

ISBN: 978-93-91768-52-2

# COVID 19: Impact and Response Volume VII

## Editors

**Dr. Shweta Rani**

**Dr. Vinod Kumari**

**Dr. Radhika P.C**

**Ms. Jaspreet Kaur**



# **COVID 19: Impact and Response**

## **Volume VII**

(ISBN: 978-93-91768-52-2)

### **Editors**

#### **Dr. Shweta Rani**

Department of Geography,  
Dyal Singh College,  
University of Delhi, Delhi

#### **Dr. Vinod Kumari**

Department of Applied Sciences  
and Humanities,  
Panipat Institute of Engineering and  
Technology, Panipat

#### **Dr. Radhika P. C.**

Department of Commerce,  
Sacred Heart College,  
Thevara, Kerala

#### **Ms. Jaspreet Kaur**

Chandigarh University,  
Mohali,  
Punjab



*Bhumi Publishing*

**ISBN: 978-93-91768-52-2**



**© Copyright reserved by the publishers**

Publication, Distribution and Promotion Rights reserved by Bhumi Publishing, Nigave Khalasa, Kolhapur  
Despite every effort, there may still be chances for some errors and omissions to have crept in  
inadvertently.

No part of this publication may be reproduced in any form or by any means, electronically, mechanically,  
by photocopying, recording or otherwise, without the prior permission of the publishers.

The views and results expressed in various articles are those of the authors and not of editors or  
publisher of the book.

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**

**COVID 19: Impact and Response Volume VII**

## **CONTENTS**

<b>Sr. No.</b>	<b>Book Chapter and Author(s)</b>	<b>Page no.</b>
1.	<b>INTELLECTUAL PROPERTY AND ACCESS TO COVID 19 VACCINES: A REVIEW OF RECENT LITERATURE</b> Qamar Uz Zaman and Nufazil Altaf	1 – 10
2.	<b>ROLE OF ELECTRONICS AND COMMUNICATION IN COVID -19 PANDEMIC</b> V. S. Gaikwad and A. U. Patil	11 – 20
3.	<b>CIRCULAR ECONOMY, HUMAN RESOURCE MANAGEMENT, AND INTERNATIONAL SECURITY IN A POST COVID-19 WORLD: STRENGTHENING THE SYNERGIES AND BRIDGING THE DIFFERENCES FOR A SAFER AND SUSTAINABLE WORLD</b> Lopamudra Ghosh	21 – 40
4.	<b>A STUDY ON EFFECT OF COVID-19 ON DIGITAL MARKETING</b> Elangbam Binodini Devi	41 – 43
5.	<b>EMOTIONAL ADJUSTMENT AND LEADERSHIP QUALITY OF HIGH SCHOOL STUDENTS</b> Aleena Johnson	44 – 50
6.	<b>COVID-19 IMPACT ON HEALTH</b> Humaira Badruzzama	51 – 52
7.	<b>CONSEQUENCES OF COVID-19 ON EMPLOYMENT AND LABOUR</b> Chandrakant W. Gajewad	53 – 55
8.	<b>COVID 19 – IMPACT AND RESPONSE</b> Sonali Dalvi	56 – 60
9.	<b>COVID-19 TOOMICRON - AN OVERVIEW</b> M. Meena and A. Vijayalakshmi	61 – 71
10.	<b>OMICRON VARIANT: A NEW CHAPTER IN THE COVID-19</b> Harsha D. Pardeshi, Varsha D. Jayaswal, Leena P. Shirsath, Harshal M. Bhamare and Sandip P. Patil	72 – 81

---

11.	<b>THE PSYCHOLOGICAL IMPACT OF COVID 19 AND POTENTIAL TREATMENTS</b>	82 – 93
	Ranjana Verma	
12.	<b>A DISCUSSION ON THE SUSTAINABLE TOURISM: ITS IMPORTANCE AND POTENTIALITIES WITH SPECIAL FOCUS ON ASSAM</b>	94 – 100
	Papul Das and Manashjyoti Mili	
13.	<b>CORONA VIRUS DISEASE 2019 - CURRENT SITUATION</b>	101 – 105
	Siddharth Chatse*, Shubhangi Deshmukh, Shruti Dake, Priyanka Manmode, Ankita Giramkar, Bhagyashali Pawar and Ganesh Tapdiya	
14.	<b>AIMS AND OBJECTIVES OF COOKING</b>	106 – 111
	Mandeep Dhiman	
15.	<b>IMPACT OF COVID-19 ON THE FOOD INDUSTRY</b>	112 – 115
	Lovely Singhal	
16.	<b>IMPACT OF COVID-19 PANDEMIC ON MENTAL HEALTH</b>	116 – 122
	Rumana Amanullah Khan	
17.	<b>COVID-19: A THREAT TO THE WELL-BEING OF SENIOR SECONDARY STUDENTS?</b>	123 – 132
	Meenu and Nirpendra Pratap Singh	

---

# INTELLECTUAL PROPERTY AND ACCESS TO COVID 19 VACCINES: A REVIEW OF RECENT LITERATURE

Qamar Uz Zaman and Nufazil Altaf\*

Department of Humanities,  
Social Sciences and Management, NIT Srinagar

\*Corresponding author E-mail: [nufazil.ahangar@nitsri.net](mailto:nufazil.ahangar@nitsri.net)

## Abstract:

The recently developed COVID-19 vaccines provided much relief against the pandemic that has hit hard the entire world in worst scenario since 1920. However the relief couldn't relieve the whole world equally. Because of limited capabilities of developing countries and the restrictive Intellectual Property regulations, the Global South became a victim and was unable to obtain vaccines. These rules exacerbate both local and global disparities, limiting countries' ability to fully realise the right to health for all of their populations. Consumption of vital medicines, such as the COVID vaccination, pushes poorer countries into deep debt and exacerbates national inequities that discriminate against the poor. This article explains how collaboration among southern states, as well as decolonial human rights and public health structure, might help to alleviate injustice to a larger extent. We envision a human rights and universal health law framework built on solidarity and broad cooperation, with funding directed toward long-term goals and access to vital medications free of patent restrictions. This would increase the number of domestic vaccines available and the global south's distribution capability.

**Keywords:** COVID-19; Vaccine; Inequalities; developing countries; India

## Introduction:

The COVID-19 pandemic is one of the biggest health crises world has witnessed since the last century. It has been stagnated the normalcy of living world. Although development of COVID vaccines has offered much needed relief to the millions of people but at the same time many countries have no access to them because of confined intellectual laws. Patents which are a form of intellectual property (IP) rights lead to production monopolies, thus contributing towards price enhancement and unequal access. Further High income countries (HICs) have reserved enough vaccine doses for their population; this magnifies the indication of power asymmetry in developing countries (Twohey *et al.*, 2021). This injustice is denominated as vaccine apartheid by World Health Organization (WHO). The pandemic generated more healthcare stress to the

low-income countries (Gross National Income (GNI) of USD <1,000) and medium-income countries (GNI of USD <12,000), whilst these countries were already suffering from the issues of unemployment, hunger, malnutrition, lack of healthcare and economic crisis making them highly vulnerable (Todres and Diaz, 2020). The mortality rates increased due to the lack of intensive care beds and ventilation system, raised concern among developing countries during the pandemic Godman (2020).

In South Asia, Afghanistan has only 2.8 physicians per 10,000 people, Bhutan 3.8, Bangladesh 5.3, and Nepal 6.5, a tenth of the number in other more advanced countries. Even India, which has one of the strongest health systems in this region, has only 7.8 physicians per 10,000 people. There were similar problems with health facilities and physical and human resources in many African countries and the situation was getting worse. For example, Malawi had only 25 critical care beds for 19 million people and many counties in Kenya have no functioning ventilators Kavanagh *et al.* (2020). Besides all these, the most concerning threat among developing countries was that of COVID vaccine.

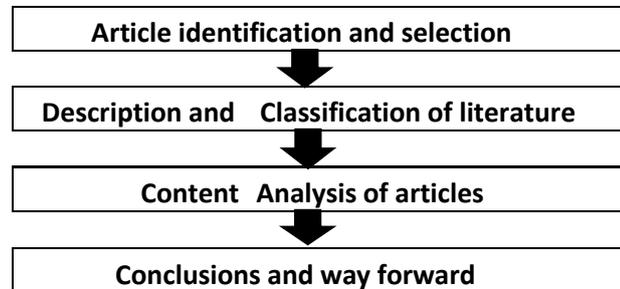
As researchers and scholars all over the globe have been advocating for complete human rights realisation, throughout the journey of pandemic they were emphasising over COVID-19 essential medicines and vaccine. The paper throws light over the literature related to developing nations and Indian work related to vaccine manufacturing and distribution. Specifically, in this article we will discuss how Intellectual rights enhance the problems offered by COVID-19 pandemic all over the developing nations and stop these countries from realizing the benefits of right to health. This in turn leads to the violation of states promise to human rights, its obligation to respect and provide right to health facilities.

The paper in end suggests the best possible way to rectify the worldwide inequalities to make equitable access to COVID vaccine all over the world. Our paper emphasises over decolonisation of health laws especially giving full access to the COVID vaccine rather than the ineffective charity in the form of COVAX. The decolonisation in global south i.e., developing countries is radical agenda that will provide equitable access to vaccine in the transparent and freeway. It will break the regressive hurdles provided by patent laws in the manufacturing and distribution practices. The COVID vaccine distribution is the biggest challenge to the health sector in the contemporary world and we have to ensure better conceptualisation and provide everyone benefits of Right to health in equitable way.

### **Research Methodology:**

A review of relevant literature is a critical part of this study. The research method used for this report is the systematic review of literature. The systematic review is a comprehensive,

critical and objective analysis of the current knowledge on the topic. It describes processes and procedures for collecting the relevant material related to COVID 19, impact of Patent and inequitable distribution of essential medicines particularly COVID vaccine in global south countries. The process of systematic literature review is given in Figure 1.



**Figure 1: Procedure for systematic literature review**

### **1. Article identification and selection:**

We started by searching published journal articles in various academic databases like Scopus, Web of Science and EBSCO. We choose these databases because they hold the academic might. The identification of articles began by a keyword search; especially I searched for articles on COVID 19, unequal access to vaccine, patent analysis. Following the key word screening, we set up delimiting boundaries for removing unwanted articles. The following delimiting was setup:

- Papers with full text available were considered
- Papers were collected for the period of 2019 to 2021

**Table 1: Article identification and selection**

<b>Database</b>	<b>Time</b>	<b>Total Papers</b>	<b>Selected</b>
Scopus	2019-2021	38	32
Web of Science	2019-2021	29	25
EBSCO	2019-2021	16	13
	Total	83	70

The total number of articles available for reading after applying the delimiting limits was 83. Following an examination of the articles, it was discovered that several had been indexed in more than one database. As a result, 13 articles were deleted to eliminate duplication, leaving me with 70 articles as the final sample. Table 1 shows the article identification and selection from the databases that were selected.

## 2. Analysis by country studied:

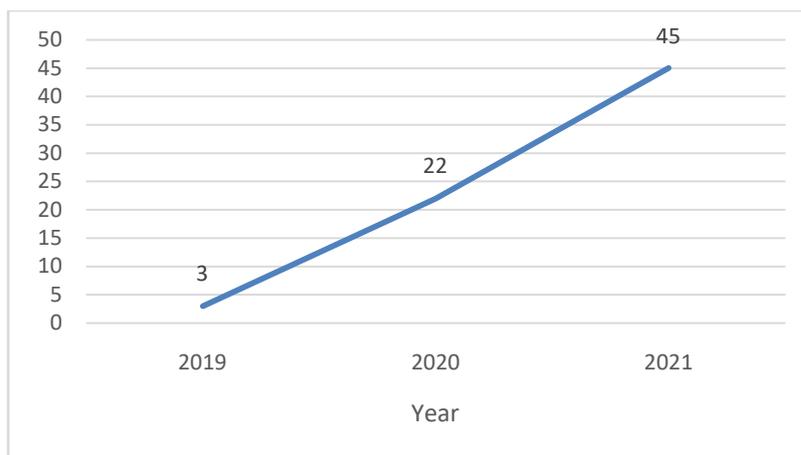
According to the figures in Table 2, a greater number of studies have used data from a single country (for instance 40 studies employed from data from developed countries and 30 studies employed sample from developing countries).The studies shows that the discourse of COVID 19 is taking roots in developed countries of the world and is spreading to most of the global south countries i.e., developing nations including India.

**Table 2: Articles by country studied**

<b>Developed Countries</b>	
<b>Country</b>	<b>Number of articles</b>
France	08
South Korea	07
USA	10
German	06
UK	04
Japan	05
Total No of articles	40
<b>Developing Countries</b>	
China	04
Brazil	06
India	07
Kenya	06
Malaysia	04
Bangladesh	03
Total No of articles	30

## 3. Analysis by year of publication:

Analysing the sample articles according to the year of publication, it was found that there was significant increase in the articles being published on issues related to study during the period 2019 to 2021 (see fig 2). The increase in number of published articles from 2020 may be due to the fact that there is an increase in the number of COVIDpatientsand patenting by manufacturing countries. So, there is sharp increase in number of articles published in these years.



**Figure 2: Articles published year wise**

#### **4. Analysis by journal of publication:**

The analysis by journal publication helps us to identify the journals that have been taken lead in disseminating information on COVID vaccines. The details of such analysis are presented in Table 3. It must be noted that a total of 15 journals contain the selected publications: however in Table 3 we have presented only the journals that have published at least 3 papers on the topic during 2019 to 2021. Among the journals the JAMA Health Forum and BMJ Global Health were the most prominent journals to publish on this topic. The number of articles 10 and 7 respectively.

**Table 4: List of Journals**

<b>Journals</b>	<b>No. of Articles</b>
Health Marketing Quarterly	03
PLoS medicine	04
BMJ Global Health	07
JAMA Health Forum	10
Bangladesh Journal of Medical Science	03
Vaccine	03
Bangladesh Journal of Medical Science	04
The Lancet	03

#### **Content analysis:**

Through content analysis of the selected articles we provide in depth details of the research on vaccine manufacturing and distribution inequalities particularly in developing nations.

## **1. Status of vaccine distribution in developing countries**

Vaccine manufacturing is a very highly complex problem requiring scientific and technical expertise, high levels of investment, strict regularity standards, quality control and quality assurance (Plotkin *et al.*, 2017). Developing countries lack all these accessories as well as finances to invest in the manufacturing of vaccine. Low- and middle-income countries (LMICs) have access to vaccine doses only enough to cover approximately one-third of their populations. So, they become dependent on the imports of materials and technologies from the other advanced countries. Another challenge to reach global population immunity is a lack of “vaccine preparedness” in many LMICs, meaning they are unprepared to begin large-scale efforts to get their population vaccinated (Stephenson, 2021). Researchers found that enough vaccine has been purchased to cover more than 80% of the global adult population. However, while analysing the potential vaccine coverage rates by income level, it was found that, high-income countries have ordered enough doses to vaccinate more than twice their adult populations (245%), whereas LMICs can cover only one – third of their population (Stephenson, 2021). Thereby, the global distribution of COVID-19 vaccine is largely directed by power disparities and inequities in financial and other resources drive the global distribution of COVID-19 vaccines, with substantially high-income countries contracting bilaterally with individual pharmaceutical companies for specific vaccines, leaving countries from the Global South countries with inequitable vaccine access. Bilateral agreements between countries and pharmaceutical firms jeopardise the COVAX initiative's effectiveness, regardless of whether it is done by Global North or Global South countries (Sekalala *et al.*, 2021). COVID-19 has thus put an emphasis on existing inequalities and on processes of colonialism (mind, body, knowledge, and power). It has created conditions for further inequities, with growing populist nationalism and isolationism, widening income disparities, and fractured systems of global cooperation among developed and developing countries (Abimbola *et al.*, 2021).

