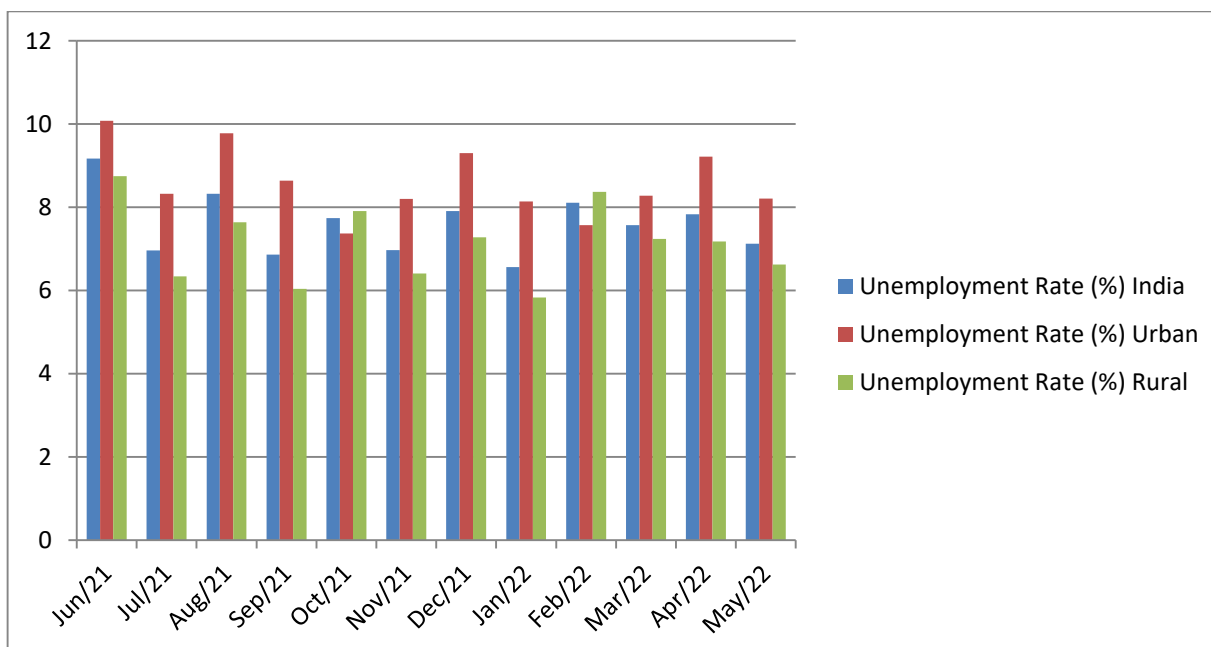
Indian economy is facing serious unemployment problem. The CMIE report reflects the problem of unemployment in India. Table -1 reveals that the unemployment rate in India dropped down slowly from 9.17% in June, 2021 to 7.12% in May, 2022. As per Periodic Labour

Force Survey Data the unemployment Rate, the Labour Force Participation rate and the Worker Population rate almost reached their pre-pandemic levels during the last quarter of 2020-21.

**Table 1: Unemployment Rates in India (June, 2021- May, 2022)**

Month	Unemployment Rate (%)		
	India	Urban	Rural
May 2022	7.12	8.21	6.62
April 2022	7.83	9.22	7.18
March 2022	7.57	8.28	7.24
February 2022	8.11	7.57	8.37
January, 2022	6.56	8.14	5.83
December 2021	7.91	9.30	7.28
November 2021	6.97	8.20	6.41
October 2021	7.74	7.37	7.91
September 2021	6.86	8.64	6.04
August 2021	8.32	9.78	7.64
July 2021	6.96	8.32	6.34
June 2021	9.17	10.08	8.75

Source: CMIE



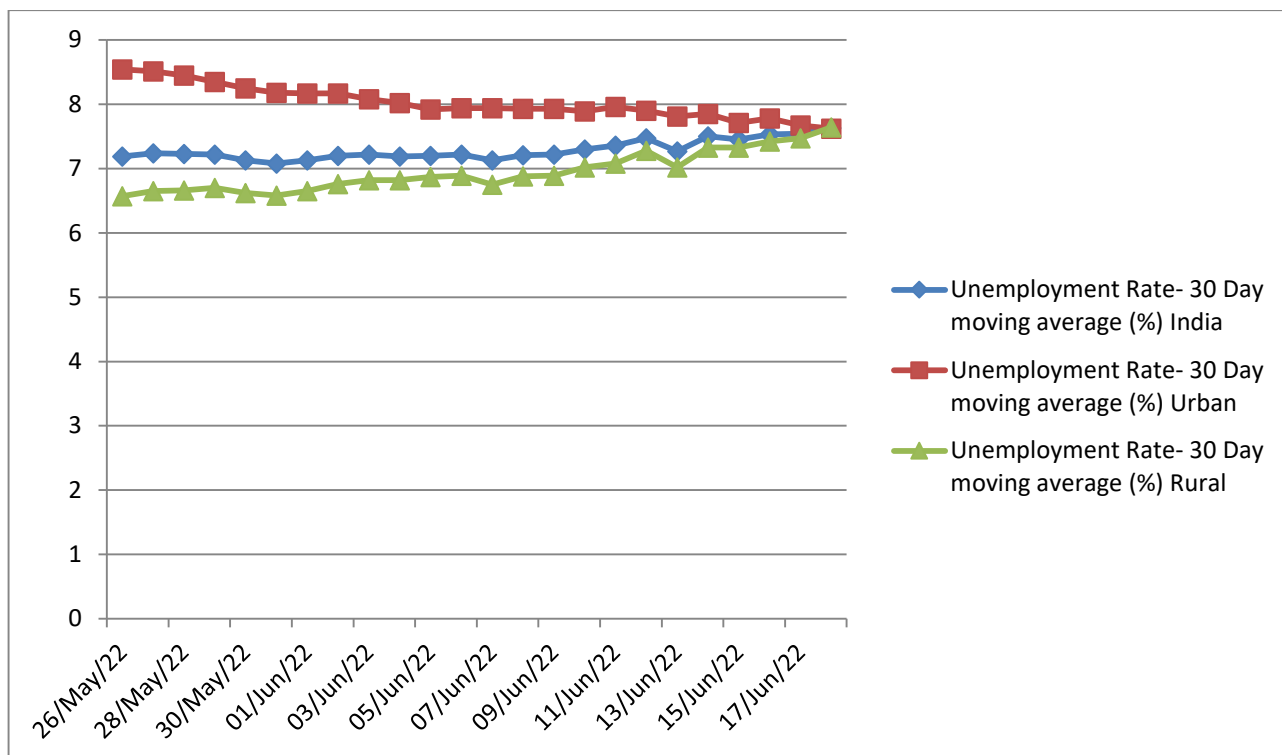
**Figure 1**

Table 1 depicts the monthly unemployment rate in India from June, 2021 to May, 2022. It is clear from the table that the rate of unemployment decreased from 9.17 % in June, 2021 to 6.96 % in the month of July, 2021. After that again increase to 8.32 % and then decrease to 6.36 % in October, 2021. If we see the trend of unemployment rates for the period it gives us slight ups and downs throughout the period. If we look into the urban unemployment rate it gives us shocking results. The rate of urban unemployment is more severe than rural.

**Table 2: Unemployment Rate- 30 Day moving average (%)**

Month	Unemployment Rate- 30 Day moving average (%)		
	India	Urban	Rural
18 Jun 2022	7.63	7.62	7.64
17 Jun 2022	7.54	7.67	7.47
16 Jun 2022	7.53	7.78	7.42
15 Jun 2022	7.45	7.71	7.33
14 Jun 2022	7.50	7.85	7.33
13 Jun 2022	7.27	7.81	7.02
12 Jun 2022	7.47	7.90	7.28
11 Jun 2022	7.36	7.96	7.08
10 Jun 2022	7.30	7.89	7.02
09 Jun 2022	7.22	7.93	6.89
08 Jun 2022	7.21	7.93	6.88
07 Jun 2022	7.13	7.94	6.75
06 Jun 2022	7.22	7.94	6.89
05 Jun 2022	7.20	7.92	6.87
04 Jun 2022	7.19	8.02	6.82
03 Jun 2022	7.22	8.08	6.82
02 Jun 2022	7.20	8.17	6.76
01 Jun 2022	7.13	8.17	6.65
31 May 2022	7.08	8.18	6.58
30 May 2022	7.13	8.25	6.62
29 May 2022	7.22	8.35	6.70
28 May 2022	7.23	8.45	6.66
27 May 2022	7.24	8.51	6.65
26 May 2022	7.19	8.54	6.57

Source: CMIE



**Figure 2**

The Indian economy started to grow gradually in 2021, contributing to a slight fall in unemployment rate. As can be seen in the figure-2 above, the unemployment rate was between 7-8 % in the preceding months. Indian economy is on the path of achieving the Prime Minister’s vision of a USD 5 trillion dollar economy by 2024-25. Economic growth positively affects job creation. Budget 2021-22 had provided a sharp increase in provisions for public investment to boost economic activity. Union Finance Minister, Nirmala Sitaraman on her budget speech 2021-22 told that economic recovery in the country is continuing to benefit from the multiple effects. Budget 2022-23 has further provided a strong impetus for growth with capital expenditure being stepped up sharply by 35.40 % in Rs 7.50 lakh crore from 5.54 lakh crore in the financial year 2021-22. This investment which is approximately 2.9% of GDP, shall not only boost economic activity but also concurrently improve the employment situation of the country.

The continuous push by the Government to infuse funds to the economy has begun to bear results in spite of the huge setback and disruptions caused by COVID 19 pandemic over the past two years. Government tries to create employment opportunities for absorbing unemployed workers. Employment opportunities are created in new sectors such as Artificial Intelligence, Cloud Computing, Data Analytics, and Automation under Information Technology/ITES etc. As per the report on Quarterly Employment Survey (QES) data of the total employment estimated in

the selected sector, Manufacturing accounted for nearly 39%, followed by education with 22% and Health as well as IT/BPOs sector both around 10%, Trade and Transport sectors engaged 5.3% and 4.6% of the total estimated workers respectively. Regular workers constitute 87% of the estimated workforce in the selected sectors, with only 2% being casual workers. However, in the construction sector, 20% of the workers were contractual and 6.4% were casual workers.

Government Report entails that the Information Technology/Business Process Outsourcing sector, the biggest employment generator has spawned the mushrooming of several ancillary industries including transportation, real estate and catering, security, housekeeping etc. Direct employment in the IT services and BPO/ITeS segment is estimated at 4.7 million in financial year 2020-21 with an addition of 1,38888 people consisting of nearly 36 percent women employees and indirect job creation is estimated to be over 12.0 million(PIB report,2022).

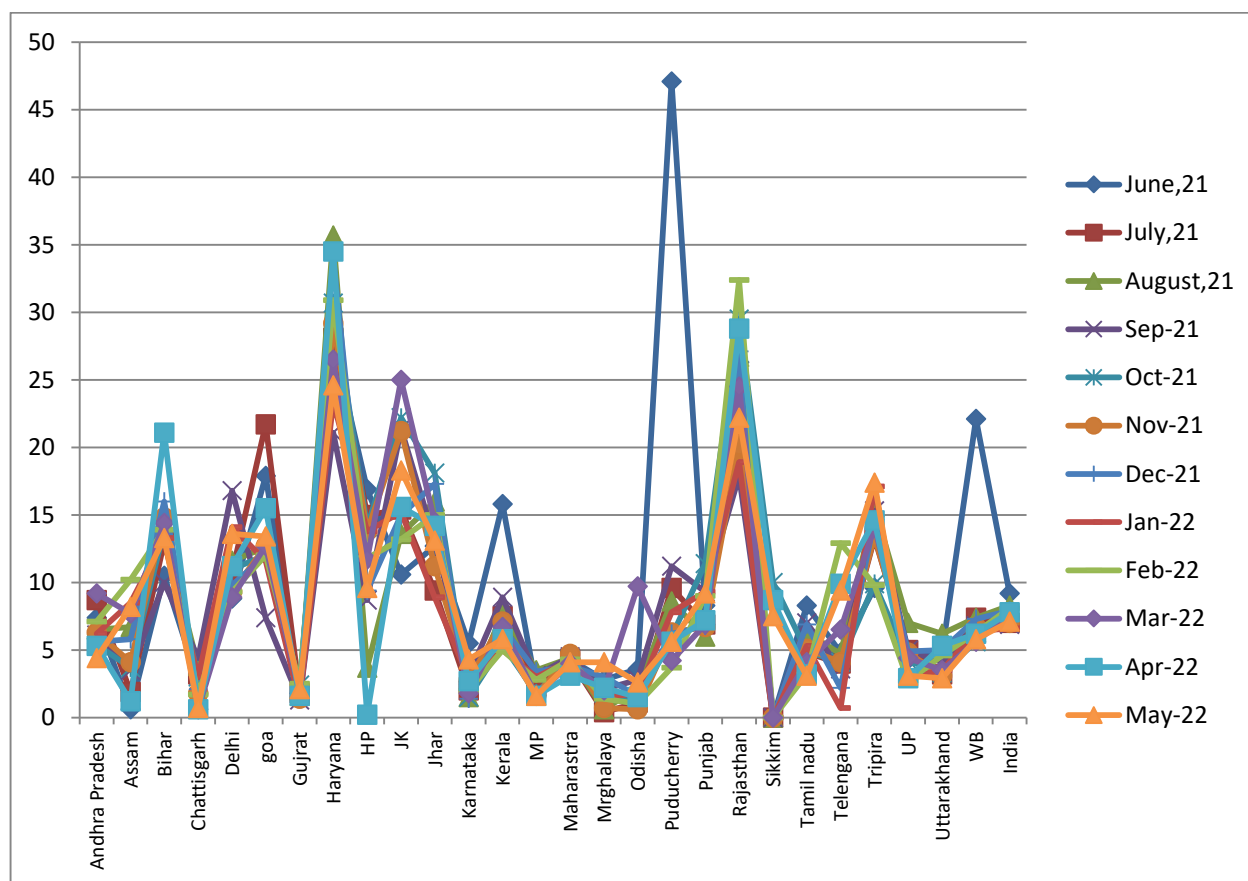


Figure 3 (Source: CMIE)

### Govt initiatives to boost job opportunities

To enhance India’s manufacturing capability and generation of employment, an outlay of Rs. 1.97 lakh crore has been announced for Production Linked incentives Schemes for 14 key

sectors of manufacturing starting from FY 2021-22. With the announcement of PLI schemes, significant creation of production, employment and economic growth is expected over the next five years and beyond. These 14 key sectors includes- Key Starting Materials(KSMs)/ Drug Intermediaries (DIs) and Active Pharmaceutical Ingredients(APIs), Large Scale Electronics Manufacturing, Manufacturing of Medical Devices, Electronic/ Technology Products, Pharmaceutical Drugs, Telecom & Networking Products, Food Products, White Goods (ACs & LEDs), High Efficiency Solar PV Modules, Automobiles and Auto Components, Advance Chemistry Cell (ACCs) Battery, Textile Products: MMF segment and technical textiles, Specialty Steel and Drones and Drone components.

In order to boost employment generation, Government of India encouraging various projects involving substantial investment and public expenditure on schemes like Atmanirbhar Bharat Scheme, Pradhan Mantri Mudra Yojana, PM Employment Generation Programme,

Atmanirbhar Bharat Package was launched on 1<sup>st</sup> October, 2020 to incentivize employers for creation of new employment opportunities along with social security benefits and restoration of loss of employment during COVID-19 pandemic. The government is providing fiscal stimulus of more than Rs. 27 lakh crore. This package comprises of various long term policies for making India self reliant and to create employment opportunities. As on 20.11.2021, scheme has been availed by 39.43 lakh beneficiaries through 1.15 lakh establishments. Under Pradhan Mantri Mudra Yojana collateral free loans upto Rs. 10 lakh are extended to Micro Small Enterprises and to individuals to enable them to setup or expand their business activities. Under this scheme Rs 31.28 crore was sanctioned up to November, 2021. Prime Minister's Employment Generation Programme- implemented by Ministry of Micro Small Medium Enterprises is a major credit-linked subsidy programme aimed at generating self employment opportunities through established of microenterprises in the non-farm sector by helping traditional artisans and unemployed youth. Garib Kalyan Rojgar Abhiyan launched on 20<sup>th</sup> June, 2020 for providing engagement of 125 days to boost employment and livelihood opportunities for returnee migrant workers and similarly affected persons including youth in rural areas, in 116 selected districts across 6 states of Bihar, Jharkhand, MP, Odisha, Rajasthan and UP. The Abhiyan has achieved employment generation of 50.78 crore person days with a total expenditure of Rs 39,293 crore. - In order to focus on urban areas, this PM Street Vendor's Atmanirbhar Nidhi was launched on June, 01, 2020 to provide working capital loan of Rs. 10000 to street vendors, vending in urban areas, to resume their business, which were hurt adversely due to COVID-19 induced lockdown in the country.

The Skill India Report, 2020 has highlighted that the industry sector is moving in the direction of adopting various innovative technologies such as Artificial Intelligence, Data Analytics, Robotics, AR/VR and automation, thereby leading to development of wide job opportunities in the market. Now a days there is a major shift in the employment trend with the rise of gig economy across the globe. The gig economy encompasses freelancers, online platform workers, self employed, on-call workers and other temporary contractual workers. The rise of gig economy is driven by emergence of tech-enabled platforms, demand for flexible work arrangements and focus on skills. Government should take every possible measure to encourage entrepreneurship development, Skill enhancement and self employment in order to solve the growing unemployment problem.

## **Conclusion**

By all estimates, India needs a crore jobs a year to remove the problem of unemployment and it will be impossible for the government alone to generate these jobs. Thirty thousand youngsters are joining the workforce daily, while not more than 500 jobs are being generated in the economy every day. To bring about significantly higher levels of employment, India needs to see much more infrastructure and manufacturing activity plus a serious boost to the service sector. Unfortunately, despite the government's encouraging fiscal allocations, investments in infrastructure and manufacturing have not yet taken off, nor have transportation, telecommunications, banking, insurance, education, health and social services. For these sectors to push growth and generate employment, India needs continuous Public and Private investments, and a clear path to 10% or more growth which is yet to happen. Every Indian needs a basic safety net guaranteeing food, electricity; skill based education, employment housing, a bank account, toilets and medical coverage. Only a robust new economy, functioning in a rule-based environment will create the jobs required through long term growth and environmental sustainability.

The pattern of growth with full employment and rising wages was one reason behind the reduction in poverty and inequality that accompanied high growth in Japan, Mauritius, the Republic of Korea and Singapore (UNDP, 1996). India should learn a lesson from the experience of East Asian Economies so that GDP growth, productivity, employment and wage increase can be moved together in the process of economic and human development. Employment friendly growth process can ensure growth with equity. India should avoid lopsided development--- with either good growth but little human development or good human development with little growth.

There is no doubt that higher economic growth is essential but it also necessary to ensure that the structure and quality of growth is directed to supporting human development, reducing poverty, protecting environment and ensuring sustainability Given the plethora of measures undertaken by the government ranging from capital expenditure injection to job creation schemes to skill development programmes and the rise of the gig economy had also revival of the economy in general post-pandemic, the employment scenario in the country is looks promising in the years to come.

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## IMPACT OF QUARANTINE ON QUALITY OF LIFE DURING COVID-19 PANDEMIC: AN EXPLORATORY STUDY

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### Abstract:

**Background:** Although quarantine is often a necessity for the greater good, the length of time in quarantine is a strong predictor of adverse mental health outcomes such as emotional exhaustion, loneliness, low mood, irritability, restlessness and anger.

**Purpose** – The COVID-19 pandemic is a global health emergency that could potentially have a serious impact on public health, including mental health. The COVID-19 has brought life to stand still. The rapidly emerging mental health issues may destabilize individuals' general well-being and have immense potential to influence the health system; hence, they need urgent and immediate attention and action. The aim of the present study is to bring forth the socio-psychological factors affecting the quality of life due to Quarantine during Novel COVID-19.