## **2. Impact of patent**

The intellectual property (IP) system appears to have compelled countries in the Global South to be reliant on the COVAX charity scheme and make them dependent on developed countries for purchasing COVID-19 vaccines. The African Union criticised the disparities emerging from IP law in a sense that this practise has repeated colonially deep-rooted power imbalances. With poorer countries lacking the convention to secure competitive prices and, as a result they pay significantly more than wealthier, developed countries. More broadly, countries in the Global South are compelled to participate in global trade systems that result in the exploitation of their own populations because of unfair global economic systems and intellectual property rules (Abimbola *et al.*, 2021; Sachs *et al.*, 2021). The high cost of vaccines for countries

from the Global South constitutes a large proportion of their health expenditure, and this comes at the expense of other health priorities (Abimbola *et al.*, 2021)

Providing vaccines to the more affluent sections of society strengthens power systems at the expense of marginalised groups. In South Africa, conservative non-governmental organisations (NGOs) closely associated with the interaction of the white minority and elite corporate interests filed a court challenge to procure private vaccine supplies, bypassing the government's nationwide mechanisms to ensure equitable vaccine access. However, due to criticism from human rights activists and the South African government, the lawsuit was eventually dropped. Kenya has likewise prioritised diplomats for COVID-19 immunisation over health workers, and Indonesia has proposed that the more productive' members of society be vaccinated first. Political leaders and their family and friends were surreptitiously vaccinated before the general population in other nations, such as Peru (Abimbola *et al.*, 2021).

### **3. India's initiative**

India is also facing like problems like many other developing nations. Although among the developing countries, India has a focus to steadfastly develop and distribute the COVID-19 vaccine. The Indian state machinery has already taken steps from the generation of intellectual property rights to the distribution of the vaccines to its citizens. It has multiplied the utilization of funds many times for research and development (R&D) for the COVID-19 vaccine via different departments such as Biotechnology, ICMR, IISC, Science and Technology institutes and the Council of Scientific and Industrial Research. These institutes provide on spot funds in support of the vaccine production initiatives. Also, a different kind of special fund has been initiated via "PM CARES Fund" which sums about 136 million USD to support vaccine development. This is a special fund proposed and initiated by the Indian Prime Minister to provide helping hand to the people crumpled by COVID-19. Pharmaceutical companies namely The Serum Institute of India, Bharat Biotech, and Zydus Cadila took no time to get engaged in vaccine production to get ready in preparations to face the challenges to come up with production of millions of dosages with the specified low-cost prices that low and middle-income countries can't afford. The Serum Institute of India is leading the giant vaccine manufacturers worldwide and has an agreement with eminent institution i.e., Oxford University to produce one billion doses of the vaccine.

India has a prestige and long history of low-cost vaccine production. Point of beauty is that India produced a very low-cost affordable COVID-19 vaccine with a cost of \$ 3 per dose for the local population that can be used in other developing countries as well (Chakraborty *et al.*, 2021). An alliance with Bill & Melinda Gates Foundation, will produce the low-cost vaccine and the work is underway. Two antiviral drugs such as Remdesivir and Favipiravir which provide

much needed relief have been given emergency approval by Indian state to treat vulnerable COVID-19 masses. These footsteps can be adopted by other nations in the developing South to control the next pandemic more effectively and efficiently.

India is in its zenith place in computer science, cloud computing, internet of things, artificial intelligence, and the development of new software. With this technological advantage, India has initiated an electronic Vaccine Intelligence Network (e-VIN) that will provide real-time information regarding the storage, usage, distribution and efficiency of vaccines in situ. This network will make easier access and distribution of the vaccines worldwide and it can be adopted in other developing countries with ease. India has a great track record of vaccine development and distribution policy (Chakraborty *et al.*, 2021). With all these specializations and expertise, India has set its glorious path clearly to vaccinate its 1.2 billion citizens and there is now question to ask why Prime Minister has recently promised the Southern developing nations that he will offer them the relaxing breath with cheaper vaccine production and distribution. From all this we can realise the unequal access can lead to drastic results of inequality and poverty.

### **Conclusion - The way forward:**

There are different ways through which we can mitigate the gap and have equitable access to vaccine. This section is dedicated to the same.

#### **1. Freed our intellect:**

Majority among us deliberately decolonize our minds. The accurate epicentre of colonization is not physical, but our minds (Todres and Diaz, 2020). Colonization was planned gradually to imbibe every facet of value judgement as rational human. Like Wa Thiong'o (1992) mentions in his book *Decolonizing the Mind*, "the colonial classroom became a tool of psychological conquest in Africa and beyond . . . and it made the conquest permanent (Dieleman *et al.* (2019). Majority of us are the results of such deliberate and ongoing colonial educational policies that are often backed by higher scholarship several of us have been privileged to achieve. It is the right time to reverse the colonial mentality process that several of us were brought through. For the same we need to build collective conscious and awareness of how colonial histories have moulded our thinking and continue to interfere in our day-to-day vision of life. We must unlearn the knowledge of western knowledge and research system in comparison to indigenous local knowledge systems in order to advance our health structure and make a positive change.

#### **2. Localising funding mechanism:**

More frequently overseas donors fund organisations based on their own interests and requirements. It wastes resources and research interest, and it undermines grantees' and funders'

faith in each other. Furthermore, when research is solely focused on LMICs, HICs hire and fund institutions and organisations in LMICs, giving HICs the upper hand (Van der Zee, 2015). For example, less than 2% of total humanitarian funding gets directly to local non-governmental organisations (NGOs) Approximately 80% of USAIDS contracts and funding go to American companies. Furthermore, US and HIC institutes receive 70% of NIH forgery funds (Saha and Pai, 2021). Thus LMIC governments and institutes must focus and invest more in their local healthcare delivery, research and training so that it reduces their dependence on HIC donors, universities and philanthropies. Enhancing and building quality research and teaching institutions in LMICs is critical to reduce reliance and dependence on HICs and to improve the overall quality, depth and relevance of scientific training and research.

### **3. Reimagining global health:**

The COVID 19 Pandemic which spread faster than Spanish flu devastated the whole world, effecting more than 1.25billion people killing over 2.7 million till March 2021. Further the pandemic has other effects in contact to it in the form of health issues impacting all the sectors of health care. So many years of progress in many areas of global health in the form of Tuberculosis, aids, and malaria have been washed away in a small span of one year (Abimbola *et al.*, 2021). It has pushed whole nations into the state of recession since worldwar 2nd. When the world is in economic shambles the health of people gets worse. The climate crisis furthers the problem which is not so far.

The question arises can global health be equitable in the world where a small number of people hold more than the wealth half of the world's population keep? The pandemic calls for more sustainable and equitable world that is holistic in nature, i.e., a new approach to global health, research, education and practise. The decolonised health system will diminish the unequal distribution of resources. It will lead to the holistic, equitable and inclusive world. Global south will remain no away from Global north in accessing vaccination for the deadly COVID disease.

### **References**

1. Abimbola, S., Asthana, S., Montenegro, C., Guinto, R. R., Jumbam, D. T., Louskieter, L., and Pai, M. (2021). Addressing power asymmetries in global health: Imperatives in the wake of the COVID-19 pandemic. *PLoS medicine*, 18(4), e1003604.
2. Biko, S. (2015). *I write what I like: Selected writings*. University of Chicago Press.
3. Chakraborty, C., & Agoramoorthy, G. (2020). India's cost-effective COVID-19 vaccine development initiatives. *Vaccine*, 38(50), 7883.

4. Chakraborty, C., Sharma, A. R., Bhattacharya, M., Lee, S. S., & Agoramoorthy, G. (2021). COVID-19 vaccine: Challenges in developing countries and India's initiatives. *Infez. Med*, 29, 165-166.
5. Dieleman, J. L., Micah, A. E., & Murray, C. J. (2019). Global health spending and development assistance for health. *Jama*, 321(21), 2073-2074.
6. Godman, B. (2020). Combating COVID-19: Lessons learnt particularly among developing countries and the implications. *Bangladesh Journal of Medical Science*, 103-S.
7. Kavanagh, M. M., Erondy, N. A., Tomori, O., Dzau, V. J., Okiro, E. A., Maleche, A., ... & Gostin, L. O. (2020). Access to lifesaving medical resources for African countries: COVID-19 testing and response, ethics, and politics. *The Lancet*, 395(10238), 1735-1738.
8. Plotkin, S., Robinson, J. M., Cunningham, G., Iqbal, R., & Larsen, S. (2017). The complexity and cost of vaccine manufacturing—an overview. *Vaccine*, 35(33), 4064-4071.
9. Sachs, J. D., Karim, S. A., Akin, L., Allen, J., Brosbøl, K., Barron, G. C., ... & Bartels, J. (2021). Priorities for the COVID-19 pandemic at the start of 2021: statement of the Lancet COVID-19 Commission. *The Lancet*, 397(10278), 947-950.
10. Saha, S., & Pai, M. (2021). Can COVID-19 innovations and systems help low-and middle-income countries to re-imagine healthcare delivery?. *Med*, 2(4), 369-373.
11. Sekalala, S., Forman, L., Hodgson, T., Mulumba, M., Namyalo-Ganafa, H., & Meier, B. M. (2021). Decolonising human rights: how intellectual property laws result in unequal access to the COVID-19 vaccine. *BMJ Global Health*, 6(7), e006169.
12. Stephenson, J. (2021, March). Unequal access to covid-19 vaccines leaves less-wealthy countries more vulnerable, poses threat to global immunity. In *JAMA Health Forum* (Vol. 2, No. 3, pp. e210505-e210505). American Medical Association.
13. Todres, J., & Diaz, A. (2021). COVID-19 and human trafficking—the amplified impact on vulnerable populations. *JAMA pediatrics*, 175(2), 123-124.
14. van der Zee, B. (2015). Less than 2% of humanitarian funds' go directly to local NGOs'. *Working in development*.
15. Wa Thiong'o, N. (1992). *Decolonising the mind: The politics of language in African literature*. East African Publishers.
16. <https://timesofindia.indiatimes.com/india/pm-cares-for-mi-grants-vaccines-and-ventilators-releases-3100-crore/articleshow/75728221.cms>
17. [www.ghsindex.org](http://www.ghsindex.org)
18. <https://www.fic.nih.gov/News/GlobalHealthMatters/july-august-2020/Pages/roger-glass-decolonizing-global-health.aspx>

## ROLE OF ELECTRONICS AND COMMUNICATION IN COVID-19 PANDEMIC

V. S. Gaikwad<sup>1</sup> and A. U. Patil\*<sup>2</sup>

<sup>1</sup>Department Electronics and Telecommunication Engineering, AISSMS's Polytechnic, Pune

<sup>2</sup>Rajaram College, Kolhapur

\*Corresponding author E-mail: [atula\\_jadhav@yahoo.co.in](mailto:atula_jadhav@yahoo.co.in)

### Abstract:

COVID-19 pandemic struck more than 210 countries all over the world placing states in a dangerous position. Overnight, companies, schools and households around the world transitioned to remote working, learning and socializing all of which require online access and increased use of video communications which increased internet usage by 70%. Electronics and Communication Engineering participate a extremely significant position in providing automated resolutions like infection supervision, incorporating sensor scheme in an android based smart phone for early recognition of infection indications like Aarogya setu app, sensor-related sanitizer dispenser, thermal scanner etc. so, utilisation of electronics components, incorporation with sensors, wifi connectivity and remote workability etc are the basic requirements for this pandemic. Therefore, our study highlights various technological solutions, which are of great help in controlling and monitoring disease spread and facing challenges caused by COVID-19.

### Introduction:

The World Health Organization (WHO) recognized COVID-19 as a pandemic and almost all countries in the world have been affected by it. Countries across the world are using wireless communication system to fight this global crisis. During the pandemic even when we are at home get connected to people around the world because of wireless communication technologies, also virtual education, and health care. Wireless communication has helped to collaborate the data and knowledge sharing to cope with the immediate impacts of the corona virus crisis and developing vaccines is possible. Electronics and Telecommunication have been played important role in keeping societies functioning during the COVID-19 global lockdown [1].

Examining the technology and associated systems that are helpful in the disease identification, limiting disease spread, and disease prevention is of principal importance. Different new age technologies can be adopted by the government as a primary response

strategy. This chapter mainly focuses on the use of drones, robots, bluetooth so utilisation of electronics components, incorporation with sensors, wifi connectivity, and remote workability etc.

**Drone:**

The use of satellite communication permits quarantined analysis with no danger of face-to-face touch, because of the infectious character of COVID19. Drones are now dominant equipments to visualize and communicate in complicated and infected areas. Drones are utilized for

- i. Surveillance & Lockdown enforcement for government authorities as well as security of infrastructure critical to national requirements
- ii. Public Broadcast
- iii. Monitoring Body Temperatures
- iv. Medical and Emergency Food Supplies Delivery
- v. Surveying & Mapping
- vi. Spraying disinfectants
- vii. Spraying fertilizers/pesticides
- viii. Monitoring oil and gas pipelines and infrastructure for detecting leakages, safety, and security and ensuring operational continuity
- ix. Monitoring industrial / office premises for safety and security [2].

**1. Drones for surveillance and screening**

Drones with camera as payload are being used mainly for surveillance other than hobbyist photography. They can be ideal for crowd surveillance due to their feature to provide current location bird eye or aerial view in no time. That is why many countries around the world are deploying drones for crowd surveillance especially during COVID-19 pandemic.

Surveillance drones added with temperature sensor can updated about body temperature of peoples in any community area. Countries including China and India have also adopted the drone technology for crowd surveillance. The drones deployed are equipped with surveillance cameras that can effectively monitor sensitive areas in the city and allow the police to handle any unwarranted situation promptly [3].

**2. Drones for deliveries of health supplies**

The use of drones for medical purposes brings many advantages, such as quick help, shortening the time of traveling to the patient, maximizing production, reducing costs and risks, and ensuring site safety and security, hence protecting the human workforce in times of a

pandemic. They can also be used for consumer-related missions like package delivery, as demonstrated by Amazon Prime Air, and critical deliveries of health supplies [4].



**Figure 1: Drones for deliveries of health supplies**



**Figure 2: Drones for Audio Broadcasting**

### **3. Drones for disinfection**

Drone technology is benefiting people where there is need to avoid direct contact with viruses and bacteria. Using drones, disinfectants can be sprayed in infected areas. These devices were already extremely practical in disinfecting agricultural areas and places difficult to access. Increase of demand has been observed for spraying drones in agricultural lands during last decade. The Spanish military has recently adopted the use of agricultural drones made by DJI, a leading Chinese drone manufacturer, to spray disinfecting chemicals over public spaces. On average, these spraying drones have a load capacity of 16 L and can disinfect one-tenth of a kilometer in an hour [5]

### **4. Audio broadcasting**

In India Flying Labs this application of drone has been used by many police chiefs. They are using drones with Loud speaker to carry out their public awareness efforts. Kenia is using drones with speakers to remind residents in the informal settlement of Kibera about the importance of hand-washing, physical distancing and the use of masks. They did this while distributing food in person [6].

### **Point-of-care devices**

Point-of-care devices are diagnostic devices that can be found in doctors' offices, hospitals, and mostly in patients' home. They are used to obtain diagnostic results while they are with the patient or close to the patient. Examples are devices used to test glucose and cholesterol levels, pregnancy testing, oximeter, tests for drugs of abuse, etc. The most prominent advantages of these devices include portability, convenience, and speed.



**Figure 3: Point-of-care devices**

### **Robotics technologies**

Owing to the rapid rate at which it spreads, its control and prevention has now become the greatest challenge. The Countries are following different strategies and policies to fight against COVID-19, Science of Robotics is another approach followed with an aim to improve patient care. 5G-enable medical robots can deliver drugs, check the patients' temperatures, and disinfect hospital rooms, dropping the contact of medical personnel to the virus, measuring vital signs, and assisting border controls. Such robots can make up for the shortage of personal protective equipment among doctors and nurses. White House Office of Science and Technology Policy and the National Science Foundation identified three broad areas where robotics can make a difference: clinical care (e.g., telemedicine and decontamination), logistics (e.g., delivery and handling of contaminated waste), and reconnaissance (e.g., monitoring compliance with voluntary quarantines) [8].

As there is the requirement for the minimization of human contact to reduce infection transmission rates in Covid -19 The Robots play an important role don't need masks, can be easily disinfected and of course, they don't get sick. They are monitoring patients, sanitizing hospitals, making deliveries, and helping frontline medical workers reduce their exposure to the virus, patrolling, and screening that aim to work alongside humans in efficiently reducing the burden of the pandemic while maintaining the quality of life. Therefore, currently available robotic technologies are essential for the further development and widespread use of robots to fight the pandemic [8-13].

• **Delivery:** Robots are deployed during COVID-19 pandemic to deliver medicines, medical equipment, and serving food in medical units to avoid contact with patients directly, hence giving relief to medical staff. A Kerala-based Indian startup named Asimov Robotics has developed a three-wheeled robot that can be used to perform all these tasks while assisting patients in isolation wards [9].

- **Social distancing:** Robots with cameras are helpful to keep check in public, if social distancing is being followed or not. And in Singapore, Spot robot dog, developed by Boston Dynamics, to search for social-distancing violators. Spot won't bark at them but will rather play a recorded message reminding park-goers to keep their distance [9].

- **Disinfecting:** A company named Xenex Disinfection Services, has developed an autonomous disinfection robot to help limit the number of hospital-acquired infections (HAIs). Xenex asserts that their UV LightStrike Germ-Zapping robots have the potential to efficiently obliterate all types of germs, including various types of viruses and bacteria. Xenex has reported witnessing an enormous surge in demand for its UV Germ-Zapping robot, especially from countries like Singapore, Japan, South Korea, and Italy [9].

A Danish robotics company, UVD Robots, has developed multiple disinfection robots to be delivered in hospitals around the world. To date, UVD Robots has delivered its robots to several provinces in China, several parts of Asia, and healthcare markets in Europe and the United States

- **Emotional support:** Several countries during pandemic undergo into strict lockdown for months .Extended isolation affects mental health of people in negative way. Particular robots are developed to share the emotions of people in isolation. These robots are virtually controlled by doctors to keep check of patient's health condition [10].

- **Medical procedures and surgeries:** The infectious nature of COVID-19 put many medical experts at added risk while performing regular actions and surgeries. As the virus easily spreads through mouth and droplets, the dentist, oncologist, and ENT surgeons stand at front of the danger zone. Although, elective surgical procedures have been postponed given the rapid spread of the COVID19 pandemic but still emergencies need special attention. Robotic surgeries are already being successfully done in different medical fields far before the pandemic crisis. Even with personal protective equipments (PPEs), physical distancing is the key to avoid virus spread. Consequently, during pandemic nonautonomous robots can prove to be safer alternative where close contact through patient's mouth and nasal cavity become necessity [11].

### **Patrolling and Screening**

Social restriction policies have been used to efficiently curb the spread of COVID-19 from asymptomatic carriers. As countries aim for exit strategies from lockdown to return to economic growth, the second wave of infections has presented as a possibility. To avoid this problem, worldwide many robotics companies have been developing existing robotic technology to enforce and facilitate social distancing policies. To restrict the spread of COVID-19 from carriers to others, early detection by means of screening is critical so that isolation protocols can

be put in place. This is another area where robotics are beneficial, as they can be designed to manage screening tests instead of medical personnel. Robots can't replace real human interaction, of course, but they can help people feel more connected at a time when meetings and other social activities are mostly on hold [12, 13].

### **Bluetooth:**

Tracers have been and are necessary to supervise the pandemic. Since the infection rate of COVID is extremely high, the contact tracing technology must be accurate and perform a quick search. Bluetooth is a wireless, low-power, and therefore short-distance, set of protocols used primarily to connect devices directly to each other in order to transfer data, such as video and audio. Bluetooth is the most suitable technology because it allows tracers to identify contacts within a range of 2-3 meters. Those contacts are considered by epidemiological models as a contact capable of passing the infection. Therefore, it helps to reduce the number of false contacts, and also allows them to be more efficient when establishing which people must self-quarantine explains Enrique Hernández Orallo.

These strict requirements make contact tracing based on smart phones quite inefficient to contain the infection propagation during the first outbreak of the virus. However, in the case of a new outbreak of the pandemic, with a percentage of the population immune, or in combination with other less strict measures that reduce the spread of the virus (such as social distancing), contact tracing based on smart phones could be extremely useful, even if only a part of the population - less than 60 percent - would be willing to use it.

Bluetooth LE has the capability of being both the least intrusive of tracking technologies (based on proximity between people choosing to use the app), whilst at the same time being highly intrusive in movement and interaction tracking (because its proximity is so small, and works as broadcast), and anonymization will necessarily cascade as the infection continues to spread, and uptake of apps increase. As with everything we're seeing in the age of Covid-19, we must be highly aware of the limitations of the choices we are offered. It is also important that technical and legal safeguards around the processing and storage of data — especially when those data can be used for anonymization — are not bypassed or ignored in the rush to deploy technology, however well-meaning or indeed vital it may be. It's also important to ensure that there exists a genuine need to use location tracking that is supported by the scientific evidence, given contact tracing is more effective at earlier stages of tackling pandemics. Balancing the risks of location tracking also involves consideration of whether the apps will be effective given the down-sides.[14,15]



a) Cleaning Robot from SoftBank Robotics.<sup>16</sup> (b) XDBot by Nanyang Technological University.<sup>17</sup> (c) Tank-style, remote-controlled disinfecting robot.<sup>18</sup> (d) Portable hand sanitizer robot from Zhen Rrobotics Corp.<sup>19</sup> (e) Aerosol Disinfection Robot from Shanghai TMiRob Technology.<sup>20</sup> (f) UV-C light Disinfection Robot by UVD Robots.<sup>21</sup> (g) Intelligent Disinfection Robot by TMiRob.<sup>22</sup> (h) UV light robot by Xenex Disinfection Services.<sup>23</sup> (i) Autonomous Cleaning Robot by Seoul National University Hospital.<sup>24</sup> (j) Pudu Technology's autonomous service delivery robot.<sup>25</sup> (k) JD Logistics' large self-driving delivery vehicle.<sup>26</sup> (l) White Rhino Auto Company's large self-driving delivery vehicle.<sup>27</sup> (m) Meituan's large self-driving delivery vehicle.<sup>28</sup> (n) ZhenRobotics' RoboPony.<sup>29</sup> (o) Quarantine watch robot.<sup>30</sup> (p) Boston Dynamics' Spot being used in Bishan-Ang Mo Kio Park, Singapore.<sup>31</sup> (q) Smart patrol robot being used in Guiyang Airport, China.<sup>32</sup> (r) Temi robots,<sup>33</sup> (s) AIMBOT, and (t) Cruzr robots from UBTech.<sup>34</sup> (u) Atris outdoor screening and patrolling robot from UBTech.<sup>36</sup>

## Conclusion:

The Covid-19 pandemic has severely affected every aspect of our life. It has changed peoples' way of viewing different things. The Countries are following different strategies and policies to fight against COVID-19, science of Robotics is another approach followed with an aim to improve patient care.

Bluetooth and GPS are being deployed to look out for disease carriers in the surroundings. This rapid review provides role of electronics and communication during COVID-19 pandemic depending the use of the Telecommunication technology. It suggest the major finding i)use of wireless communication and artificial intelligence in healthcare and day to day life during the COVID-19 pandemic. Drones have changed the entire concept of how things are delivered. Drones, and robots have joined hands together for the progress of telemedicine field, which can be used for spreading inadequate clinical resources across a wide geographic area. It improves quality of care and access during the ongoing pandemic. All these technologies are on the way of maturing to help us fight against the deadliest pandemics.

## References:

1. <https://adamasuniversity.ac.in/responsibility-of-electronics-and-communication-engineers-in-fight-against-covid19-epidemic/>
2. <https://ficci.in/SEDocument/20500/COVID-19-Drones.pdf>
3. <https://www.geospatialworld.net/blogs/how-drones-are-being-used-to-combat-covid-19>
4. <https://www.unicef.org/supply/media/5286/file/%20Rapid-guidance-how-can-drones-help-in-COVID-19-response.pdf>
5. <https://www.mapfre.com/en/insights/innovation/drones-fighting-pandemic/>
6. <https://blog.werobotics.org/2020/04/09/drones-coronavirus-no-sense/>
7. <https://www.weforum.org/agenda/2020/05/robots-coronavirus-crisis/>
8. <https://spectrum.ieee.org/how-robots-became-essential-workers-in-the-covid19-response>
9. <https://www.cnbc.com/2020/11/11/people-with-depression-anxiety-want-to-reveal-pain-to-a-robot.html>
10. <https://www.nature.com/articles/s42256-020-00238-2#article-info>
11. <https://analyticsindiamag.com/countries-are-deploying-more-robots-for-police-patrolling-how/>
12. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8027549/>
13. <https://news.mit.edu/2020/bluetooth-covid-19-contact-tracing-0409>
14. <https://www.bluetooth.com/learn-about-bluetooth/use-cases/covid/>

15. World Health Organization WHO consultation on priority public health interventions before and during an influenza pandemic, Geneva 16-18 March 2004.
16. Weekly Epidemiological Record= Relevé épidémiologique hebdomadaire. 2004;79(11):107–108
17. World Health Organization Vaccines against influenza WHO position paper— November. Weekly Epidemiological Record= Relevé épidémiologique hebdomadaire. 2012;87(47):461–476.
18. Lee I., Lee K. The Internet of Things (IoT): applications, investments, and challenges for enterprises. *Business Horizons*. 2015;58(4):431–440.
19. Vishnu S., S.J. Ramson, R. Jegan, March. Internet of medical things (IoMT)-An overview. In 2020 5th International Conference on Devices, Circuits and Systems (ICDCS). IEEE, 2020, pp. 101–104.
20. Vegesna A., Tran M., Angelaccio M., Arcona S. Remote patient monitoring via non-invasive digital technologies: a systematic review. *Telemed. e-Health*. 2017;23(1):3–17.
21. <https://meddevops.blog/2019/10/09/the-future-of-remote-patient-monitoring-is-in-artificial-intelligence/>
22. <https://thasso.com/abilify-mycite-the-first-digital-pill-where-does-all-that-silicon-go/> .
23. Yang T., Gentile M., Shen C.F., Cheng C.M. Combining point-of-care diagnostics and internet of medical things (IoMT) to combat the COVID-19 pandemic. *Diagnostics (Basel)* 2020;10(4):224.
24. Mohammed M.N., Syamsudin H., Al-Zubaidi S., A.K.S.F R.R., Yusuf E. Novel COVID-19 detection and diagnosis system using IOT based smart helmet. *Int. J. Psychosoc. Rehabil.* 2020;24(7)
25. <https://percepto.co/what-are-the-differences-between-uav-uas-and-autonomous-drones/>
26. <https://isnblog.ethz.ch/security/civilian-drones-fixing-an-image-problem>
27. Saleh M., N.Z. Jhanjhi, A. Abdullah, February. Proposing a privacy protection model in case of civilian drone. In 2020 22nd International Conference on Advanced Communication Technology (ICACT) . IEEE, 2020, pp. 596–602.
28. Clarke R. Understanding the drone epidemic. *Comput. Law Security Rev.* 2014;30(3):230–246.
29. <https://www.nanalyze.com/2019/12/autonomous-drone-flights/>
30. <https://insideunmannedsystems.com/unintended-consequences-coronavirus-spurs-perceptos-drone-in-a-box-surveillance-solution/>
31. Gascuena D., Drones to stop the covid-19 epidemic, News BBVA, Apr. 2020. <https://www.bbva.com/en/drones-to-stop-the-covid-19-epidemic/>

32. Sharma M., How drones are being used to combat COVID19, Geospatial World, Apr. 2020. Available from: <https://www.geospatialworld.net/blogs/how-drones-are-being-usedto-comb%at-covid-19/> .
33. Pan C., Spain's military uses DJI agricultural drones to spray disinfectant in fight against Covid-19, South China Morning Post Apr. 2020. <https://www.scmp.com/tech/gear/article/3077945/spains-military-uses-dji-agricultural-drones-spray-disinfectant-fight> .
34. Yang G. Z., B.J. Nelson, R.R.Murphy, H.Choset, H.Christensen, S.H.Collins, et al., Combating COVID-19—The role of robotics in managing public health and infectious diseases, 2020.
35. UVD Robots are fighting Coronavirus. (Feb. 2020). China Buys Danish Robots to Fight Coronavirus. Available from: <http://www.uvdrobots.com/fight-coronavirus/>
36. Sharma A., Bhardwaj R. Robotic surgery in otolaryngology during the Covid-19 pandemic: a safer approach? Indian J. Otolaryngol. Head Neck Surg. 2020:1–4.
37. <https://www.merriam-webster.com/dictionary/robot/>
38. Dawkins T., How COVID-19 could open the door for driverless deliveries, World Economic Forum, Apr. 2020. <https://www.weforum.org/agenda/2020/04/how-covid-19-could-openthe-door%-for-driverless-deliveries/> .
39. Arthur C., R. Shuhui. In China, Robot Delivery Vehicles Deployed to Help With COVID-19 Emergency. UNIDO, Apr. 2020. Available from: <https://www.unido.org/stories/china-robot-delivery-vehiclesdeployed-he%lp-covid-19-emergency/>
40. Xu Q., Xu A., Huang Z., Li C. World Congress on Medical Physics and Biomedical Engineering 2006. Springer; Berlin, Heidelberg: 2007. A potential application of bluetooth in the medical field—HOLTER applied by the Bluetooth Technology; pp. 362–365.
41. GPS.gov. The Global Positioning System. Available from: <https://www.gps.gov/systems/gps/>
42. Bhajantri R., Bhapkar P., Chaugule P., Patil V., Kotkar M. Patient health care and ambulance tracking system. J. Anal. Comput. 2019;12(4):1–10.
43. Karkar A., Smart ambulance system for highlighting emergency-routes. In 2019 Third World Conference on Smart Trends in Systems Security and Sustainability (WorldS4), IEEE, 2019, pp. 255–259.
44. Ferretti L., Wymant C., Kendall M., Zhao L., Nurtay A., Abeler-Dörner L. Quantifying SARS-CoV-2 transmission suggests epidemic control with digital contact tracing. Science. 2020;368(6491)

**CIRCULAR ECONOMY, HUMAN RESOURCE MANAGEMENT, AND  
INTERNATIONAL SECURITY IN A POST COVID-19 WORLD:  
STRENGTHENING THE SYNERGIES AND BRIDGING THE DIFFERENCES  
FOR A SAFER AND SUSTAINABLE WORLD**

**Lopamudra Ghosh**

Kabi Joydeb Mahavidyalaya affiliated to the University of Burdwan,  
World Forum for Welfare Geopolitics (WFWG);

World Youth Parliament for Water (WYPW); HundrED, Helsinki, Finland;

The Inked Perceptions (TIP) Community; Step Up Group

Corresponding author E-mail: [lopamudraghosh42@gmail.com](mailto:lopamudraghosh42@gmail.com)

**Abstract:**

Circular Economy (CE) is a sustainable development strategy that is being proposed to tackle urgent problems of environmental degradation and resource scarcity. CE's 3R principles are to reduce, reuse and recycle materials. The principles account for a circular system where all materials are recycled, all energy is derived from renewables; activities support and rebuild the ecosystem and support human health and a healthy society and resources are used to generate value. This research is a review of the rapidly growing literature on CE covering its concept and current practices and assessing its implementation. The review also serves as an assessment of the design, implementation and effectiveness of CE related policies. It first presents the concept of CE and compares it with the current linear economy of taking materials, producing goods and disposing waste. It explains why it is imperative to move away from a linear economy towards regenerative sustainable industrial development with a closed loop. The paper then introduces current practices that have been introduced and discusses standards for the assessment of CE's development and performance. The main focus here is on providing a summary of the data analysis of key CE indicators to give a picture of CE practices. Third, based on an analysis of literature, the paper identifies the underlying problems and challenges to CE in an entrepreneurial perspective. Finally, the research provides a conclusion on CE's current development and gives policy suggestions for its future development as part of an entrepreneurial and innovative international level development strategy.