**Design/methodology/approach** – The present research employee's explanatory research design to deduce and explain the relationship between the variables. To carry out the research, online platform was used to reach the targeted sample. A structured questionnaire, based on 5 points Likert Scale, was employed to collect the data. Hypotheses were then statistically tested using correlational analysis and structural equation modelling.

**Findings** – The results indicate that the study has identified stressors of quarantine that affect the Quality of life. The stress level due to the COVID-19 pandemic has been multiplied by the quarantine compulsions.

**Originality/value** – The study has identified certain quarantine stressors, and thus paving path to identify more stressors of quarantine that affect the quality of life.

**Keywords:** COVID-19, Quarantine, Stressors, Quality of life.

## **Introduction:**

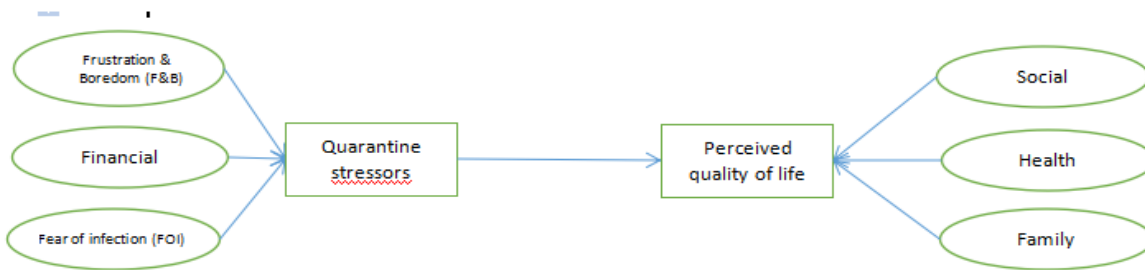
In today's global society, due to our rapid travel across national borders and continents, infectious disease outbreaks can spread rapidly around the world (Quinn and Kumar, 2014). The COVID-19 pandemic is a global health emergency that can have serious effects on public health (including mental health). Since the discovery of a cluster of SARS of unknown etiology in Wuhan City, Hubei Province, in late December 2019, the viral disease has continued to spread exponentially in China and around the world (Rossi *et al.*, 2020). Coronavirus belongs to the family of viruses and can cause various symptoms such as pneumonia, fever, shortness of breath, and lung infections (Adhikari *et al.*, 2020). Disease outbreaks and control measures themselves can create widespread fear and panic, especially social stigma and exclusion, for patients, survivors and family members of covid confirmed individuals, which can lead to negative psychological reactions, including adjustment disorders and distress (Zhang *et al.*, 2020). As a new disease, Covid-19 is sure to cause confusion, anxiety, and fear in people. These factors can lead to harmful stereotypes. Due to the associated stigma, people may be forced to hide their illness for fear of discrimination, prevent people from seeking immediate medical attention, and may prevent them from engaging in healthy behaviors. Stigmatization of infected people, families and even medical personnel has been observed. All stations have reported that the concerns and stressors generated by this new situation are generating psychosocial pressure on individuals, families and communities, which can be the root cause of mental anguish (Das, 2020). Physical alienation and social isolation can not only have a serious impact on your mental health, but also on your physical health and function (Steinman *et al.*, 2020). The psychological impact of isolation is broader, more significant, and can last for a long time. This is not to say that insulation should not be used; the psychological effects of not using isolation and allowing the disease to spread may be worse (Brooks *et al.*, 2020). Anecdotal evidence and newspaper reports also indicate that the suicide tendency of communities, COVID 19 patients, and people in quarantine and isolation is on the rise. Fear of illness can cause normal people to develop new psychiatric symptoms, worsen patients with existing mental illness, and cause distress to those caring for those who are ill. Regardless of the level of exposure, people may feel fear and anxiety due to illness or death, helplessness or blame the sick person, which may trigger a mental breakdown (Roy *et al.*, 2020). Rapidly emerging mental health problems can undermine people's overall well-being and have great potential to affect the health system; therefore, they need urgent and immediate attention and action. Community mental health problems can be diversified and segregated according to specific populations (Dalal *et al.*, 2020). The purpose of this study is to understand the psychosocial factors that affect the quality of life due to isolation during the new COVID19 period.

**Research methodology:**

Research is an art of planning, executing and investigating the research questions (Ghauri and Gronhaug, 2010), in a systematic manner. The present research employee’s explanatory research design to deduce and explain the relationship between the variables. To carry out the research, online platform was used to reach the targeted sample. A structured questionnaire, based on 5 points Likert Scale, was employed to collect the data. The questionnaire included six variables with total of 20 questions. The variables were include Fear of Infection (FOI), Frustration and Boredom (F&B), Social (SC), Health (HLTH), Family (FM) and Financial (FC).

**Proposed research model:**

The proposed research model explains the research intentions. The models briefs about the projected relationship between the two variables. The study will continue in the below given framework to achieve the hypotheses proposed for the study (figure 1).



**Figure1: proposed model for the study**

**Hypotheses:**

Based on the previous studies a model was proposed to achieve the set objectives. Based on the model proposed for the study, certain hypothesis were set. The hypotheses for the study have been already discussed above.

- H1. Quarantine stressors have significant impact on the Perceived Quality of life.
- H2: Quarantine has significant impact on the social life.
- H3: Quarantine has significant impact on the health management.
- H4: Quarantine has significant impact on family management.

**Table 1: KMO and Barlett’s test**

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.694
Bartlett's Test of Sphericity	Approx. Chi-Square	1007.410
	Sig.	.000

**Sampling:**

As the present study was conducted during the COVID-19 Pandemic, so it was not possible to collect the whole population. In order to reach the audience, social media channels were employed to collect the data. So, the population considered in the study were the friends and friends of friends in the social media channels. Snowball sampling technique was employed to distribute the instrument. In total 423 responses were received, out of that 12 were excluded and 411 were used for final analysis.

**Research instrument:**

**Table 2: factor loadings and Cronbach’s alpha**

Item	Component						α
	1	2	3	4	5	6	
Q1		.817					.817
Q2		.817					
Q3		.653					
Q4		.771					
Q5	.920						.765
Q6	.909						
Q7	.835						
Q8	.842						
Q9	.492						
Q10				.745			.781
Q11				.727			
Q12				.788			
Q13						.656	.721
Q14						.818	
Q15			.767				.752
Q16			.765				
Q17			.680				
Q18					.562		.713
Q19					.816		
Q20					.667		

**Table 3: independent samples test of gender**

Items	F	Sig.	Sig. (2-tailed)
foi	.043	.836	.513
FB	.056	.921	.589
SC	.36	.782	.233
HT	.049	.665	.092
FM	1.41	.321	.453
FC	.78	.091	.328

The research instrument, used in the study, was developed by the researchers using the previous studies. The questions posed to the audiences related to the quarantine and perceived Quality of life were deduced from various sources. The questionnaire is thus self-framed. There were originally 25 items in the scale. However, 5 were eliminated and thus only 20 items were included in the final instrument (Table 2). The items were removed phase wise through pre-

testing technique, pilot testing and finally exploratory factor analysis. So, the instrument has been tested through face validation and pre-testing followed by the Exploratory Factor Analysis (EFA) initially.

**Variable validity:**

Internal consistency validity is employed to check the validity of the variables in the present study. The reliability analysis ensures the good level of internal consistency of the variables with Cronbach's alpha value above 0.7 (Table 2). The inter-item correlation establishes that all items in the variables show supportable order of magnitude, thus, confirming the usability of the instrument.

**Exploratory factor analysis:**

Initially pilot testing was done to check the variability and dependency of the instrument. Exploratory factor analysis was performed on the data set to check the authenticity of the variables. In total six factors were established. The factor loading for all items is more than 0.5 (Table 2) (Bagozzi and Yi, 1988), with no negative loading and cross loadings of above 0.5 (Bagozzi *et al.*, 1991). Thus, confirming the factors for the present study. The Kaiser Miller-Olkins test (KMO) calculated is 0.695 (Table 1), confirming distinction and reliability of the confirmed variables.

**Results:**

**Descriptive analysis:**

In the present study, the descriptive statistics performed on the demographic variables indicate that the 59% of respondents were male, while as 41% were females. 27% of the total respondents were government employees, 19% students, 11% scholars, 28% self-employed and 15% were private sector employees. Further classifying, 37% were post graduates, 28% graduates, 21% research scholars and 14% were matriculate and above. Moreover, 38% respondents were aged between 20-30years, 33% between 31-40, 19% were aged between 41-50 and 10% were above 51 years.

**Analysis:**

COVID-19 PANDEMIC has impacted the lives of the people in many ways. Health related issues have been a major concern during the pandemic. There have been many studies that have studied the impact of COVID-19 pandemic on health and other health related issues. But, few studies have concentrated on the social and psychological impact of COVID-19. Moreover, fewer of them consider the impact of quarantine on the social and psychology life of the quarantined people. In the present study an attempt has been made to understand the impact of the psycho-social stressors of quarantine on perceived quality of life.

The results deduced from the study reveal that stressors of quarantine identified in the study have impact on the perceived quality of life. The results from the demographic variables ascertain that across various groups based on educational qualification the opinions seem to be varied (Table 4). Frustration and boredom and family management, both show significance of below .05. Moreover, the results also reveal that different age groups of respondents show difference in opinion again towards Frustration and boredom with significance level below .05 (Table 5), other factor show no significant differences. The results also reveal that there is difference in opinion of different groups of respondents based on occupation from the (Table 6), it is evident that respondents differ in opinion related to family management. Besides, all other factors show no significant differences in opinion across various occupational groups. However, both the genders included in the study, show no significant difference in their perception towards impact of quarantine on perceived quality of life, during COVID-19 PANDEMIC. The results also show that the differences in opinion of the respondents are not significant, across various groups related to location of respondents (table 7). The regional groups were divided between Residents of state of Jammu and Kashmir, Rest of India and Foreigner.