**JEL Classification:** E01, F18, F64, H23, O44, Q50, Q53, Q55, Q58, R11.

**Keywords:** Circular Economy; Entrepreneurial Strategy; Environmental Policy; Human Resource Management; International Development Strategy; International Security; Sustainable Development Strategy.

## **Introduction:**

Environment and economics are closely inter-related. However, most economics textbooks pay little attention to the environment and in the best-case scenario, a chapter illustrating how the economic theory can be applied to diverse environmental issues is added to them. This approach obscures the fundamental ways in which environment affects economic thinking. Circular economy (CE) with its 3R principles of reducing, reusing and recycling material clearly illustrates the strong linkages between the environment and economics. In an effort to breach this gap, the concept of circular economy was first introduced by Pearce and Turner. In their *Economics of Natural Resources and the Environment* (1990) they outline the theories within and between economics of natural resources and their interactions and implications for the concept of how economics works. The authors elaborate on environment both as an input and as a receiver of waste. They illustrate that ignoring the environment means ignoring the economy as this is a linear or open-ended system without an in-built system for recycling.

The number of resources used in production and consumption by the first law of thermodynamics cannot be destroyed and are equal to waste that ends up in the environmental system. Kenneth Boulding's 1966 essay *The Economics of Coming Spaceship Earth* contemplates the earth as a closed economic system in which the economy and the environment are characterized by a circular relationship where everything is input into everything else. The model of economics and environmental relation in Pearce and Turner (1990) is further extended by Boulding to account for the natural environment's assimilative waste capacity, disposal of non-recyclable resources and non-renewable or exhaustible resources. The search is to find out what needs to occur for economics and the environment to coexist in equilibrium. Leontief (1928, 1991 translation) in *The Economy as a Circular Flow* refers to the economic theory's main focus on price theory and neglecting the material point of view. He suggests re-establishing the correct relationship between the material and value points of view and arranging the two views such that the material approach is of considerable importance (also see Samuelson, 1991).

Rapid environmental deterioration around the world has led to the development of policies for reducing the negative impacts of production and consumption on the environment. A number of countries have introduced acts and laws for establishing the recycling principle of a circular economy. Germany is the forerunner in this as it started implementing CE in 1996. This was accompanied by the enactment of the law 'Closed Substance Cycle and Waste Management Act'. The law provides a framework for implementing closed cycle waste management and ensures environmentally compatible waste disposal and assimilative waste capacity. Another example of an attempt to start implementing CE is in Japan. The Government of Japan has developed a comprehensive legal framework for the country's move towards a recycling-based

society (METI, 2004; Morioka *et al.*, 2005). ‘The Basic Law for Establishing a Recycling-Based Society’, which come into force in 2002 provides quantitative targets for recycling and long-term dematerialization of Japanese society (Van Berkel *et al.*, 2009).

China is the third country that is engaged in serious efforts to implement CE on a large scale. However, in contrast to the German and Japanese cases, the Chinese government for various reasons like retaining competitiveness, intends to initially introduce the CE framework on a smaller scale through a number of pilot studies so that it has a better basis for assessing its large scale and full coverage in the longer run. This policy is similar to economic liberalization which started with costal free economic zones.

Several other countries like Sweden have for a long time successively introduced various incentive programs. They have also tried to facilitate optimal conditions for gradual and effective increase in the rate of recycling through public education. The policy has been successful and to the satisfaction of policymakers and environmentalists. Sweden, Germany and several other European countries have managed to incorporate green political parties in their political systems and processes of decision making which have both encouraged and eased a transfer towards a circular economy.

Another significant effort by the European Commission (2012) is the *European Resource Efficiency Platform (EREP) – Manifesto and Policy Recommendations*. The manifesto calls on business, labour and civil society leaders to support resource efficiency and move to a circular economy. It provides an action plan for transitioning to a resource efficient Europe and ultimately becoming regenerative towards CE. The common feature in these countries’ CE policies is preventing further environmental deterioration and conserving scarce resources through effective use of renewable energy and managing production and consumption wastes, especially through integrated solid waste management.

### **Literature review, research gap and research hypothesis**

Literature on the evaluation of CE is not yet well developed and gained experience from the four Chinese pilot cities provides limited guidelines on CE implementation at the macro level. Various methodologies of index numbers are used to aggregate individual indicators into composite and multidimensional indices to measure CE’s performance in various recognized dimensions and levels. As in other areas of development research the issue of an optimal weighting in aggregation of the indicators is far from being resolved. Other challenges include lack of reliable information, shortage of advanced environmental technology, enforcement of legislations, weak economic incentives, poor management and lack of public awareness. This review attempted to define standardized quantitative measurements and goals so as to provide a clear picture of where China and some European countries stand in the CE adaptation process.

We suggest the deployment of a range of policies to overcome these challenges and provide a guide for designing an optimal future direction of the development strategy to prevent a reversion to old practices and standards. An assessment of China's 12<sup>th</sup> five-year plan (2011-15) when data becomes available will help shed light on the old and new challenges which will possibly require a changed set of policies.

The limited existing evidence on the implementation of the circular economy in practice in China and elsewhere suggests that consensus has been reached on the concept of CE which in many ways resonates with the concept of industrial ecology. This concept emphasizes the benefits of reusing and recycling residual waste materials. It includes energy, water, different by-products as well as knowledge (Jacobsen, 2006; Yuan *et al.*, 2006; Park *et al.*, 2010). Industrial symbiosis is an extended concept which states that the overall benefits come from integrated economic and environmental aspects. According to Anderson (1994) economic benefits are attributed to firms' agglomeration attracting pools of common production factors such as capital, labour, energy, materials and infrastructure reducing unit costs and raising factor productivity. Other economic benefits resulting from firms' proximity include gains from transportation and transaction costs and technology spillovers between firms (Coe *et al.*, 2004). The environmental benefits arise from reduced discharged waste and reduced use of virgin materials (Andersen, 2007). A third dimension – social -- is added to the economic and environmental aspects by Zhu (2005). According to him an ecological economy is required to bring about a fundamental change in the traditional way of open and linear development. The three aspects jointly promote competitiveness through efficient resource allocation and higher productivity by redesigning industrial structures reducing negative externalities and finally by improving the overall well-being in society.

### **Research objective and research methodology**

This research is a review of the rapidly growing literature on CE covering its concept and current practices as also assessing its implementation. The review serves as an assessment of the design, implementation and effectiveness of CE's policy and practices. It is conducted in a number of steps. First, the CE concept is presented and compared with our current linear economy where one uses materials, producing goods and disposing waste and explains why it is imperative to move towards a regenerative sustainable industrial development with a closed loop. Second, current CE practices are introduced and the standards for the assessment of its development and performance are discussed. Third, based on an analysis of literature, the underlying problems and challenges in an entrepreneurial perspective are analysed. Finally, the research provides a conclusion to CE's development and makes some policy suggestions for future improvements, adaptations and further development as part of an entrepreneurial and innovative national level development strategy.

The rest of this research paper is organized as follows. In the next section, the importance of CE as a development strategy is discussed. Current CE practices are presented in the section dealing with the research findings. An assessment of CE and national indicators are classified which leads to the development of a circular economy development index system. The findings of this research highlight the development of a circular economy in pilot studies while the implications of this research focus on the challenges and barriers in the successful development of a circular economy. The discussion is extended to the future of CE as an entrepreneurial and innovative sustainable international level development strategy in the following section. The last section gives policy recommendations and conclusions.

### **Findings of the research:**

#### **Impact of circular economy and human resource management on sustainable development and international security**

Zhou (2006) finds developing CE an urgent and long-term strategic task for China to build a resource-saving and environment-friendly society. The timing is seen as optimal as China is in an accelerating stage of urbanization and industrialization. The country has invested significant resources and efforts in developing CE with the objective of promoting Eco-Industrial Development (EID). By using the coexistence of a healthy economy and environmental health such a development attempts to integrate environmental management so as to meet environmental, economic and community development goals (Chertow, 2000). Discussing CE's development in China, Geng and Duberstein (2008a) describe the measures being implemented for its long-term promotion. These include formulating objectives, legislations, policies and incentive measures for China to leapfrog its way from the current environmentally damaging development to a more sustainable path. They identify a series of barriers and challenges to CE's implementation and draw conclusions from these. Geng *et al.* (2010a) evaluate the applicability and feasibility of the eco-industrial park standard indicators.

In a review of CE as a development strategy in China which aims at improving efficiency of material and energy use, reducing CO<sub>2</sub> emissions, promoting enterprises' competitiveness and removing green barriers in international trade, Suet *al.* (2013) evaluate the implementation of the strategy in a number of pilot areas. The rich Chinese literature on CE's practical implementation is seen as a way of tackling the urgent problems of environmental degradation and resource scarcity in the country. They study and compare the performance of pilot cities Beijing, Shanghai, Tianjin and Dalian. There is evidence of positive changes but the authors are not sure if the improvement trends will hold. They identify the underlying problems and challenges and offer conclusions regarding CE's current and future developments. The current practices are

carried out at the micro, meso and macro levels and cover production, consumption, waste and water recycling management. Evidence suggests that CE presents a unique policy strategy for avoiding resource depletion, energy conservation, waste reduction, land management and integrated water resources management.

The challenges include lack of clear, standardized quantitative measurements and goals, data quality, shortage of advanced technology, poor enforcement of legislations, weak economic incentives, poor leadership and management and lack of public awareness. Deploying a wider range of policies and economic incentives is required to overcome these challenges so that a successful CE can be implemented as a development strategy.

Implementing CE based on the 3R principles (of material use reduction, reuse and recycling) is embedded in both production and consumption as the flow of materials and energy penetrates both these areas. Zhu and Qiu (2007) elaborate on the principles and flows. They see CE as a sustainable economic growth model which aims at effective use and circulation as the principle. It also considers low demand and consumption, low emissions and high materials, water and energy use efficiency in production and maximizes uses of renewable resources as core characteristics. Reduction refers to minimizing inputs of primary energy and raw materials which can be achieved through improvements in production efficiency. Reuse suggests using by-products and waste from one stage of the production in another stage. This includes the use of products to their maximum use capacity. Finally, recycling of used materials substitutes consumption of virgin materials (see also Zhu and Qiu, 2008 and Zhu *et al.*, 2010). In another related research Li *et al.* (2011) schematically illustrate the agricultural development of CE and compare it with traditional agriculture. The important theoretical models of China's agricultural circulation economy practice are: multi-industry, ecological protection type and agricultural waste recycling development models. The main differences in these are in the conservation of resources and recycling. The authors recommend implementing the agro-circular economy development models accounting for these modes in the context of the Erhai Lake Basin.

China's special environmental circumstances have led to the government sparing no efforts to push CE as an economic development strategy into a nation level and full-scale practice to mitigate environmental challenges. The 12<sup>th</sup> five-year plan (2011-15) for the nation's economic and social development is evidence of the government's determination to continuously implement and further develop CE. Motivation for this comes from a number of reasons attributed to the problems of land degradation, expansion of desertification, deforestation, water depletion, air pollution, loss of biodiversity and waste generation. First, China is facing great environmental challenges due to large scale and rapid industrialization and urbanization which combine with lack of strong environmental regulations and oversight. Chinese national statistics suggest a 7.5 per cent annual growth rate in CO<sub>2</sub> emissions (Guan *et al.*, 2012). The emission

rate which is lower than the rate of economic growth is a result of heavy reliance on energy-intensive industries and coal as the primary energy source.

The second reason for continuously implementing and further developing CE is severe shortage of resources and energy to meet growing demands and high rate of economic growth so that a pathway to sustainable development can be found (Li *et al.*, 2010). CE is an alternative way of reducing the large gap in resource requirements and supply shortages in relation to the population and industry structure (Vermander, 2008). The boom in economic growth and surge in the output of heavy and energy intensive industries have implied a doubling of energy consumption over the last decade (Guan *et al.*, 2012). Energy is mainly sourced from non-renewable polluting sources. Dawud (2014a) suggests use of demand response to reduce the consumption of electricity.

The third strong argument for CE as a development strategy in general and for China in particular is the recent decade of strict production and environmental standards, regulations in international trade and tendencies towards implementation of higher labour standards. These are called 'green barriers' which are expected to hurt developing countries' competitiveness and export earnings. Implementation of these standards requires acquisition of advanced technologies and implementation of green reforms in production and transportation. In this regard Wang and Liu (2007) view CE as providing a fundamental solution for removing green barriers and for China to gain enhanced national competitiveness in its international trade relations.

The fourth reason for investing in a new development strategy is that CE strengthens national security because it promotes alternative primary energy resources and because of its saving and efficiency in the use of materials. The effects are reflected in sustainable energy and material supplies. In addition, positive environmental effects help improve the health and overall well-being in society and advance knowledge, technology and modernization (Heck, 2006). The positive effects spill over national borders and impact global well-being.

This discussion indicates that urgent environmental problems, resource shortages and scarcity and potential strong competitiveness in international trade and overall well-being benefits of CE in the short and long-run for a country like China support the new national level development strategy. The strategy which aims at changing and saving materials and energy use induces radical changes in education, technology and regulations. The strategy has been implemented in a number of pilot study areas. Several studies provide explanations about the concept and its practical implementations. However, there is also evidence of CE's limited success. Designing effective policies, evaluating their effectiveness and creating measurements and evaluation standards are among the areas which require intensified interdisciplinary

research. A chronologic summary of selected empirical studies on CE, sustainable development and economic growth is also provided in this research paper.