**Table 4: Anova for educational qualification**

Items	F	Sig.
Foi	.572	.684
Fb	2.710	<b>.033</b>
SC	1.858	.121
HT	1.198	.314
FM	2.701	<b>.033</b>
Fc	2.010	.097

**Table 5: Anova for age**

Items	F	Sig.
foi	.566	.638
fb	2.613	.054
SC	.280	.840
HT	2.034	.112
FM	.598	.617
Fc	.815	.488

**Table 6: Anova for Occupation**

Items	F	Sig.
foi	.449	.718
fb	.328	.805
SC	2.012	.115
HT	.236	.871
FM	6.182	.001
fc	.168	.918

**Table 7: Anova for Region/location**

Items	F	Sig.
foi	.598	.552
fb	1.061	.349
SC	1.085	.341
HT	1.010	.367
FM	.050	.951
fc	.245	.783

**Confirmatory factor analysis:**

As the scale is used in the present context for the first time, Confirmatory factor analysis (CFA) was performed to further evaluate the technicality of the scale. The estimates confirmed from the analysis present the internal reliability and convergent reliability of six

variables included in the study. All the six variables have recorded the factor loading of above .50, exceeding the threshold limits prescribed, thus, explaining that all the items evaluate well the variables. Moreover, AVE calculated for the variables is well above the recommended level of .50. CR value computed for all the variables again fall well above the threshold level of .70 (Table 8), thus, confirming the validity and reliability of the scale for further analysis.

**Table 8: CFA**

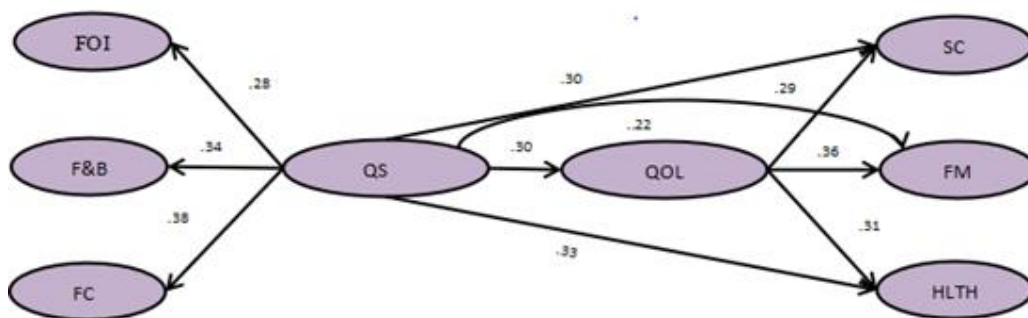
Validity measure estimates		
Variables	AVE	CR
Fear of Infection	0.634	0.904
Frustration & boredom	0.789	0.962
Social	0.632	0.909
Family	0.714	0.924
Health	0.782	0.911
Financial	0.761	0.924

**Measurement model:**

In the present study, Amos 23 was used to affirm the Measurement Model. The first order measurement model, generates values for goodness of fit indices as **CFI= 0.945**, **GFI=0.912**, **AGFI=0.888**, **CMIN/DF=1.876**, **SRMR=0.036**, **RMSEA=0.062** & **P.Close=0.365**. All the measurement indices that are derived from the measurement model are above the prescribed level. Thus, the first order IPI model indicates that the obtained model has excellent goodness of fit. The model is fit for computation of the implicit variables.

**Structural Equation Model (SEM):**

The structural model defines the causal relationship between the latent variables. Frequently used fitness indicators in the SEM model have been considered to check the feasibility for running the SEM model for the present study.



**Figure 2: Path diagram of Structural Equation model for present study**  
(*QS= QAURINTINE STRESSORS; QOL= QUALITY OF LIFE; FOI=FEAR OF INFECTION; F&B= FRUSTRATION AND BOREDOM; FC= FINANCIAL; SC= SOCIAL SETUP; FM= FAMILY MANAGEMENT; AND, HLTH=HEALTH*)

As discussed earlier, most of the studies indicate that likelihood ratio chisqux statistic ( $X^2$ ), Root Mean Square Error Approximation (RMSEA), Goodness of Fit Index (GFI), Adjusted Goodness of fit index (AGFI), Comparative Fit Index (CFI), Root Mean-squared Residual (RMR), Standardized Root Mean-squared Residua (SRMR) and P.Close are used to access goodness of fit for the SEM model (Jöreskog and Sörbom, 1993; Schermelleh-Engel and Moosbrugger, 2003). The SEM model has values for goodness of fit indices as CFI= 0.956, GFI=0.895, AGFI= 0.879, CMIN/DF=1.699, SRMR=0.038, RMSEA=0.053 & P.Close= 0.422. The measurement indices for the present SEM model are above the prescribed values for fitness. Thus, the SEM model developed has excellent goodness of fit.

**Table 9: Relationship between exogenous and Latent Endogenous variables**

Latent endogenous Variable		Exogenous Variable	Estimate	S.E.	C.R.	P
QAULTY OF LIFE	<---	QAURANTINE	.301	.057	5.931	***
SOCIAL	<---	QAURANTINE	.308	.064	5.398	***
FAMILY MANAGEMENT	<---	QAURANTINE	.224	.060	3.604	***
HEALTH MANAGEMENT	<---	QAURANTINE	.344	.063	4.221	***

The path Diagram (Figure 2.), explains the SEM Model with path values indicating the relationship weights. The table (table 9), indicates that the  $P < 0.01$  in all the cases. Thus, indicating that the relationship between the latent variables and the exogenous variables is significant. The exogenous variable Quarantine (Stressors) has significant impact latent endogenous variable Quality of life, with  $P < 0.01$ , and the estimates define 30% with S.E =.057 and C.R =5.931. Similarly, with estimate above 30% with S.E =.064 and C.R =5.398, the results explain that the quarantine (stressors) impact the social life.

The path constant between Quarantine and family management is .224, indicating quarantine 33% of negative influence on family management. Moreover, Quarantine has negative impact on the health of the individuals. The path constant between Quarantine and health is .344, indicating Quarantine brings 34% of change in health of an individual. The results obtained from the study indicate that all the hypotheses for the study stand accepted.



## **Conclusion:**

The aim of the present study is to bring forth the socio-psychological factors affecting the quality of life due to Quarantine during Novel COVID-19. The COVID-19 has brought life to stand still. The COVID-19 epidemic has brought complete breakdown of social psychological interventions, especially to face-to-face communication and traditional social gatherings. That in turn has brought serious social psychological impact on the people worldwide, especially those quarantined due to present pandemic.

The present study comprehends that all the sects of the society, irrespective of the gender, age, profession and qualification, have been victims of the present COVID-19 pandemic in every region of the world. The continuous lock-downs, quarantine and physical distancing has had serious impact on the social as well as the physiological aspects of life. The study finds that the quarantine stressors identifies in the study have serious influence on the perceived quality of life. The study reveals that feeling of frustration and boredom due to the quarantine is highest among the respondents. Due to the fast urbanization and paced life, most of the individuals spending time outside their home, this pandemic has disturbed the routine life style of the people. Thus, creating the boredom and frustration among the people. Financial complicates among the individuals is also one of the major stressor due to quarantine. The results reveal that financial constraints due to the quarantine has strong impact on the quality of life. The respondents feel especially the people working as self-employed and those having running their own businesses have strong impact on the quality of life during the quarantine due to the COVID-19 pandemic. The SEM analysis indicate that Frustration & boredom is highly correlated with the Fear of infection among the individuals, another highly influencing quarantine stressor that affects the quality of life. The fear of infection has held back every individual within the four wall of their houses. The fear of infection does not allow the individuals to move out and perform the daily chores, thus affecting the quality of life. The study has identified stressors of quarantine that affect the Quality of life. The pandemic has been testing time for every sect of the society. The individuals have faced hard times at individual level and the institutes have also faced at same velocity. The stress level due to the COVID-19 pandemic has been multiplied by the quarantine compulsions. Now, it becomes important for the institutions at government level, societal level as well as the individual level to integrate intervention models for psycho-social reconstruct. It is important to integrate physicians, psychiatrists, psychologists and social workers into Internet platforms to carry out psychological intervention.

### Scope for future research:

The present study has taken into account the online users due to the non-availability of the face to face interaction. The future studies can include the nonsocial media users. The study has identified certain quarantine stressors, and thus paving path to identify more stressors of quarantine that affect the quality of life. Moreover, the respondents included in the study are educated enough to use online platforms, people with lower level of literacy may have different approach to the same problem.

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## THE ROLE OF NUTRITION DURING COVID 19

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### Abstract:

The effect of COVID-19 lockdown both negatively and positively impacted dietary practices throughout globally, and negative diet habits were associated with other poor lifestyle outcomes including weight gain, mental health issues, and limited physical activity. Both in the short term and if sustained in the long term, these changes may have significant impacts on the health of the population.

### Introduction:

The pandemic of coronavirus is currently experiencing by the world (CoV). The CoV infection began in Wuhan during late 2019, Hubei, China. It had been originally called 2019 nCoV and it has been renamed CoVID-19 by the world health organisation. The direct cause of death is generally due to ensuing severe atypical pneumonia. CoVID-19 has been declared a pandemic by the World Health Organization, and people in all countries are under quarantine in order to reduce the spread of the virus. Since quarantine is associated to the interruption of the work routine, it could be result in boredom. Boredom has been associated with a greater energy intake, as well as the consumption of higher quantities of fats, carbohydrates, and proteins (Muscogiuri *et al.*, 2020).

Thus, during quarantine time it's important to take care of nutritional habits containing a high amount of minerals, antioxidants, and vitamins. Several studies declared that fruits and vegetables supplying micronutrients can boost immune function. This happens because some of these micronutrients such as vitamin E, vitamin C, and betacarotene are antioxidants. Antioxidants increase the number of T-cell subsets, enhance lymphocyte response to mitogen, increased interleukin-2 production, potentiated natural killer cell activity, and increased response to influenza virus vaccine compared with placebo (Chandra, 1995)

To enhance the physical and mental health of individuals vis a vis the COVID-19 pandemic, it presents a framework for action to maintain optimal nutrition at the individual, community, national and global levels using an adapted version of the ecological model of health behaviour. At the individual level, the common denominator that drives most of the nutrition and

dietary recommendations to combat viral infections, including COVID-19, lies within the link between diet and immunity. In fact, existing evidence highlights that diet has a profound effect on people's immune system and disease susceptibility. It has been noted that specific nutrients or nutrient combinations may affect the immune system through the activation of cells, modification in the production of signaling molecules, and gene expression. Furthermore, dietary ingredients are significant determinants of gut microbial composition and consequently can shape the characteristics of immune responses in the body. Nutritional deficiencies of energy, protein, and specific micronutrients will lead to depressed immune function and increased susceptibility to infection. For the maintenance of immune function, an adequate intake of iron, zinc, and vitamins A, E, B6, and B12 are necessary. Therefore, the key to maintaining an effective immune system is to avoid deficiencies of the nutrients that play an essential role in immune cell triggering, interaction, differentiation, or functional expression (Farah Naja *et al.*, 2020).

The low physical activity levels, even for short periods, could negatively affect physical and mental health. The state of lockdown and confinement could also lead to irregular eating patterns and frequent snacking, that will further lead to higher caloric intake and increased risk of obesity (Scully *et al.*, 2009). It is necessary to make an effort to choose a healthy lifestyle, eat diets high in fruits and vegetables, exercise during free time, try to maintain a healthy weight, and get an adequate amount of sleep during COVID-19 pandemic. The other responsibility of individuals is to avoid the spread of misinformation related to nutrition and dietary intake, and the COVID-19. Since the outbreak, networks of social media were flooded by messages of single foods/herbs promising cure or prevention of the infection. The effects of such unfounded claims could lead to negative implications ranging from giving a false sense of protection against the infection to toxicity. At the community level, food access and availability are particularly vulnerable to the implications of the COVID-19 outbreak, primarily because of difficulties in transportation, distribution, and delivery (Vallianatos *et al.*, 2010).

In a study of the effect of an outbreak on behavior, the response is to stockpile supplies, food, and water (Kohn *et al.*, 2012). Those who can afford extra food may hoard more than they need and pose devastating consequences on at-risk populations. Hoarding could lead to extreme shortages in markets, leading to rapidly rising prices (Timmer, 2010). Therefore, at a community level, it is crucial to spread awareness against 'Panic-buy'. Furthermore, during the COVID-19 pandemic, older adults and patients with chronic diseases became particularly vulnerable and most at risk to nutrition imbalance.

Firstly, the adults 60 years and older and patients with preexisting medical conditions, especially heart disease, lung disease, diabetes or cancer are more likely to have severe— even

deadly—coronavirus infection than other groups is observed by the existing research work (World Health Organization, 2019). Second, the recommendations to stay home and abide by social distancing targeted these groups specifically, given their vulnerability.

Third, the limited purchasing ability of elderly and patients with chronic diseases will lead to malnutrition. Therefore, at community level, it is crucial to identify these vulnerable groups and extend assistance in food access and availability through a structured and reliable support system. At the national level, while governments of countries around the globe are dealing with the burden of the COVID-19 and its enormous strains on the healthcare system, they are also battling a destabilization in their economies and a rising threat of food insecurity. In light of these challenges to provide adequate and nutritious food at times of pandemics, each country is urged to define, finance, and distribute a food basket of a least-cost diet that supports the health needs of the population, ensure the use of the local agricultural produce of the country, and minimize reliance on food imports. Significant planning is needed at the national level to increase the nation's preparedness, including the formulation of policies to support the production, distribution, and access of this food basket to different communities (Naja and Hamadeh, 2020).

The policies those are related to mobilization of resources in order to finance food purchases and provisions, tax waiving for staple foods and commodities, and support for agricultural and food production industries. Given the effect of the COVID-19 pandemic on the demand and supply dynamics of food, price hikes became prevalent reaching at times uncontrollable levels, a situation that requires national efforts to closely monitor and inspect food prices and markets. The COVID-19 pandemic imposed a paradigm shift on governments, whereby it became imperative to build networks with the private sector, the international agencies, and local communities. It is only through a coordinated effort of these different entities that securing essential nutritious food stocks become possible. Also, governments are asked to build and maintain open and two-way communication with the public during this pandemic, especially that transparency is critical for building trust, support, and compliance. Specific methods to inform the public about adequate food consumption and intake might include public awareness campaigns, nutrition education, emergency news bulletins, radio and TV announcements and interviews, and the dedication of specific telephone hotlines for direct communication with government representatives (Pan American Health Organization).

### **Importance of nutrients for CoVID-19**

During quarantine time it is important to take care of nutritional habits, following a healthy and balanced nutritional pattern containing a high amount of minerals, antioxidants, and vitamins. Many studies revealed that there is an increased intake of macronutrients that are

accompanied by micronutrients deficiency thus making more susceptible to viral infections. The fruits and vegetables supplying micronutrients can boost immune function. This happens because some of these micronutrients such as vitamin E, vitamin C, and betacarotene are antioxidants. Anti-oxidants increase the number of T-cell subsets, enhance lymphocyte response to mitogen, increased interleukin-2 production, potentiated natural killer cell activity, and increased response to influenza virus vaccine compared with placebo (Giovanna Muscogiuri *et al.*, 2020).

### **Immunity boosting foods:**

The most potent anti-viral food items that must be included in ones diet to boost up the immune system and protect body against infectious diseases are listed below (De and De, 2020).

**Garlic (*Allium sativum*):** Garlic is reported to reduce the risk of heart disease including high cholesterol, high blood pressure and cancer. In modern medical science, garlic is used for the treatment of intestinal worms, infections, digestive disorders and fungal infections such as thrush. Garlic containing the sulphur compounds diallyl disulfide is believed to be anti-carcinogen. It is rich in ‘allicin’ a powerful anti-biotic and antifungal compound which help in enhancing immunity of individuals. In addition, it contains also alliin, ajoene, enzymes, vitamin B, minerals and flavonoids (De and De, 2020).

**Turmeric (*Curcuma longa*):** Turmeric rhizome contains 5% essential oils and up to 7.3% curcumin, a polyphenol (Plate 2). It is used as food colouring component for curry and as a preservative for food. Traditionally, it is used as a medical herb due to its antioxidant, anti-inflammatory, antimutagenic, antimicrobial, antibacterial and anticancer properties. It is used in the treatment of stomachache, skin problems and arthritis. In China, it is used as analgesic and for colic, hepatitis, ringworms and chest pain. Otherwise, it is antiseptic for cuts, burns and bruises and is used for strengthening overall energy of the body (De and De, 2020).

**Ginger (*Zingiber officinale*):** The oleoresin from the rhizomes of ginger contains many bioactive components, such as gingerol that is believed to exert a variety of remarkable pharmacological and physiological activities (Plate 3). Ginger has been used for thousands of years for the treatment of numerous ailments, such as colds, nausea, arthritis, migraines, hypertension, indigestion, flu, pain, cancer, heart diseases and overall sickness of the body (De and De, 2020).

### **Antioxidant rich foods:**

#### **High antioxidant-rich fruits**

Fruits with a documented high concentration of antioxidants belong to the plant members of *Rosaceae* (dogrose, sour cherry, blackberry, strawberry, and raspberry), *Empetraceae* (crowberry), *Ricaceae* (blueberry), *Grossulariaceae* (blackcurrant), *Juglandaceae* (walnut), *Asteraceae* (sunflowerseed), *Punicaceae* (pomegranate), and *Zingiberaceae*

(ginger). Pomegranate, grape, orange, plum, pineapple, lemon, date, kiwi, clementine, and grapefruit have been identified with high antioxidant properties. Other fruits associated with a high amount of antioxidants include dog rose, sour cherry, blackberry, strawberry, raspberry, cloudberry, and rowanberry. Among these fruits, berries account for the highest antioxidant content and dog rose has the highest compared to others such as crowberry, wild berry, black currant, sour cherry, wild blackberry, wild strawberry, cultivated blackberry, and cowberry/cranberry. Berries have a high content of phytochemicals such as flavonoids, tannins, stilbenoids, phenolic acids, and lignans (Afam *et al.*, 2021).

### **High antioxidant-rich vegetables**

Broccoli, brussels sprout, green cabbage, tomato, cauliflower, spinach, leek, lettuce, and sweet pepper have been reported with different antioxidant levels.<sup>l</sup>Hounsome and Hounsome<sup>l</sup> showed that the phytochemical  $\alpha$ -carotene and antioxidant  $\beta$ -carotene are richly found in broccoli (1 and 779 mg/100 FW), carrot (4.6 and 8.8 mg/100 FW), tomato (112 and 393 mg/100 FW), pea (19 and 485 mg/100 FW), and sweet pepper (59 mg/100 FW,  $\beta$ -carotene only). These phytochemicals were reported to vary in structure and function from vegetable to vegetable and from cultivar to cultivar, with the level of maturity, postharvest handling, and processing among other factors having a significant impact on their variability. Vegetables rich in ascorbic acid include beans, broccoli, cabbage, cauliflower, cress, pea, spinach, spring onion, and sweet peppers. Asparagus, brussels sprout, cabbage, carrot, cauliflower, kale, lettuce, spinach, sweet potato, and turnip are rich sources of vitamin E. Red pepper has also been reported to have a high content of vitamin C (144 mg/100 g) (Afam *et al.*, 2021).