## **Current trends in the implementation of circular economy and human resource management practices in key sectors of international security: some case studies**

### **China: a key implementor**

China is the only country that has developed the concept of CE and has practiced it as a development strategy on a large scale. This explains the reason for the emphasis that is placed on the case of China in investigating current CE practices. Ideally, successful implementation of the CE policy must take place simultaneously at all three levels of aggregation: micro, meso and macro. This is emphasized in a number of studies (Geng and Duberstein 2008a; Su *et al.*, 2013; Yuan *et al.*, 2006; Zhu and Huang, 2005). Su *et al.* (2013) categorize on-going CE practices into four areas of production, consumption, waste management and other support. The authors maintain that the complexity of practices increases with the aggregation level suggesting that the micro and meso levels are vibrant as compared to the macro level. Inspired by Su *et al.*'s (2013) categorization each combination of these levels and areas are now described.

At the low level of aggregation and activity area, namely production of firms and agricultural products, producers are encouraged and required to adapt cleaner production methods and eco-designs. Clean production refers to low levels of emissions, while eco-design refers to incorporating environmental aspects in production processes designs and products that are efficient and sustainable through innovative designs and production lines. China's Cleaner Production Promotion Law was enacted in 2003 (Geng *et al.*, 2010b; Negny *et al.*, 2012; Peng *et al.*, 2005). The law addresses key issues related to generating pollution and the efficient use of resources at all stages of the production process. Implementation for heavily polluting enterprises to reduce their energy intensity, material use and negative externalities is compulsory (Hicks and Dietmar, 2007). A survey conducted by Yu *et al.* (2008) on electrical and electronic manufacturing firms showed little evidence of eco-design in their products. Considering consumption and waste management areas, green consumption and use of environmentally friendly services and products is promoted and the generated wastes have to be recycled into new production stages as part of an industrial eco-system (Geng and Cote, 2002; Geng and Duberstein, 2008b).

At the intermediate meso level, the CE practices include developing eco-industrial parks and eco-agricultural systems. These must be complemented with other measures such as environment-friendly designs of industrial parks and managing the waste accordingly. Building waste trading systems and venous industrial parks for resource recovery from green products are other measures (Geng *et al.*, 2009a). By applying the concept of industrial symbiosis, eco-industrial parks utilize common infrastructure and services. This enables clusters of firms to

cooperatively manage resource flows and trade industrial by-products which decrease environmental externalities and reduce both firms' and the nation's dependency on resources. The reduced overall production cost raises industrial productivity and competitiveness. A similar effect is achieved from the eco-agricultural system (Chertow, 2000; Liu *et al.*, 2012; Yin *et al.*, 2006). In parallel with eco-industrial and eco-agricultural parks, the program includes green design for residential communities to create an eco-friendly habitation environment. Again, the focus is on regulation and management of urban consumption of energy, water and land to reduce their use, as well as on managing and recycling of waste water and solid waste to improve the quality of life and general public well-being (Zhu and Huang, 2005).

Finally, the CE practice at the aggregate macro level requires forming complex and extensive cooperative networks and active cooperation between industries and industrial parks including primary, secondary and tertiary sectors in production areas and in the residential sector. In the context of China, the macro level is aimed at major cities or region/provinces. The objectives of the 3R principles can be achieved by proper design and management of urban infrastructure and sub-urban industrial production and agricultural layouts, as well as through inventive public programs to phase out energy intensive and polluting technologies and replacing them with environment-friendly technologies and activities. Regarding the consumption area, Stahel (1986) and Zhu (2005) suggest a system of renting and a service economy as a shift from a system of selling and buying to just utilization of products. The suggested system will reduce resources' needs and the wasted and lower production capacity will be compensated for by the creation of a new service economy. An urban symbiosis as an extension of an industrial symbiosis which needs to be developed to take care of waste management through transfer of waste materials for environmental and economic benefits from recycling and reusing (Geng *et al.*, 2010a).

The last area of other support includes initiatives from governmental and nongovernmental organizations covering all areas of production, consumption and waste management at all levels of aggregation. China regulates the environment and CE implementation through two agencies: the Ministry of Environmental Protection (MEP) and the National Development and Reform Commission (NDRC). The former is in charge of the National Pilot Eco-Industrial Park Program with the main focus on the meso level, while the latter is in charge of the National Pilot Circular Economy Program focusing on both meso and macro levels (Zhang *et al.*, 2010). As part of other support, a number of laws and policies related to CE have been introduced in the recent decade including the cleaner Production Promotion Law of 2003, the amended law on Pollution Prevention and Control of Solid Waste in 2005, various initiatives to facilitate implementation of CE and the circular Economy Promotion Law

in 2009 (Ren, 2007). Regulations and initiatives are further strengthened by the development of environmental and non-governmental organizations to change attitudes towards the environment in society. This is facilitated by investments in education, providing information and active public participation to increase environmental awareness (Xie, 2011).

**Other key stakeholders: case studies of India, Europe and Africa**

Besides China, many individual countries which are mainly industrialized, newly industrialized and emerging economies partially apply the 3R principles (REDUCE, REUSE and RECYCLING of material). The reduce component is mostly practiced in production as a result of competition and the necessity of achieving high input use efficiency. In developed nations' households recycling of certain materials such as glass, plastic, paper, metal and burnable solid waste is becoming more common. Municipalities take the responsibility of treating and reusing waste water from households as well as solid waste and recycling auto and household appliances. Treatment of waste water from industry is also regulated but reuse of material is less developed and provides far from full coverage. In practice greater attention is paid to the consumption rather than the production stages. Regulations remain one step behind environmentally hazardous technology development and monitoring producers' responsibilities.

Europe has developed concepts and mechanisms for a common environmental policy for its members and regions. These cover all aspects including production, consumption, waste management and environmental policies. It is not necessarily called a circular economy but the patterns are closely in line with the circular economy's principles. *The European Resource Efficiency Platform (EREP): Manifesto and Policy Recommendations* (EC, 2012) is a call on labour, business and civil society leaders to support resource efficiency and to move to a circular economy. The document presents a manifesto for a resource-efficient Europe, lists actions for a resource efficient Europe and suggests ways towards a resource efficient and circular economy. This effort is a result of the growing pressure on resources and on the environment to embark on a transition to a resource-efficient and ultimately regenerative circular economy. A circular resource-efficient and resilient economy is expected to be achieved in a socially inclusive and responsible way by encouraging innovations and targeted investments, smart regulations and standards, abolishing environmentally harmful subsidies and tax breaks, creating market conditions for CE friendly products, integrating resource scarcities and vulnerabilities into wider policy areas and setting targets and standard indicators to measure progress. Estimates suggest that by using resource efficiency as an economic strategy EU could reduce its material requirements by 17-24 per cent and create 1.4-2.8 million jobs (EC, 2012: 5). The manifesto calls on the European Parliament, Commission and the Council to make resource efficiency and the circular economy an essential building block in the Europe 2020 agenda in an effort to deliver smart, sustainable and inclusive economic growth. Product service systems (PSS) have

been heralded as an effective instrument for moving society towards a resource-efficient economy. In a review of product services for a resource-efficient and circular economy, Tukker (2015) sheds light on business to consumer relations and the PSS inflexibility as the reason why the system has still not been widely implemented.

In the report *Towards the Circular Economy* published by Ellen MacArthur Foundation (EMF, 2012) emphasis is placed on the economic and business rationale for an accelerated transition to the current system. The foundation views CE as providing a framework for system level redesign offering opportunities to harness innovations and creativity to enable a positive and restorative economy. Steady-state economics claim a low circulation rate of natural and social-economic systems to achieve sustainable development. However, due to its anti-consumerism and anti-technical tendency, this ecological view of evolutionary economics has never been in the mainstream. Pin and Hutao (2007) suggest that a circular economy can be enriched by the steady state economy for China which is not rich in natural and environmental resources and which is highly dependent on substance recovery. In relation to a discussion of zero growth and the possibilities of maintaining past standards through political and social mobilization and transition to some regulated '*Steady-State Capitalism*', Garcia-Olivares and Sole (2015) are of the view that zero growth and competition conditions will probably transform the system into a post-capitalist *Symbiotic Economy*.

In a recent study, Kalmykova *et al.* (2015) investigate resource consumption drivers and pathways to resource efficiency and reduction. They studied the economy, policy and lifestyle impacts on the dynamics of resource use at the national (Sweden) and urban scales (Stockholm and Gothenburg) during 1996-2011 (see Tables 1 and 2). Empirical resources' (domestic material consumption, fossil fuels, metals, non-metallic materials, biomass and chemicals and fertilizers) consumption trends show that the implemented policies have failed to reduce resources and energy to desired levels. The biased focus on energy use efficiency has reduced the consumption of fossil fuels, but waste generation outpaces improvements in material recycling impeding the development of a circular economy. Policies that have been implemented have addressed efficiency in use but not on reducing demand for resources including non-fuel resources (see also Li *et al.*, 2013 and Kalmykova *et al.*, 2015). The role of recycling within the hierarchy of material management strategies is investigated by Allwood (2014). His focus is on growth trends in global demand for materials during 1960-2010 and covers airplane passengers carried, transport CO<sub>2</sub> emissions, steel, cement, paper and car production, built space, silicon wafer production and electric motor data. His data analysis suggests that the vision of a future sustainable material economy is not prescribed by the ambition to create a circular economy, but

aims to minimize its total environmental impacts. Reducing demand and reusing products, components and materials have greater potential of reducing environmental impacts.

**Circular economy, human resource management, sustainable development and international security: prospects for the development of future synergies**

**Implementing circular economy as the key investment strategy for economic growth in the future: understanding sustainable development as an irreversible path**

This research which is based on existing literature establishes that sustainable development is not a reversal path. Hall *et al.* (2010) provide a foundation for potential future research directions in the field of sustainable development and entrepreneurship. Current research has been more prescriptive and optimistic. Future research should be descriptive and provide answers to the extent to which entrepreneurs have the potential for creating sustainable economies which require insights into at least five related issues. First, the conditions under which entrepreneurial ventures rather than incumbent firms or their combinations transform economies into sustainable systems providing sustainable products and services. Second, incentivized conditions leading to entrepreneurs pursuing sustainable ventures. Here the key factors are developing the theory, removing structural barriers to capturing economic rents, differences among sustainability-oriented and traditional entrepreneurs and differences in behaviours and risk preferences. Third, the conditions under which entrepreneurs can simultaneously create economic growth, while advancing social and environmental objectives. It should be noted that entrepreneurial dynamics for sustainable development in impoverished communities within developing and emerging economies can be a hindrance to environmental investments. Fourth, conditions that factor in all externalities in entrepreneurship welfare-creation versus welfare-destruction should be considered. The key factors are possible negative externalities, unanticipated problems, newly created social and environmental challenges and potential unsustainable rent seeking by entrepreneurs. Finally, the conditions under which public policy can positively influence the incidence of sustainable entrepreneurship. The policy and practice should provide answers to all the questions raised here. Depending on the drivers of entrepreneurs to adapt sustainable orientation, it is important to introduce an optimal combination of policies of allocation of innovation support to incumbents or to new ventures, heterogeneity in the support being provided by the sector, industry structure and dynamics and provision of demand-side tax and supply-side R&D subsidies. The interplay and trade-offs between competing social, environmental and economic objectives will determine the optimal mixture of sustainable entrepreneurship policies.

Heckerts and Wustenhagen (2010) have theorized about the role of incumbents (greening Goliaths) and new entrants (emerging Davids) in sustainable entrepreneurship. The two types of players are characterized by age, size and objectives. Sustainable entrepreneurship is defined as

the discovery and exploitation of economic opportunities linked to market failures in the process of generating market equilibrium. The objective is to transform industries into environmentally and socially sustainable states. Thus, sustainable entrepreneurship describes activities that represent disruptive rather than incremental innovations. Incumbent and large firms engage in incremental environmental or social process innovations such as introduction of sustainability management systems, ecoefficiency or corporate social responsibility initiatives (Schmallegger, 2002). On the other hand, the new entrants are '*Sustainable Entrepreneurs*' or '*Bio-Engineers*' or '*Social Bricoleurs*'.

The diffusion of sustainable products and services is a traditional case S-shape and includes the stages of introduction, early growth, take-off and maturity. The two forces evolve over time. The co-evolution of sustainability start-ups and market incumbents towards the sustainability transformation of an industry is from different initial positions. Emerging Davids by having a sustainability niche have high environmental and social performance but low market share, while the greening Goliaths have low environmental and social performance but a high market share. They both target high environmental performance and market share as an outcome of the sustainability transformation of the industry in the maturity stage. Regulations, environmental and health awareness and various sustainable innovation policy incentive programs will influence the speed and outcome of the transformation and the allocation of market share. Examples of such markets are organic retailer whole foods markets, solar cell production, smart cars, electric vehicles and clean power production which provide some basic information about the transformation process, the interplay between firms in the market and effects of various public policies, as well as potential negative externalities.

#### **Dalian city in China and other Chinese pilot cities**

Dalian city in China is an important pilot study where the CE strategy was implemented during 2006-10 (see Table 6). The industrial and business area characteristics of the city and the local government's initiatives led to the aspiration of transforming it into a leading environment-friendly city. The strategy had several objectives including further improving resource use efficiency and improving the level of material reuse, recycling and recovering solid waste and waste water (Dalian Municipality, 2006, 2007; Geng *et al.*, 2009b). By comparing data from 2005 and the target and actual data from 2010 Su *et al.* (2013) assessed how many of the strategy's goals have been achieved. Ten indicators were selected for this purpose and grouped into four aspects: energy and water efficiency, waste discharge, waste treatment and waste reclamation.

As part of the CE strategy, in 2007 the Dalian municipality decided to shut down small scale facilities with high energy use rates and encourage energy saving technologies and

production scales instead. Other plans and supply and demand driven policies were also introduced to improve water use efficiency through price incentives and quota management, waste management, waste reporting and tracking systems (Dalian Municipality, 2007; Geng *et al.*, 2009b; Qu and Zhu, 2007; Wang and Geng, 2012). Thus, the policy included close cooperation between the government, enterprises and households. The emphasis was on relationships between energy use, economic size and industrial value added. In an assessment of CE's implementation, Su *et al.* (2013) found that the goals stated here had been well achieved. Calculated changes in the ten indicators between 2006 and 2010 showed that the CE policies had been successfully implemented in terms of resource use efficiency and waste discharge, treatment and reclamation.

The Dalian pilot study and its successful CE implementation strategy can serve as a success example for other regions with similar characteristics. Su *et al.* (2013) compare Dalian's performance with three other CE pilot cities (Beijing, Shanghai and Tianjin) using the same ten evaluation indicators system. These cities are economically developed but have different industrial and demographic characteristics. The percentage changes in each indicator for all the four cities between 2005 and 2010 were computed and compared (see Table 7). The relative performance of the cities for each indicator was also calculated (see Table 8). The results show that with a few exceptions all four cities have achieved improvements in all four aspects of the CE strategy. However, the cities' performances differ from one indicator to another and their positions with reference to best practice technology and policy changes also differ. The relative measures also show the degree of success in material use, waste discharge reductions and waste reclamation increase as compared to the best performance used as the benchmark. The numbers indicate evidence of both over- and under-shooting of the pilot cities target levels.