### **Antioxidants and health maintenance**

The body has several mechanisms to counteract oxidative stress by producing antioxidants, either naturally generated in situ (endogenous antioxidants), or externally supplied through foods (exogenous antioxidants). The roles of antioxidants are to neutralize the excess of free radicals, to protect the cells against their toxic effects and to contribute to disease prevention (Lien Ai Pham *et al.*, 2008)

### **The ROS Sources**

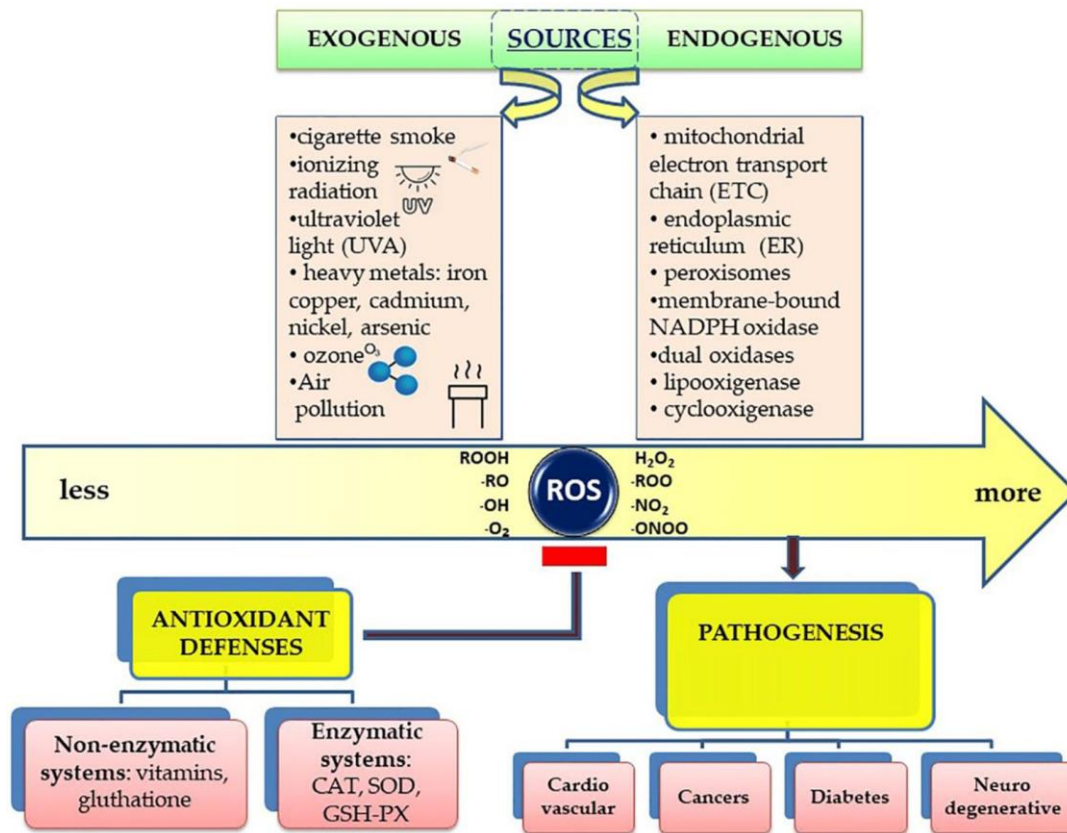
Free radicals are generally produced as a result of the influence of external factors, such as pollution, cigarette smoke, or internally, as a result of intracellular metabolism if the antioxidant mechanisms are overwhelmed (Figure 1).

### **Exogenous ROS**

Environmental triggers, such as exposure to cigarette smoke, UV radiation, heavy metal ions, ozone, allergens, drugs or toxins, pollutants, pesticides, or insecticides, may all contribute



to the increase of ROS production in cells (Antunes dos Santos *et al.*, 2018; Mahajanetal., 2018; Okeetal, 2019).



**Schematic presentation of the sources of free radicals and their effects on the human body (Mehdi Sharifi-Rad *et al.*, 2020)**

### Chronic diseases influenced by ROS-modalities of action:

Ionizing radiation acts by converting hydroxyl radicals, superoxides and organic radicals into organic hydroperoxides and hydrogen peroxide. Subsequently, the peroxides react with the metal ions of Fe and Cu at the cellular level through redox reactions with secondary oxidative activity. Several studies have shown that the exposure of fibro blasts to alpha particles has led to an intracellular increase of oxygen and an accelerated production of peroxide at this level (Spitz *et al.*, 2004; Spitz and Hauer-Jensen, 2014).

Ultraviolet radiation (UVA) triggers oxidative reactions by stimulating riboflavin, porphyrins and NADPH-oxidase, with the production of 8-oxo-guanine as the main result and the decrease of intracellular glutathione (GSH) level with a return to normal after cessation of exposure (Marchitti *et al.*, 2011).

Heavy metals play an essential role in the production of free radicals (Sciskalska *et al.*, 2014). Iron, copper, cadmium, nickel, arsenic, and lead can induce free radicals by Fenton or Haber-Weiss type reactions, but also by direct reactions between metal ions and cellular

compounds with similar effects – for example, the production of thiol type radicals. Lead triggers lipid peroxidation and increases glutathione peroxidase concentration in brain tissue. Arsenic induces the production of peroxides, superoxides, nitric oxide and inhibits antioxidant enzymes such as glutathione-transferase, glutathione-peroxidase, and glutathione-reductase by binding to the sulfhydryl group. The free radicals generated from these reactions can affect DNA, with substitutions of some DNA bases such as guanine with cytosine, guanine with thymine and cytosine with thymine (Jan *et al.*, 2015). Exposure to ozone can affect lung function even in healthy individuals by increasing inflammatory infiltrate in the respiratory epithelium (WuX *et al.*, 2019).

### **Endogenous ROS production:**

The main endogenous sites of cellular redox-reactive species generation-including ROS and reactive nitrogen species (RNS) comprise mitochondrial electron transport chain (ETC), endoplasmic reticulum (ER), peroxisomes, membrane-bound NADPH oxidase (NOX) isoforms 1–5, dual oxidases (Duox) 1 and 2 complexes, and nitric oxide synthases isoforms 1–5 (NOS1–3). The complexes I and III of mitochondrial ETC produces super oxide anion (Rodriguez and Redman, 2005). The mitochondrial ETC is considered to be the primary endogenous source of ROS but other internal sources are also present. Other sources of ROS, primarily H<sub>2</sub>O<sub>2</sub>, are microsomes and peroxisomes. Immune cells, such as macrophages and neutrophils, can also generate ROS due to their oxygen dependent mechanisms to fight against invading microorganisms based on NOX<sub>2</sub> isoform (Curi *et al.*, 2016). Furthermore, dys regulated ROS signaling may contribute to a multitude of disease associated with oxidative stress (Finkel, 2011).

ROS are produced in mitochondria during aerobic metabolism (Rodriguez and Redman, 2005). ROS generation within mitochondria (oxidative metabolism) is closely associated with ATP synthesis (oxidative phosphorylation). In aerobic organisms, the coupling of these reactions is the primary source of energy (Papa *et al.*, 2012). Mitochondria serve as a major ROS generator and, at the same time, as a ROS receptor. Covalent and enzymatic changes in proteins during or after protein biosynthesis as well as during protein cleavage or degradation promote disease through oxidative damage and mitochondrial dysfunction. These post-translational changes participate in the regulation of mitochondrial function through free radical species and other messengers (Huand Ren, 2016). Since oxidative phosphorylation is a leaky process, 0.2– 5% of the electrons circulate through ETC in each round of ATP production. This produces an incompletely O<sub>2</sub> reduction (Hamanaka *et al.*, 2013). Super oxide radicals are produced by NADPH oxidases (NOX) and, to a minor extent, as by-products of a wide number of metabolic enzymes

such as cyclo oxygenase (COX) 1/2, lipoxygenase, xanthine oxidoreductase (XOR) and cytochrome p450 (Finkel, 2003).

Because of the anionic properties of superoxide radicals, they diffuse through biological lipid membranes at the meager extent. They are sequentially reduced inside cells to form hydrogen peroxide and hydroxyl radical (Bartosz, 2009). Furthermore, peroxy and alkoxyradicals, as well as hypochlorite ions, are also formed (Valkoetal, 2007). All these types of ROS can be very harmful to cells; in fact, they can oxidize and subsequently inactivate several functions of cell components and even DNA (Valko *et al.*, 2007). All these processes may trigger irreversible apoptotic and necrotic cell death. Several studies indicate that human cells can also actively trigger ROS production at small doses, as part of signaling pathways, regulating cell survival and proliferation, as a defense mechanism against invaders (Bartosz, 2009; Sena and Chandel, 2012). In particular, specific enzymatic systems, such as the NOX family, dedicated explicitly to superoxide radical production with physiological signaling purposes, are developed by cells (Bedard and Krause, 2007).

### **Nutrition recommendations during COVID-19 pandemic**

#### **Individual:**

- The diet must include -balanced meals, Free from irregular snacking
- The foods rich in vitamins A, C, E, B6 and B12, zinc, and iron such as citrus fruits, dark green leafy vegetables, nuts, and dairy products will be chosen.
- Maintain a healthy lifestyle of exercise (home-exercises), regular sleep and meditation
- Avoid smoking, alcohol, and drugs
- Don't spread misinformation related to nutrition and dietary intake and the COVID-19 (Naja and Hamadeh, 2020).

#### **Community:**

- Spread awareness regarding panic-buy
- Support populations at risk of malnutrition within the community, especially elderly and patients with chronic diseases
- Create a structured and reliable support system to ensure availability, access, and affordability of essential food commodities to all members of the community (Naja and Hamadeh, 2020).

#### **National:**

- Define, finance and distribute a food basket of a least-cost diet that addresses the health needs of the population, ensures the use of the local agricultural produce of the country, and minimizes reliance on food imports
- Mobilize resources in order to finance food purchases and provisions

- Waive taxation for staple foods and commodities
- Support agricultural and food production industries.
- Closely monitor and inspect food prices and markets.
- Build networks with the private sector, the international agencies, and local communities
- Maintain high levels of transparency, critical to build trust, support, and compliance (Naja and Hamadeh, 2020).

**Global:**

- Assure continuous flow of global trade, avoiding any trade restrictions would be beneficial to keep food and feed supplies, as well as those of agricultural inputs, from worsening local conditions already strained by COVID-19 response measures
- Reduce import tariffs and other restrictions on food commodities (Naja and Hamadeh, 2020).