This study based on data covering the four pilot cities in China with different economic and demographic characteristics provides a comprehensive picture of the achievements of implementing CE in China. The results show evidence that the strategy has been implemented effectively and with desired outcomes, in particular in terms of the use and efficiency of resources. Here resources refer to energy, water and land. The positive outcomes seem to be a result of relocation of heavy industries and application of instrument regulations, as well as the four cities' level of development and manpower and technology and financial resources to achieve efficiency in resource use. It is important to mention that the results are based on Chinese official statistics which lack trust and possibly suffer from systematic inaccuracies. The many large percentage positive changes at a time when the environmental conditions in China are deteriorating suggest that the results have been interpreted with caution. This also makes a case for the need to have some other case studies from European countries with lesser uncertainties associated with data quality and estimation of effects of environmental policies.

**Strengthening the nexus of circular economy, human resource management, and international security: the only feasible development strategy for the future**

A report published by the Swedish government's offices titled '*Sweden's National Strategy for Sustainable Development*' (ME, 2002) defines sustainable development as the overall objective of the government's policy. The strategy brings together social, cultural, economic and environmental priorities in a shift towards more sustainable development in Sweden. The report describes the government's efforts in the form of objectives, measures and strategies adopted and reflected in policy towards sustainable development. Sustainable development strategies have also been formulated by EU, OECD, the Nordic Council of Ministers and several other organizations and countries. In a recent study Wijkman and Skånberg (2015) explore the potential for a significant increase in resource efficiency and assess benefits for society in the form of carbon emissions and employment gains. The modelling exercise shows significant emission reduction and positive employment and trade balance effects from renewable, energy-efficient and material efficiency sources. Using the Swedish economy as a case, the authors recommend lowering taxes on work and increasing taxes on the use of natural resources and white certificates as policy measures to promote the move towards CE and increasing its benefits for society. Glomm *et al.* (2008) examine the double dividend from revenue neutral green (gasoline) taxes in the form of consumption efficiency and environmental quality dividends. Positive net employment effect is found in Cai *et al.* (2011) who studied the relationship between the green economy and green jobs in China's power generation. Mehmet (1995) too studied employment creation and the green development strategy. By highlighting the jobs versus environment dilemma for densely populated developing countries Mehmet suggests that the North should finance job creation in the South using funds raised through ecotaxes and levies on international trade. Samet (2013) also discusses circular migration between the North and the South.

The Swedish national level sustainable development strategy defines the long-term vision of a sustainable society and its foundation of values and specifies policy instruments, tools and processes necessary to implement the change process, as well as the monitoring and evaluation of its implementation. Different players are called to join in the broad participation which is based on public consultations. The national level development strategy is expected to include all three dimensions of sustainability -- ecological, social and economic -- and to make prudent use of, conserve and invest in human and environment resources. The sustainable development strategy is based on a democratic system of government institutions that promote resource-efficient production and consumption patterns and learning and collective public goods comprising knowledge, health and the environment. A balanced combination of social welfare,

economic development and a sound environment is at the heart of the Swedish vision and policy of sustainable development. The Swedish government has prioritized eight strategic core areas encompassing the important elements of a sustainable society: the future environment; limitation of climate change; population and public health; social cohesion, welfare and society; employment and learning in a knowledge society; economic growth and competitiveness; regional development and cohesion; and community development. Each core area is presented and some general objectives and measures provided (see GOME, 2002: 21-35).

Environmental degradation is not only a national problem but a global one. The challenge of the 21<sup>st</sup> century is facilitating and strengthening democratic cooperation on sustainability at the international level to promote the environment, human health and wellbeing. Since 2001 the European Council has been urging members to formulate their national sustainable development strategies so that in cooperation with the UN system this can lead to worldwide development of a sustainable development strategy. Sweden is a major contributor when it comes to integrating ecological, economic and social sustainability. This is achieved by joint responsibility in creating sustainable sectors of special needs including industry, working conditions, regional development, agriculture, forestry, fisheries and a good built environment. The three aspects of sustainability are protection of natural resources, sustainable management of resources and improved efficient use of resources. These account for social and economic sustainability and provide a good picture of the national sustainability strategy and its scope. Sustainability in family and working life is among the great future social and economic challenges. Sweden as a technologically developed nation with a strong innovation capability in the area of environmental regulations, green taxes and standards, could explore the entrepreneurial/business opportunities which Swedish firms could participate in for transferring advanced waste management and technology. Waste management is an old but aggravated challenge that requires new solutions in the form of public investments in cleaner and more efficient waste-removal systems to build a sustainable and intensified urbanization environment. An example of successful entrepreneurial firms trying to use the opportunities of developing new technologies and approaches based on the circular economy, such as the quantum system technology, is the Swedish company Envac (Törnblom, 2014).

Implementing a sustainable development policy requires a number of tools and incentives (GO-EM, 2002). These include environmental legislations to support efforts towards a sustainable society, the role of spatial planning of communities, synergies in mutually supportive economic, environment and social actions and programs and having an integrated product policy for life cycle management of good and services. Economic instruments are the drivers of the development. The main component, tax on harmful activities, promotes both economic and ecological sustainability. An evaluation of the impact of policies at different levels provides a

better basis for decision making. Progress in creating standards for regular monitoring and evaluations have in general been slow. Efforts at getting a national sustainable development strategy indicators system continue. Research and development, education, information dissemination and dialogue between actors are essential elements of a sustainable society. Finally institutional capacity is crucial for integrating development issues in all policy areas and at all decision-making levels. Effective coordination and the complex task of combining short- and long-term processes is a challenge that calls for active leadership in achieving the goal of CE as an innovative national level development strategy.

The responsibility for sustainable development lies with the individual state, although climate, environmental degradation and globalization have increased the states' mutual dependence. Thus, sustainable development calls for measures at local, national, regional and global levels. The key international organizations are the UN, EU, OECD, WTO, the Nordic Council of Ministers and other environmental organizations such as the Stockholm Environmental Institute (SEI) and the recently established Global Green Growth Institute (GGGI).

One of the eight millennium development goals is ensuring environmental sustainability. Development of environmentally sustainable energy systems and efficient transportation systems that reduce emissions and greenhouse gases are important sustainable consumption and production measures. Agreements have been reached under the UN Framework Convention on Climate Change to support the developing countries in their transition economically and technologically. Global water partnership, peace and security, EU and OECD sustainable development strategies, in addition to local and nation level activities are among other initiatives that are essential to global sustainable development. OECD Green Growth Studies (OECD, 2014) has developed a green growth framework and indicator set to monitor progress towards green growth. Green growth aims at fostering economic growth and development while ensuring that natural assets continue to provide the resources required for enhancing our well-being. The set contains indicators covering the socioeconomic context and characteristics of growth, the environmental and resource productivity of the economy, the nature of the asset base, the environmental quality of life and economic opportunities and policy responses. The indicators are useful for designing and evaluating policies.

### **Conclusion: Policy recommendations and suggestions for further research**

One of the key challenges listed earlier is lack of reliable information and data. Provinces in China have a relatively high degree of autonomy. In recent years a number of comprehensive surveys and databases have been created and generously made available to researchers without

much restriction on their access. This openness applies to a large number of areas including collection and dissemination of statistics. However, data in general is collected by the National Statistical Agency. In parallel, provinces and major municipalities also collect and publish local statistics. The way data is collected, processed and made available for research is still managed and controlled in the old-fashioned way where the state has a strong influence on the content and the way it is presented and disseminated. Radical changes are needed to improve the general public's trust in the accuracy and quality of the data. New standardized databases covering all levels and provinces need to be collected and used in assessing CE's implementation. This applies to all countries with an increased focus on environment. The OECD (2014) Green Growth Studies has suggested a measurement framework and provides a range of topics and indicators. China has industrialized at a very rapid pace. The level of technological capabilities has developed significantly but not homogeneously across different sectors and locations. Shortage of advanced technologies is one key limitation in the efficient management of the environment and for coping with the rapidly deteriorating environmental conditions in the country. Developing such technologies is not feasible given the current relatively low indigenous technology levels. Improved global awareness about the environment and climate change has developed channels and mechanisms to facilitate related and advanced technology transfers to developing countries. Through such cooperative channels and its own joint venture regulations for corporations to gain access to the Chinese market, China has been able to facilitate transfer of needed technology. It is worth mentioning here that current technology levels are short of the optimal level and investments in environmental technology innovations are necessary for developing the needed technologies. This will further increase the cost of production and in general it is considered harmful to firms' competitiveness. However, it promotes energy and material savings in production and green trade as dividends. The new and advanced environmental technologies adapted to CE's 3R principles should be a priority for central and regional governments and for municipalities in China.

Sweden is a technologically developed nation with strong innovation capabilities and is a major donor for international development aid. The Swedish state and municipalities with strong capabilities in areas of environmental regulations, green taxes and development of standards, could encourage entrepreneurs and business corporations to participate in the implementation of the advanced waste management and technology development in China and elsewhere. Scandinavian gained experience in data collection, grassroots participatory decision making and solidarity in sharing welfare and responsibility are among potential exportable services that place

Sweden and its corporations at the forefront of practitioners of environmental concerns. This is in line with the green wave and the Nordic view of environmental justice (see Lehtonen, 2007).

There are no intended public restrictions on development and introduction of production and consumption technologies considering their positive environmental and climate impacts. Such interventions as in the case of medicines and their health and side effects could be developed. Legislations are being introduced to cope with polluting technologies regardless of their type and source. However, legislations are often introduced long after the technologies have been developed and introduced in the market. Thus, their introduction is more or less an issue of repairing damages that have already happened and their sources may not be within the range of the law. Even if legislations are introduced to prevent harm to the environment, their efficient enforcement is a precondition for successful implementation of environmental and advanced costly technology use regulations.

The main focus of the central and provincial governments in developing countries in general and in China in particular has been on investments for developing infrastructure. Costly environmental considerations and their negative effects on competitiveness have not been priorities. Thus, few resources have been allocated in the form of economic incentives to promote development and implementation of CE. International practices reveal that public economic incentives remain an effective means of conserving resources and the environment. Economic incentive policies stimulate the behaviour of producers and consumers to bring them in line with the 3R principles of CE. Examples of economic incentive policies include public R&D and innovation support, pricing and tax policies, environmental damage and health policies and insurances, cap and trade systems, support to research in the fields of energy saving, renewable energy alternatives, recycling of materials and green and environmental labelling of products.

Business and methods of operation and management are developed globally. Transfer of finances, management, skills and technology is much easier and faster than design and implementation of environmental regulations. Such soft knowledge is often developed indigenously and with long lags and in response to market failures. This phenomenon combined with issues such as corruption led to poor management of the public sector and its responsibilities. There is a desire to attract enterprises' establishment and operation for reasons such as creating employment opportunities. These limit the effects of regulations. Improvements regarding the enforceability of legislations and the management system along with the government and corporate governance system, reform of judicial management mechanisms, a transparent monitoring and auditioning mechanism and accountability are required. Green political parties, civil society and NGOs' participation in inclusive decision-making processes and rich policy experience from the traditional market economy in developed nations ease the implementation of a green growth strategy and sustainable development.

Like enhancing business awareness about the environment, public awareness in the capacity of business owners, employees and consumers is equally important as components of production, consumption and waste management; this is also needed in the implementation of regulations. Countries differ by level of education and general awareness about the environment. A transition from socialism to the market economy in China has created space for experimentation. However, the unlimited desire to produce, export and accommodate in an unsustainable way and under minimum regulations has been extremely harmful to the environment. Achieving an optimal level of public education and increasing awareness require enormous resources. Significant investments at all levels and in all areas are necessary for achieving the desired level of awareness that is conducive to the environment. Media channels can be used for facilitating close cooperation between producers, consumers and regulators in the field of environment and material management.

## **References**

1. Allwood, J.M. (2014). Squaring the Circular Economy: The Role of Recycling within a Hierarchy of Material Management Strategies. *Handbook of Recycling*. Chapter 30, 445-477.
2. Altvater, E. (2009). World Economy, the Financial Crisis, and Ecological Sustainability – A Trilemma. *Capitalism Nature Socialism*, 10(4), 37-68.
3. Andersen, M.S. (2007). An Introductory Note on the Environmental Economics of the Circular Economy. *Sustain Science* 2, 133-140.
4. Anderson, G. (1994). Industry Clustering for Economic Development. *Economic Development Review*, 12(2), 26-33.
5. Bilitewski, B. (2012). The Circular Economy and its Risks. *Waste Management* 32, 1-2.
6. Chen, W.H. (2006). Study on Indicator System of Urban Circular Economy Development. *Economic Management*. *New Management* 16, 55-60.
7. Chertow, M.R. (2000). Industrial Symbiosis: Literature and Taxonomy. *Annual Review of Energy and the Environment* 25, 313-337.
8. Stahel, W.R. (1986). The Functional Economy: Cultural and Organizational Change. In: *The Hidden Wealth*. Science and Public Policy, London, UK. Special issue, 13(4).

## **A STUDY ON EFFECT OF COVID-19 ON DIGITAL MARKETING**

**Elangbam Binodini Devi**

Department of Business Management,

Hemvati Nandan Bahuguna Garhwal University (A Central University),

Srinagar-Garhwal – 249 161, Uttarakhand, India

Corresponding author E-mail: [binodinielangbam@gmail.com](mailto:binodinielangbam@gmail.com)

### **Abstract:**

Covid-19 creates the basic necessity of digital marketing in everyone's life. Customers are ready to spend their abundant free time in looking digital marketing and advertising. Businesses have to rely on digital technologies; google.com, facebook, youtube, amazon.com, flipkart.com, meesho etc. are some of the commonly used digital technologies. Private companies or government organizations nowadays have to provide digital platforms for the customers. The present will emphasise on the impact of pandemic to digital marketing. Benefits and disadvantages of digital marketing are also analysed.

**Keywords:** Covid-19, digital marketing, free time and digital technologies.

### **Introduction:**

Covid-19 witnessed loss of jobs and economy instable. On the other side during the pandemic people prefer digital marketing and advertising. Here businesses fulfilled their marketing objectives through internet. Digital technologies such as google.com, facebook, youtube, amazon.com, flipkart.com, meesho etc. are used by business to make aware their products to the customers. Now business cannot rely only on traditional methods; traditional mode should go hand in hand with online mode of marketing. New digital technologies provide new business opportunities for their survival and success. Digital marketing grows due to advanced technologies. Social media is the key for the growth and success of digital marketing. Facebook facilitates large number of people to interact with products and services of companies. Blogs also helps success of digital marketing, initiates increased sales. Internet and other related digital platforms are the most important tool for businesses to get success in modern society. Power of internet increased day by day. Through emails companies sort out the problems of customers.

Digital marketing is preferred by customers due to following benefits enjoyed by the customers:

- Customers aware of the updated information of offered products and services of companies
- Customers can compare products and services of various companies very comfortably through digital technologies
- Customers can purchase 24/7 round the clock without time boundation
- Customers can give feedback of the products and services without any hesitation
- Companies could get opportunities of improving goods and services as per the needs and demand of customers.

Some disadvantages of digital marketing may be listed as below:

- In some areas internet is not accessible and in other areas poor internet connectivity is shown. Many customers do not rely on website.
- Normally we find few websites they showed high quality products and they delivered very poor products.

### **Various channels of digital marketing**

1. Email Marketing: Selling products and services through email.
2. Associate Marketing: Conversions payment
3. Social Media Marketing: Businesses can connect with customers through Facebook, Twitter, Instagram, Youtube, WhatsApp and other platforms.
4. Pay Per Click (PPC): Company pays only when a prospective customer clicks on that particular company's advertisement
5. Online Advertising: Advertising on other users' websites

### **Covid-19 and digital marketing**

- Due to lockdown situation of the pandemic, customers stayed at their home and they had lot of free time. Marketers found ample of time to spend with their customers through social media sites.
- Maximum people performed their duties through work from home mode. Having lot of free time, there is huge demand of video streaming platforms and micro video content platforms due to covid-19. Marketers found video and micro video contents for advertisement and promotion of their products and services.
- A.I based Chat-bots provides assistance to the customers. The customers' demand for these bots increased tremendously; these chat-bots become a virtual assistant to the customers.
- Digital tools become an important part in every phase of business life cycle. They are playing inseparable role in the upgradation of processes, occupying new markets and enhance business competitiveness.

- Work from home situations created changed needs and behavior of customers, which necessitated digital transformation.
- In order to be competent companies and government organizations, digitalization becomes basic.
- Covid-19 created the scope of digital tools instead of face-to-face interactions.

Digital marketing is cost effective. Nowadays customers cannot find free time, in their busy schedule they can purchase products and services through digital marketing in a minute. The Covid-19 situation widens the scope of digital marketing. Lockdown situations led to lot of free time of customers popularize digital marketing.

### **References:**

1. Ayush, G.K and R. Gowda, R. (2020). A Study on Impact of Covid-19 on Digital Marketing .Vidyabharati International Interdisciplinary Research Journal, 225-228.
2. Bala, M., and Verma, D. (2018). A Critical Review of Digital Marketing (SSRN Scholarly Paper ID 3545505). Social Science Research Network. <https://papers.ssrn.com/abstract=3545505>
3. Bhosale, V. S., Raverkar, D. P., and Tamondkar, T. (January-March). IMPORTANCE OF DIGITAL MARKETING IN THE NEW AGE. International Journal of Advance and Innovative Research, 7(1(IV)).
4. Nachit, H., and Belhcen, L. (2020). Digital Transformation in Times of COVID-19 Pandemic: The Case of Morocco. Available at SSRN 3645084. <http://dx.doi.org/10.2139/ssrn.3645084>

# **EMOTIONAL ADJUSTMENT AND LEADERSHIP QUALITY OF HIGH SCHOOL STUDENTS**

**Aleena Johnson**

DB Pampa College, Parumala

Corresponding author E-mail: [aleenajohnsondec212@gmail.com](mailto:aleenajohnsondec212@gmail.com)

## **Introduction:**

In the current era, the technology-driven industrial world needs young people with competitiveness and skills who can survive and succeed under the pressures and challenges of modern industry and corporate backgrounds. Educational courses have been steadily increasing in improving students' emotional regulation and leadership qualities. Teenagers often begin to question authority and are unwilling to accept social norms, but still want to please their parents. They have also encountered conflicts in understanding themselves and meeting the needs of their families and schools. The indifferent behavior of adolescents is likely to leave a bad impression in the minds of their parents, and then produce a reactive attitude towards them. Students learn many habits and behaviors in school. They see teachers as role models, but they are more susceptible to peer pressure. Peers persuaded students to indulge in dangerous behaviors such as alcoholism, smoking, teasing, and sexual arousal towards the opposite sex. These behaviours are reflected in the form of excitement, nervousness and happiness. All these tend to create adjustment problems and have a negative impact on the mental health of secondary students (Rajeswari and Eljo, 2013)

Emotions play an important role in life and contribute to the personal and social development of individuals. Persistent emotional disorders can hinder personal growth and development, leading to psychological, social, and physical problems. Emotion regulation is to maintain emotional balance in the face of internal and external pressure. The cognitive balance in the face of internal and external pressures and the cognitive process of acceptance and adaptation facilitate this. Emotional adjustment is a key task. Emotional adjustment can lead to normal behavior, and disorder can lead to abnormal behavior. Various factors such as emotional stability and strong leadership qualities affect personality development. High school is an important turning point and a key turning point in our education system, and the acquisition of skills plays a pivotal role at this stage. Therefore, at this stage, students' emotional adjustment and leadership qualities must be developed.

**Statement of the problem:**

The present study is an attempt to find out the relationship existing between emotional adjustment and leadership quality of high school students. Several investigations were conducted on various aspects related to the present variables- emotional adjustment and leadership quality. But a very few studies were done on both these variables together. And hence the present investigation, **Emotional adjustment and leadership quality of high school students** is the need of the hour. The study is significant with the students of today's generation, as they lack in adjustment and stress management. Thus the need for checking the emotional adjustment and leadership quality are essential in today's educational scenario.

**Definition of the key terms:**

**(a) Leadership Quality**

Leadership quality is a process of influencing the activities of an organized group in its efforts towards goal setting and goal attainment. Leadership is the ability to influence the activities of an individual or group towards the achievement of a goal. (Addison, 1984)

**(b) Emotional Adjustment**

According to Crow and Crow (1973), "An emotion is an affective experience that accompanies generalized inner adjustment and mental and psychological stirred up states in the individual and that shows itself in his over behaviour" and the adaptation towards it is the emotional adjustment.

**(c) High School Students**

Any school recognized by Government of Kerala for giving instructions to students of school education comprising of VIII, IX and X class students.

**Objective:**

The objective of the study is

To find out whether there is any relationship between emotional adjustment and leadership quality of high school students.

**Hypothesis:**

The hypothesis formulated for the study is that, there is significant correlation between emotional adjustment and leadership quality of high school students.

**Methodology in brief:**

'Normative survey method' was used in the present investigation. According to Sidhu (2007), "the normative survey method is concerned with the condition or relationship that exist,

practices that prevail, views or attitude that are going on and the effects that being fell or trends that are developing”.

The details regarding population, sample, variables, tools, data collection procedure, and statistical technique were discussed as follows:

**(a) Population**

The population of the present study was the high school students, who follow the State Board syllabus in Kerala.

**(b) Sample**

A sample of 300 high school students from various districts of Kerala, were selected for the study by using stratified sampling technique. According to Best and Kahn (2017), “It is advisable to subdivide the population into similar homogenous groups to get more accurate representation”. This method results in the stratified random sample.

**(c) Variables**

The variables used in this study were as follows:

- (i) Emotional adjustment
- (ii) Leadership quality

**(d) Tools**

The following standardized tools constructed or adopted were used for measuring the variables in this study.

- (i) Emotional Adjustment Scale was constructed by the investigator.
- (ii) Leadership Quality Scale was adopted from Aravind and Joy (2012).
- (iii) Personal Information Schedule was constructed by the investigator.

**(e) Data collection**

The data required for the investigation were collected from the students in group situation. Data were consolidated and analysis was made by basic calculations.

**(f) Statistical technique**

Karl Pearson’s Product Moment Correlation is the statistical technique used in the present study. It is to find out the correlation between two variables.

**Analysis:**

➤ **Correlation between emotional adjustment and leadership quality**

The correlation between emotional adjustment and leadership quality of high school students are obtained as shown in Table 1.1.

**Table 1: Correlation between emotional adjustment and leadership quality**

Variables Correlated	N	r	Level of Significance	Verbal Interpretation
Emotional adjustment and leadership quality	300	0.41	Significant at 0.01 level	Substantial correlation

From Table 1, it is clearly stated that the correlation between emotional adjustment and leadership quality among high school students was 0.41 which was significant at 0.01 level as the calculated value is greater than the table value. This indicated that there existed a marked or substantial correlation between emotional adjustment and leadership quality. In other words, when emotional adjustment increases leadership quality also increases.

#### **Test of tenability of hypothesis**

The Hypothesis, “There is significant correlation between emotional adjustment and leadership quality of high school students”, was accepted.

#### **Finding:**

The finding of the present study is that, the r obtained by correlating the variables emotional adjustment and leadership quality of high school students was 0.41.

#### **Conclusion:**

The conclusion implies that there is a significant correlation between the emotional adaptability of high school students and their leadership qualities. Therefore, these variables are critical for students to solve the problems they face and deal with the environment.

#### **Implications of the study:**

The present investigation has highlighted several implications in various fields of education. Some of these implications are discussed below:

##### **➤ Implications for Sstudents**

This research shows that there is a significant correlation between emotional adjustment and leadership qualities. Students can succeed in their lives by appropriately combining emotional adjustment and leadership skills, which can be acquired from the school itself. Students should also develop the ability to adapt to any situation in life. Children should try to

share their interests, problems, experiences and challenges with their parents. Now, one-day students need to be competent in their social interactions and relationships as well as academic ability. They should instil strong willpower to face the social, emotional and economic problems they face in their daily lives. Students should also develop the ability to interact with peers to promote student cooperation and collaborative learning, which is adopted by most educational institutions.

➤ **Implications for teachers**

Studies have shown that the emotional adjustment and leadership qualities of high school students are interrelated, which shows that teachers play a catalytic role in promoting and providing an appropriate atmosphere to develop these skills and abilities from the school itself. Teachers play a pivotal role in meeting the emotional needs of students, which can influence students to absorb leadership qualities and can motivate them to become leaders. Through education, individuals should be taught how to behave in society and how to properly manage their emotions. Teachers should understand the individual differences of learners and treat them accordingly.

Teachers should conduct a student counselling programme to reinforce the students' abilities for emotional control. Facilitate students self emotional control, and emotional disorder and bad adaptation. Teachers should encourage the students to participate in all curricular, co-curricular, and extra-curricular activities of the school which aid the students' positive adjustment to emotional adjustment. Tomorrow's leaders are developed in today's classroom. Teacher realizes the strength and weakness of his/her students. So teachers should give proper educational, vocational, and personal guidance, which can help the students to manage their emotional stress. The findings help the teachers in adopting better instructional strategies and render extra educational treatment like guidance and counselling.

➤ **Implications for parents**

Home is the first school, and parents are the first teachers. Parents should give their children enough freedom and create a good atmosphere for their children. They should help them develop their innate abilities and give them the responsibilities and responsibilities to improve the quality of leadership. The attitude of the parents towards children affects the development of cognitive and affective domain of the children. The parents should be loving, caring, and supporting the children in studies and also in all other activities in their life. Emotions have the quality of displacement, so parents must train their children to adjust to their surroundings which may change day by day and aid in fostering the all round development of the child. Parents should understand the problems of their children inside and outside the home. Thus parents

should accept the children as major members of the family and have a democratic attitude towards them.

➤ **Implications for curriculum constructors**

Curriculum constructors can suggest learning activities which cater the need and interest of the students. As curriculum is the totality of the experiences, it should be planned according to the requirements of the students. Organizing parents' teachers meeting helps the parents and teachers to have an open discussion about their child and problems of their children should be discussed openly so as to resolve them together.

➤ **Implications for policy makers**

This study puts more emphasis on the two variables of emotional regulation and leadership qualities, which are very important in educational psychology and modern educational practice. Also it's a great help for the government to frame certain rules regarding the necessity of educational programmes that should be carried out in the state. The government officials should plan different programmes like cultural and social programmes, which insist students to participate in it.

**Suggestions for further research:**

The present study provides various opportunities for further research. Some of the suggestions made in this regard were as follows:

- (a) To enable more generalizability of the results, the sample size could be increased or the study could be extended to more districts of the state for getting more reliable and objective results.
- (b) Further investigations may be carried out using other psychological variables as correlates of two variables chosen for the present study.
- (c) The research can extended to higher secondary and college level students.
- (d) Research can be done in the same topic by using different sampling techniques.
- (e) In the present study, the statistical technique used is Pearson's Product Moment Correlation. Statistical techniques like t test, ANOVA, chi-square, multiple correlations can be used for further research studies.
- (f) More research can be conducted in the areas of curriculum construction that provides scope for the development of emotional adjustment and leadership quality of the students.
- (g) Experimental studies can be done on each variable at different levels.
- (h) For more reliability, further studies may be conducted by taking more number of samples.

It is expected that the present study would open many novel avenues for further research in the selected areas for the investigation. The investigator would feel obliged, if the findings and implications of the study are made use by various professionals like teacher educators, educationist, social workers and all others who have a research quest in their mind.

**References:**

1. Addison, L. B. (1984). Investigation of the leadership abilities of intellectually gifted students. Unpublished doctoral dissertation, University of South Florida.
2. Aravind, G. (2012). Leadership quality, sociability and emotional intelligence of higher secondary school students. Unpublished master's thesis, Mahatma Gandhi University, Kottayam.
3. Best, J. W. and Kahn, J. V. (2017). Research in Education (10<sup>th</sup> ed.). Noida: Pearson India Education Services Pvt. Ltd.
4. Crow, L. D. and Crow, A. (1973). Educational Psychology (3<sup>rd</sup> Indian Reprint), New Delhi: Eurasia Publishing House.
5. Rajeswaris, S. and Eljo, J. O. (2013). Emotional adjustment of adolescent school students. International journal of Humanities and Social sciences, 2(2), 49-56.
6. Sidhu, K. S. (2007). Methodology of research in Education. New Delhi: Sterling Publishers.

## **COVID-19 IMPACT ON HEALTH**

**Humaira Badruzzama**

J. A. T. Arts, Science and Commerce College (For Women), Malegaon, Nashik, India

Corresponding author E-mail: [homairaraees@gmail.com](mailto:homairaraees@gmail.com)

### **Abstract:**

Corona virus is a family of viruses' causes' illness ranging from common cold to more severe diseases. The original source of viral transmission to humans remains unclear as whether the virus became pathogenic before or after the event for severe cases recovery can take six weeks or more and there may be damage to heart, kidneys, lungs and brain. The best preventive action is to avoid being exposed to the virus. If you have been infected by COVID-19 you should seek medical care as soon as possible. In order to reduce the spread of infection it is essential to provide correct information and encouraging the social distancing, promoting personal and hand hygiene and advising seeking of treatment.

**Keywords:** Corona virus, Pathogens, infection etc.

### **Introduction:**

COVID-19 is an infectious disease caused by the SARS-CoV-2 virus. It is a novel virus, has a new strain that has not been previously identified in humans. COVID-19 came by infection with the severe acute respiratory syndrome. Human Corona virus capable of causing illness, ranging from common cold to more severe disease such as middle East respiratory syndrome (MERS fatality rate ~ 34%). It is a contagious disease caused by severe acute. Its symptoms are fever, cough, fatigue, vomiting, shortness of breath, loss of taste or smell. This virus primarily spreads between people through close contact and aerosols and respiratory droplets are exhaled when talking, breathing or otherwise exhaling, as well as those produced from cough and sneezes.

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

COVID-19 has inequalities by income, age, sex, geographic location. Global health gains & world people continuously face threats to their health. Isolation, loss of income and fear creates mental health conditions uncomfortable. Most of the people fearing increased level of alcohol and drug use, insomnia & anxiety.

COVID-19 leads to neurological and mental complications such as agitation and stroke. People with pre-existing mental disorders are more vulnerable and may stand a higher risk of severe outcomes and even death. Older people and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease and cancer are to develop serious

illness. People of all ages infected by COVID-19 virus. Older people and younger people infected by with COVID-19. People with pre-existing medical conditions appear more problem becoming severely ill with the virus. Older people face significant risk due to physiological changes due to aging. Women with children report symptoms of anxiety and depression compared to men. Mental health is increases due to social isolation, and loneliness. Stay at home order was issued also caused worry; depression sleeps disruptions and thoughts of suicide. Closure of universities, loss of income and employment also bring poor mental health. Children suffered from mental disruption distress due to disruption in routines, loss of social contact and stress in households.