**The role of micronutrients in supporting the immune response:**

Nutrition plays multiple roles in supporting the immune system. The diet provides:

- Fuels for the immune system to function
- Building blocks for the generation of RNA and DNA and for the production of proteins (antibodies, cytokines, receptors, acute phase proteins etc.) and new cells.
- Specific substrates for the production of immune-active metabolites (e.g. arginine as a substrate for nitric oxide).
- Regulators of immune cell metabolism (e.g. vitamin A, zinc).
- Nutrients with specific antibacterial or anti-viral functions (e.g. vitamin D, zinc).
- Regulators that protect the host from oxidative and inflammatory stress (e.g. vitamin C, vitamin E, zinc, selenium, longchain omega-3 fatty acids and many plant polyphenols).
- Substrates for the intestinal microbiota which in turn modulates the immune system (Philip *et al.*,2020 )

**Current recommendations about breastfeeding and COVID-19**

Human breastfeeding enhances both maternal and infant health, with a dynamic, bidirectional exchange between the mother and the infant, which constitutes the cornerstone of infant and child well-being. Despite concerns of transmission from the infected mother to the infant, global and national health stakeholders have so far univocally encouraged breastfeeding during the COVID-19 pandemic. The WHO the United Nations International Children's Emergency Fund (UNICEF), the Union of European Neonatal & Perinatal Societies (UENPS), and the US Centers for Disease Control and Prevention (CDC), all highlight the well-established overall short- and long-term immunological and psychosomatic benefits of breastfeeding for the

dyad. The current recommendations point out that there is, at present, insufficient evidence about the transmission of COVID-19 through breastfeeding. For this reason, strict measures of mother-infant separation and discontinuation of breastfeeding are to be avoided, regardless of a positive diagnosis and the intensity of symptoms, unless the severity is of such a level that the mother cannot take care of the infant, in which case, expressed, fresh, unpasteurized breast milk should be provided for the baby. In spite of these guidelines, there has considerable scepticism during the pandemic among the front-line healthcare professionals, gynecologists, midwives, and pediatricians, on whether they should encourage the infected mother to breast feed her baby (Vassilopoulou *et al.*, 2021).

### **Conclusion:**

The adverse impact of poor nutrition on the immune system, together with its inflammatory part, could also be one among the reasons for the upper risk of additional severe outcomes from infection with SARS-CoV-2 seen in older individuals and in those living with obesity. The role of fine nutrition in promoting a diverse gut microbiota, that successively supports the immune system mustn't be overlooked and it is vital to notice that the gut microbiota is also affected by ageing and by obesity. The importance of nutrition in supporting the immune response also applies to assuring good responses to vaccination. Thus, attention should be focussed on addressing the current nutritional inadequacies (obesity, general undernutrition, micronutrient deficiency) that are widespread within population in order to support the immune response. This is the major lesson from the study of nutrition and immunity that is relevant for the battle with SARSCoV-2 and the disease it causes, COVID-19, and for ensuring the population is better prepared for future pandemics.

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## IMPACT OF THE COVID-19 PANDEMIC ON TUBERCULOSIS MANAGEMENT

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### **Abstract:**

The beginning of a new era was marked by the outbreak of severe acute respiratory syndrome coronavirus 2, also known as SARS-CoV-2, which originated in a seafood market in Wuhan, China. It progressed into a pandemic, captured the attention of people all over the world, and emerged as the most significant event of the year 2020. The ongoing COVID-19 pandemic has had a significant impact on our day-to-day lives, captivating the implementation of non-pharmaceutical interventions in a number of nations and placing a burden on the public health services and healthcare systems of countries all over the world. These conditions are producing results that were not intended, such as an increase in the burden of disease caused by other conditions. COVID-19 surpassed tuberculosis in terms of daily deaths worldwide on April 1, 2020. COVID-19 as well as tuberculosis have a high potential for morbidity and mortality. In addition, the pandemic brought on by COVID-19 has a mutual and big impact on the management and therapy of tuberculosis. Within the scope of this chapter, we discuss tuberculosis and COVID-19, paying close attention to the disparities that exist between different countries.

**Keywords:** COVID-19, Tuberculosis, SARS-CoV-2, Pandemic.

### **Introduction:**

Since January 2020, a worldwide pandemic of coronavirus disease has been caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (COVID-19). This makes it harder to treat many other diseases, including tuberculosis (TB) (Hasan *et al.*, 2020). To lower the risk of spreading the disease, governments have taken immediate steps like making everyone wear face masks, closing public spaces, and putting limits on people's freedom of movement. To reduce the risk of nosocomial transmission, healthcare providers have reduced the number of outpatient visits to a bare minimum (Aznar *et al.*, 2021). The first wave of the SARS-CoV-2 infection has been brought under control as a result of these strategies; however, there is some cause for concern that we have paid a high price in the fight against other diseases (MJ *et al.*, 2020). All the cases of the COVID-19 are not fatal. Only fifty percent of patients are critically ill due to COVID-19 complications (i.e. such as cytokine storm, multiple organ dysfunction and

severe complications), while the overall mortality rate of COVID-19 is estimated to be around two percent. About twenty percent of individuals who are diagnosed with COVID-19 are hospitalized (Thierry *et al.*, 2020). Now symptoms of SARS-CoV-2 have been documented by the World Health Organization. Tuberculosis (TB) is one of the top ten leading causes of death worldwide, according to the World Health Organization. Furthermore, since 2015, tuberculosis has been the leading cause of death due to an infectious aetiology. In 2019, tuberculosis was estimated to be the cause of 1.2 million deaths among individuals who did not have HIV, and 251,000 deaths among HIV-positive patients (WHO epidemiological report., 2020). In recent decades, high-income countries have seen a significant reduction in the prevalence of tuberculosis (TB). Today, the disease is primarily diagnosed in immigrants who come from nations with a high TB incidence or in immunocompromised patients (Montalvá *et al.*, 2018). According to recent research, new cases could increase by 6.3 million over the next five years, while deaths could increase by 1.4 million as SARS-CoV-2 countermeasures prevent national TB programmes from establishing a consistent set of actions (Hogan *et al.*, 2020). At the start of the pandemic, one of the measures that were put in place was that anyone with mild COVID-19 symptoms (cough, fever) had to stay away from other people for 14 days, or longer if the symptoms didn't go away. Because the signs and symptoms of pulmonary tuberculosis are comparable to those that are associated with respiratory viral infections, such as COVID-19, the diagnosis of TB may be delayed as a result. Control measures that were implemented at the altitude of the first wave of the TB epidemic may have contributed to an increase in the number of TB infections. Because of a lack of access to medical care, tuberculosis may have been diagnosed late, increasing the risk of transmission. On the other hand, wearing a mask and being restricted in your movement may have a beneficial effect on tuberculosis transmission (Aznar *et al.*, 2021).

### **Comparison and contrast of COVID-19 and TB:**

Both COVID-19 and tuberculosis (TB) have the potential to put a strain on health care systems. Both are airborne diseases that can be easily spread from person to person; both can be diagnosed quickly (even though the application of quick testing is not yet available in all contexts); both cause stigma; and both require public responsiveness and support in order to be effectively prevented, diagnosed, and treated. Although tuberculosis (TB) and viral diseases can be reported separately, most countries still lack information on COVID-19, and information on TB lacks many clinical and immunological parameters that would aid in better understanding the interaction between the two diseases (Migliori *et al.*, 2020).

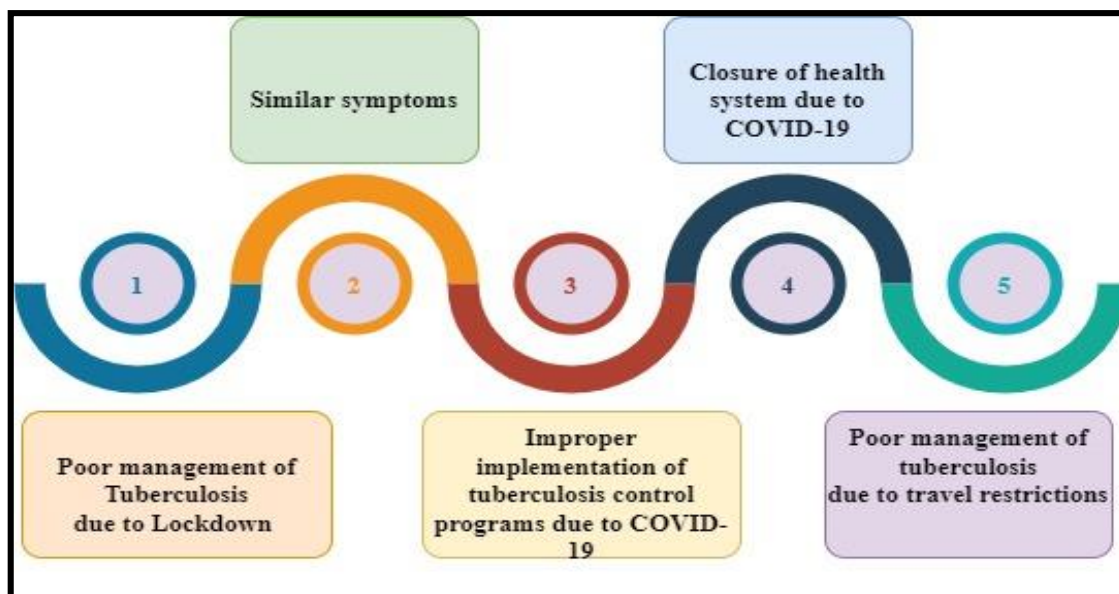


### **Interactions between COVID-19 and TB on a biological level:**

The virus that causes COVID-19 is SARS-CoV-2, a beta Coronaviridae member. SARS-CoV-1 and MERS-CoV (coronaviruses associated with the Middle Eastern respiratory syndrome) are also members of this group (Lu *et al.*, 2020). In comparison to the genome of SARS-CoV-1, the genome of SARS-CoV-2 has up to 80% of the similarities with MERS-CoV. To encounter humans, coronaviruses use angiotensin-converting enzyme 2 (ACE2) activated by the spike (S) glycoprotein of the coronavirus, which is found in all of the viruses studied (Coronaviridae Study Group., 2020; Millet *et al.*, 2014). In spite of the fact that both SARS-CoV-2 and Mycobacterium tuberculosis weaken the immune system, there is little evidence that they can co-infect the same person. COVID-19 co-infection may be linked to TB status, as shown by studies in China and India, as well as a study that looked at immune signatures linked to COVID-19 disease outcome and the spectral response of asymptomatic and symptomatic TB in COVID-19-infected people (Yasri *et al.*, 2020; Sheerin *et al.*, 2020). As a result of this study, the hazard of severe COVID-19 is increased because there are more circulating myeloid subpopulations, which are also present in the lungs of severe COVID-19 patients (Sheerin *et al.*, 2020). Even after the pandemic has ended, the use of immunosuppressive medications in critically ill COVID-19 patients may increase the risk of developing active tuberculosis due to reactivation or new M. tuberculosis infections. The reason for this is that immunosuppressive drugs have a negative effect on the body's ability to fight off infections (Aznar *et al.*, 2021).

### **The reasons behind the negative impact of the COVID-19 on TB management:**

Every part of global health has been hurt by the COVID-19 pandemic, but tuberculosis services have been damaged the most. Both tuberculosis (TB) and COVID-19 are contagious diseases that primarily affect the lungs. According to projections made by the WHO, nearly 10 million individuals will be diagnosed with tuberculosis in the year 2020. However, there were only 5.8 million cases that were diagnosed and reported, which is an 18 percent decrease from 2019. This drop was mostly in 16 countries (WHO Global tuberculosis report., 2021). India, Indonesia, the Philippines, and China, which are all in Asia, saw the biggest drops in the number of cases reported. All of these countries had big COVID-19 outbreaks and problems with their health care services (Pai *et al.*, 2022). It is predicted by WHO modelling that the pandemic's impact on the incidence and mortality of tuberculosis in 2020 will worsen in 2021 and beyond, in some cases across all 16 countries considered (WHO Global tuberculosis report., 2021). There are different reasons behind the bad impact of COVID-19 on TB management.



**Figure 1: Different reasons behind the negative impact of COVID-19 on TB management**

### **1. Similar symptoms:**

Because of its rapid spread across the globe, the COVID-19 pandemic has developed into a significant danger to public health and is having a significant impact not only on rates of morbidity and mortality but also on the global economy (Carolas *et al.*, 2021; Wang *et al.*, 2020). The symptoms of COVID-19 and TB are the same (Udwadia *et al.*, 2020). In the Civil Society Report on TB and COVID, 2021, it was recommended that people with symptoms of TB and COVID avoid other people but still spend time with close friends and family members who were unaware of the existence of COVID-19. About eighty percent of COVID-19 patients exhibited mild-moderate symptoms, whereas twenty percent exhibited severe disease (Liu *et al.*, 2020). The most prominent symptom of tuberculosis and COVID-19 is an ongoing cough. Tuberculosis symptoms other than bloody sputum include fever, hemoptysis, dyspnea, sweating at night, loss of appetite, and loss of weight (Wei *et al.*, 2020). There is a lack of data pertaining to the potential for disease or severe consequences in patients who are infected with both TB and COVID-19. Due to the fact that the two diseases share similar symptoms, the WHO's global TB control programmes were met with significant obstacles. These obstacles made TB diagnosis and treatment more difficult, and TB patients suffering from COVID-19 were neglected, which led to an increase in drug-resistant MTB strains. TB and COVID-19 also have some of the same risk factors, such as problems with the immune system, diabetes, poverty, overcrowding, and air pollution (Togun *et al.*, 2020). These similar symptoms are creating problems in the early diagnosis of Tuberculosis patients.

## **2. Closure of health system due to COVID-19:**

The World Health Organization's second round of a "pulse survey" reveals that significant disruptions are still occurring more than a year into the COVID-19 pandemic. About 90% of countries continue to report one or more interruptions to vital health services, indicating that there has been no significant change on a global scale since the first survey, which was conducted in the summer of 2020 (WHO COVID-19 report-2021). However, the magnitude and scope of disruptions have, on average, become less widespread within individual countries. In the year 2020, nations reported that, on average, approximately half of the essential health services were impacted by disruptions. However, they reported progress during the first three months of the year 2021, with slightly more than one-third of services currently being disrupted. When responding to COVID-19, countries must continue to make crucial decisions that may negatively impact access to care for other health issues (WHO COVID-19 report., 2021). Many hospitals have closed their outpatient departments (OPDs), making treatment more difficult for patients and medical staff to access. Government and private hospitals have also refused to participate in the Directly Observed Treatments, Short Courses (DOTS) programme, which may have contributed to the initial decline in DOTS registrations during the outbreak. As a result of fewer people signing up, fewer DOTS cases have been successfully litigated, resulting in a 23 percent drop in the average 6-month drop since March 2020 (India spend report., 2021).

## **3. Poor management of TB due to Lockdown and travel restrictions:**

The number of COVID-19 cases that have been reported in India has been steadily increasing ever since the nationwide lockdown was implemented on March 25, 2020. As a response to the widespread TB epidemic around the world, the United Nations has proposed the target of ending TB by the year 2030 as a Sustainable Development Goal. Despite the numerical strength, tuberculosis continues to be overshadowed on a global scale by HIV and malaria (Sustainable development report). At the same time, COVID-19 and its effect on TB consequences are major sources of concern right now (Wingfield *et al.*, 2020). In China, at the very beginning of the COVID-19 outbreak, the government immediately implemented a series of multifaceted public health interventions and strictly enforced them throughout the entire country. These included the suspension of all public transportation, the banning of all public gatherings, and the mandate that all residents remain inside their homes throughout the duration of the emergency. These interventions were effective in reducing the spread of COVID-19, which was a positive outcome (Tian *et al.*, 2020). On the one hand, these measures might make people less likely to seek medical attention and reduce the number of medical services that are available in hospitals. On the other hand, the measures will lessen the likelihood of tuberculosis being passed on in settings other than private residences.

#### **4. Improper implementation of TB control programs due to COVID-19:**

"To ensure that TB prevention and care are safeguarded in the context of COVID-19 and other emerging threats" was included as one of the 10 significant approvals for actions needed to fast-track growth towards global TB targets in the 2020 progress report on TB (Government of India TB report, 2021) that was issued by the United Nations secretary general. This description acknowledged the possibility of a shift in attention away from the ongoing crisis caused by tuberculosis (TB), and it included this recommendation. This was reaffirmed in the Global TB Report 2022 published by the WHO. The immediate impact of COVID-19 on health care systems around the world was catastrophic. Personnel were moved from TB to other/COVID-support services, and resources were reallocated as a result of sick leave and quarantining. In addition, employees had a more difficult time getting to work because of reduced access to public transportation and new restrictions on how they could move around (MS *et al.*, 2020). As a result of staff shortages, preventive therapy programmes such as the BCG vaccination were negatively impacted. For instance, in April 2020, one million fewer Indian children than usual received the BCG vaccination (India spend report, 2020). Additionally, the staff had a harder time getting in contact with TB patients who were receiving treatment. This was made worse by disruptions to supply chains, which meant that essential supplies of medication and diagnostic reagents started to run slow.

#### **Positive impact of COVID-19 on tuberculosis:**

Overall, the COVID-19 pandemic has resulted in a 26% decrease in the number of TB cases reported by the Government of India, compared to the same period last year. India was on the right track up until March 24. As a result of the national and state-specific lockdowns triggered by COVID-19, the number of reported cases of tuberculosis decreased by 60% and the difference between estimated cases and reported cases returned to its pre-lockdown level (Report of TBC India). During the pandemic, we maintained social distance and wore protective equipment such as masks and gloves, which not only assisted us in preventing the spread of the coronavirus but also tuberculosis. Coronavirus spreads in the same way that TB does, and the world has been able to stop COVID-19 by putting in place strict and effective standard operating procedures (SOPs). This is good news for the world because it shows how a disease that spreads through air droplets can be stopped (Ali *et al.*, 2021).

#### **Conclusion:**

COVID-19 poses a serious threat to the community and disrupts the medical healthcare systems. Patients either were unable to access medical services because of closures and travel

restrictions, or they hesitatingly sought treatment out of concern that they might be infected with COVID-19. Giving known TB patients more medicine and digital treatment support seems to be easier to do from a distance than diagnosing TB, which usually requires direct contact between people. Since then, the risk of getting TB has gone up a lot. Health resources had to be shifted during the COVID-19 pandemic because this disease was prioritised over other illnesses. This made it hard to diagnose and treat a number of health problems (Raymond *et al.*, 2020). It also meant that many outpatient activities and elective procedures had to be cancelled (Ng *et al.*, 2020). Furthermore, in many countries, all community-based health promotion and disease prevention programmes have been severely impacted (Abdela *et al.*, 2020). Because of the pandemic of COVID-19, the number of healthcare workers who typically treat patients with tuberculosis was decreased, according to Aznar and colleagues' findings. Organizational and operational changes were noted by the majority of TB units as well. Because governments have put restrictions on people (like telling them to stay at home) to stop the spread of SARS-CoV-2, the way care is given to patients has changed. As a result of these changes, patients have had to wait longer for care for acute emergencies, their chronic diseases have gotten worse, and they have been gone in psychological distresses. All of these things have had a big effect on their health (Hamadani *et al.*, 2020; Woolf *et al.*, 2020). The pandemic caused by COVID-19 has resulted in significant shifts in the treatment of tuberculosis, according to the findings of a study that was carried out by Aznar and colleagues. During the COVID-19 pandemic, patients with tuberculosis had long-lasting forms of the disease in their lungs. The increased rates of latent tuberculosis infection and active tuberculosis in children who were in close contact with patients and lived in the same household reflect increased rates of COVID-19 transmission in households. In the end, the COVID-19 pandemic has transformed the mode of people living around the world. We should use this chance to work together to end TB, which has been a problem for a long time and give people hope for a better future where new diseases won't be a problem.

**Acknowledgement:** Authors are thankful to Era University for providing the Research facilities

**Abbreviations:**

**SARS-CoV-2-** Severe acute respiratory syndrome coronavirus 2.

**COVID-19-** Coronavirus disease-2019;

**TB-** Tuberculosis.

**WHO-** World Health Organization;

**HIV-** Human immunodeficiency virus.

**MERS-CoV-** Middle East respiratory syndrome coronavirus.

**ACE2-** Angiotensin-converting enzyme-2;

**M. tuberculosis-** *Mycobacterium tuberculosis*;

**MTB-** Multi drug resistant tuberculosis.

**DOTS-** Direct Observed Treatments, Short Course;

**BCG vaccination-** Bacillus Calmette-Guérin vaccine.

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# COVID 19: Impact and Response Volume X

ISBN: 978-93-91768-46-1

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