The COVID-19 viral strain directly impacts the lungs reducing its capacity and limiting the intake of oxygen and leading pneumonia. It is especially deadly in individuals who has underlying illness and respiratory complications. COVID-19 put a risk of brain stroke in persons who initially developed COVID-19 symptoms and later develop stroke as a multi-organ involvement. Medical illness during COVID-19 related lockdown affected in rural site uncontrolled diabetes was reported. Change in sleep and appetite was observed. Dietary compliance was decreased. The COVID-19 impacts on society and enforce social distancing, lockdown and telecommunicating which decreased the physical activity. Staying at home with a sedentary life style and increased screen time, decreased energy consumption and increasing difficulty to the access fresh food and vegetable. Higher depression and lower well-being source were found to associate with the greatest adverse impact upon health related behaviour.

Finally COVID-19 outbreak affects all segments of the population and continues to affect populations including people living in poverty situations older persons, persons with diabetes youth and indigenous people. It ultimately affect more to poor people for example homeless people because they are unable to safe shelter in place people without access to running water, refugees migrants or displaced persons also stand to suffer due to limited movement, fewer employment.

#### **References:**

1. <https://ejmo.org>>pd
2. <https://en.wikipedia.org>>wiki>sev
3. <https://my.clevelandclinic.org>>health
4. <https://www.hopkinsmedicine.org>
5. <https://www.mohfw.gov.in>
6. <https://www.unicef.org>>file

## **CONSEQUENCES OF COVID-19 ON EMPLOYMENT AND LABOUR**

**Chandrakant W. Gajewad**

A. C. S. College, Shankarnagar, Tal. Biloli, Dist. Nanded

Corresponding author E-mail: [cgajewad115@gmail.com](mailto:cgajewad115@gmail.com)

### **Introduction:**

The sudden emergence of the covid-19 pandemic is dealing a serve blow to state economics. Business and labor or workers first and foremost states are strengthening their health care capacity in the event that demand for medical services surge. Ensuring there are enough licensed health care professionals is key component in this preparation.

In this Covid-19 pandemic situation state are also restricting access to in dining restaurants, theatres, concert halls, some retail stores and other non-essential businesses where large groups of people risk coming into close contact with one another. Many other business have voluntarily closed to protect their employees and the public as a whole. Perhaps the most visible closure has been the nearly universal shutdown or the professional sport industry all these changes in the market and largely effects on the employment and labor job.

These unprecedented challenges are having economics ripple effects across the country as thousands of Americans unexpectedly find themselves out of work with the potential for significant increases in unemployment.

The Covid-19 impacted on the small scale business service sectors business, transportation business industriesand such type of all the production units remained closed. Indirectly effect on the labor, employees and his family development as well as incompleteness of delay needsthere for this situation very bad position to the employment sectors

### **Objectives of the study:**

1. To study the covid-19 pandemic situation
2. To study the impact of covid-19 pandemic on the employment and labour

### **Research Methodology:**

The present research study is depend on the secondary data in this research paper used a descriptive research methods and collecting data through the sources of secondary data like Journals magazines, Newspapers, Research papers, Books etc.

### **Covid-19 Impact on the employment:**

The Covid-19 pandemic in Indian has vary severely impacted rather negatively the employment figures of India since early 2020. We have seen so many scenarios since March 2020 like corona Infection in huge number, corona testing, containment ambulances, and haltering sheltering of the health personal that is doctors, Nurses, other staff.

We have also seen another type of industrial units, a beeline of the job loser laboures, with hungry children, women, and elderly family member'scarrying belonging headings towards their native villages. These pictures were not only about unemployment but have raised several questions which our welfare state could not answer.

The study found that nearly half of formal salaried workers moved into informal work either or self-employment (30%), casual wage (10%), or informal salaried (09%), workers between late 2019 and 2020 and there was a decline in their income level as well in April and May the poorest (20%) of households lost their entire income and the richer households suffered losses of less than a quarter of their pre- pandemic incomes.

### **Covid-19 impact on labour:**

The novel corona virus pandemic and ensuring lockdowns have severely affected the labour market. In India, the pandemic and the prolonged lockdowns have led to a reduction or complete loss of their livelihoods, which has disproportionately affected the migrants and the working poor. The pandemics thus directly disrupted the lives of millions of works in countries across the world by causing lay-offs reduction in working hours and wages, emphasis on the catastrophic effects on the pandemic on working hours and employment globally and international labour organization report states that it is expected to erode 6.7% of working hours in the second quarter of 2020. Which is equivalent to that of 195 million full time workless

### **Conclusion:**

The country wide lockdown has brought nearly all economic activities to an abrupt halt. The disruption of demand and supply forces are likely to continue even after the lockdown is lifted. The longer the cries lasts, the more difficult it will be for firms to say afloat, This will negatively affect production in almost all domestics industries this in turn will have further spillover effects on investment, employment, labour, income and consumption, pulling down the aggregate growth rate of economy. This covid-19 pandemic situation majorly effect on employment and labour and his economic condition. This is presumably due to the renewed lockdowns all over the country and damage to consumer sentiment and overall economic productivity and Industrial production.

**References:**

1. [https://economictimes](https://economictimes.indiatimes.com) indiatimes.com
2. <https://time.com/imp-coronavirus-collapse>
3. <https://www.ideasforindu.in>
4. Mahendra Dev S. Impact of covid-19 on Indian economy, Research Paper (IGIDR)
5. Soverr Business Today- May 06, 2021.
6. Wadhwa R.K., Globalization of economy and India, V.D. Chopra. New Delhi-2006.
7. [www.ideasforindia.in/money-finance](http://www.ideasforindia.in/money-finance).
8. [www.liveinient.com](http://www.liveinient.com)

## **COVID 19 – IMPACT AND RESPONSE**

**Sonali Dalvi**

Department of Gynaecology and Obstetrics,

Dr. D. Y. Patil Homoeopathic Medical College and Research Centre,

Dr. D. Y. Patil Vidyapeeth, Pimpri, Pune, Maharashtra, India

Corresponding author E-mail: [dr.sonudalvi@gmail.com](mailto:dr.sonudalvi@gmail.com)

### **Abstract:**

The sudden emergence of COVID-19 pandemic has affected every individual's life in many aspects like physical and mental health, health care facilities, education, economy, employment. The article highlights how the COVID-19 pandemic has affected various perspectives of human life. Along with negative impacts, we also get to see the positive impacts of the pandemic.

**Keywords:** COVID-19, Pandemic, Impact, Positive, Negative

### **Introduction:**

Coronavirus disease-2019 (COVID-19) caused by SARS-CoV 2, a newly emergent coronavirus, that was first recognized in Wuhan, China, in December 2019. In India, the first case of COVID-19 was reported on 30<sup>th</sup> January 2020 in Kerala. On 25<sup>th</sup> March 2020, the Government of India declared a countrywide lockdown till 31<sup>st</sup> March, which was extended upto 14<sup>th</sup> April 2020. This lockdown was further extended to 3<sup>rd</sup> May, then upto 17<sup>th</sup> May 2020 (Park, 2021).

The sudden outbreak of this highly infectious pandemic has led to dramatic loss of human lives across the world. To control the spread of virus infection, the government had declared national lockdown. The lockdown was declared to control the number of rising cases of COVID 19 and secondly that people should remain at their home and be safe, but this restriction on movement had serious implications on the mental as well as physical health of the people. Private and public transports were not allowed to run.

### **Impact of this pandemic on human life:**

We get to see the positive and negative impacts of the pandemic on human life.

### **Negative impacts**

- The measures that were taken to control the spread of virus (use of mask, sanitizers) had significant effect on the environment.
- Biomedical waste increased since wearing of masks and use of sanitizers was compulsory.
- Inappropriate handling of these disinfectants and disposal of masks has contributed to environmental pollution.
- Excess use of chemicals, sanitizers and disinfectants has caused skin problems.

### **Mental health**

- There were serious implications of the pandemic and lockdown on the mental health of the people over the world. Mental health consequences due to the pandemic were fear of exposure and getting / acquiring the infection.
- Anxiety, depression due to isolation, or being quarantined due to infection.
- Feeling depressed due to movement restriction, loss of job and income and closure of entertainment places, shopping malls, multiplexes. Also people experienced change in the pattern of their sleep.
- People who got the infection and their family members had to suffer the stigma.
- Even, health care professionals and workers who were on essential duty and at the front had to face the social stigma and discrimination because of uncontrolled fear of infection amongst the general public.
- Emotions like grief, sorrow and bereavement were experienced by those who lost their near ones, especially the dependant members of the family.

During lockdown, even women experienced lot of stress due to increase in the household workload. Be it a joint family or nuclear the entire family household workload was on their shoulders. Helpers could not come due to lockdown and since all family members were at home. In the phase of pandemic, the situation was stressful for them due to work from home, salary reductions, loss of jobs. Women had to adjust with this difficult situation. Due to frustration there were lot of family issues and rise in cases of domestic violence. Due to loss of jobs and shortage of money there were quarrels in the families ([www.academic.oup.com](http://www.academic.oup.com)).

### **Economy**

The lockdown had serious impact on the economy of the world due to restriction on movement and temporary closure of shops, restaurants, theatres, malls and due to limited timings of shops for sell of essential goods.

Small businesses had to close down and due to loss of jobs large number of people had to migrate to their villages and home town.

### **Health services**

Right from the beginning of the pandemic, it was a major challenge to the medical services. To manage such infectious disease was a stressful and new experience for the health care providers. The infectious nature of the disease and the huge number of casualties across the world created a panic and fearful atmosphere worldwide. Medical services were disrupted.

People suffering from non-communicable health problems, cardiac, diabetes, orthopaedic conditions, and other chronic illnesses had to suffer due to limited health care services. There was non-availability of transport, less staff workers, and health care providers were assigned Covid duty and if required they were quarantined. So the general health care services were hampered. At times planned treatments and surgeries had to be postponed or were even cancelled. Being quarantined and isolated had psychological effects.

Health care workers were on essential duty throughout the first and second wave of the pandemic. They were at a high risk of acquiring the infection. They experienced lot of stress in managing a totally new infectious disease condition, constantly wearing their personal protective equipments or kits and constant fear of getting the infection. At times they had to do additional duties also. The family members of these health care professionals also had to adjust to this difficult situation ([www.who.int](http://www.who.int)).

### **Education**

- The pandemic affected the Education system too. Academics of the students got disturbed. Basic education of school children was affected.
- Offline education suddenly turned to online lectures and training. Everyone one had to adjust to this new mode of teaching learning.
- All had to start using apps for online trainings like zoom, google meet etc.
- Students had to attend online classes. It was difficult for kids to concentrate for entire lecture. Even their parents had to sit besides the child during the online lectures.
- At college level, most of them had online lectures and practicals. Along with the lectures, other academic material could be share with large number of students.
- Educational research surveys and exams were conducted through google forms (WHO, 2019).

### **Positive impacts**

1. Environment: During lockdown there was restriction on movement and only essential duty health workers were allowed to travel. So, Air pollution had decreased and air quality improved and one could see greenery and colorful flowers on highway. Even noise pollution decreased. We could see birds happily flying and singing cheerful, as if nature trying to balance the ecology system ([www.earth5r.org](http://www.earth5r.org)).
2. Though the majority education training was online, it was an eye opener for all. It helped people to develop their soft skills. Education activities, academic activities, business meetings could continue despite the lockdown because of advanced technology and people learned and upgraded themselves to use these latest technologies so that they could continue with their work. Many of us who were not so techno-savy suddenly started using various apps for communication ([www.aphrc.org](http://www.aphrc.org))
3. Various payment modes were through internet banking, google pay, phone pay.
4. Though health services were affected, people learned to manage minimal health problems and avoid unnecessary visits to hospital. They had to eat home-made food and could get time for exercise which itself was adding healthy lifestyle.
5. People understood the importance of immunity and learned different ways to boost up their immunity.
6. Due to lockdown, people realized that there was no need for unnecessary shopping and could save money.
7. They learned how to manage with the things that are available with them.
8. Family members got quality time for each other which helped in good bonding.
9. Some private organizations helped needy people during the pandemic for a social cause.
10. The pandemic has taught us that even the wildlife has right to live on this earth.

### **Conclusion:**

Though the Covid 19 pandemic had adverse effects on the human life in many aspects, we have learned a lot from this pandemic. It was an eye opener for handling various aspects of out life. We can conclude that the pandemic had a two way effect – negative and positive, on the people around the world.

It taught us how to be prepared and handle such medical emergency, how to manage life with limited resources even if one does not get access to everything, how to enjoy life with few things available, how to respect and support each other.

We must thank all healthcare professional, workers who rendered services to provide medical care during this pandemic. They deserve great appreciation.

**References:**

1. Park K. (2021): Park's Textbook of Preventive and Social Medicine, Chapter 5, Epidemiology of Communicable Disease, Page 191, 26<sup>th</sup> Edition. M/S Banarsidas Bhanot Publishers.
2. <https://www.who.int/news/item/13-10-2020-impact-of-covid-19-on-people's-livelihoods-their-health-and-our-food-systems>
3. <https://academic.oup.com/qjmed/article/113/8/531/5860841>
4. <https://earth5r.org/impacts-corona-virus-environment/>
5. <https://aphrc.org/blogarticle/useful-soft-skills-for-students-during-covid-19-pandemic/>
6. <https://www.who.int/news/item/01-06-2020-covid-19-significantly-impacts-health-services-for-noncommunicable-diseases>
7. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/question-and-answers-hub/q-a-detail/coronavirus-disease-covid-19-schools>

## **COVID-19 TO OMICRON - AN OVERVIEW**

**M. Meena\* and A. Vijayalakshmi**

Department of Chemistry, R. M. K. Engineering College,  
Kavaraipettai 601 206, India

\*Corresponding author E-mail: mm.sh@rmkec.ac.in

### **Abstract:**

The spreading of disease and emergence with pandemic potential frequently occur in world history. Human life was affected by pandemics and epidemics such as flu, cholera, plague, Severe Acute Respiratory Syndrome, Coronavirus (SARS-CoV), and Middle East respiratory syndrome coronavirus (MERS-CoV). These viruses are constantly changing, and that can cause a new variant or strain of a virus. For example, there are many variants of Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2), which caused coronavirus disease 2019 (COVID-19). World Health Organization designated five SARS-CoV-2 variants of Alpha, Beta, Gamma, Delta, and Omicron. This paper gives an overview of the history of pandemics, variants of COVID-19, and vulnerable categories of COVID-19, test, treatment, and vaccines for COVID-19, and impacts of COVID-19.

### **Introduction:**

The world is currently under the crisis of the pandemic situation of COVID-19. The term coronavirus was derived from a Latin word. In Latin, corona means crown or garland. The nomenclature of coronavirus is due to the spikes that protrude from its membranes that resemble the tines of a crown or the sun's corona. Coronaviruses belong to the Coronaviridae family in the Nidovirales order. At the end of 2019, a coronavirus outbreak was declared in Wuhan, China. The virus belongs to the  $\beta$  group of coronaviruses. Chinese researchers named this virus as Wuhan coronavirus or 2019 novel coronavirus (2019-nCov). The International Committee on Taxonomy (ICTV) named the virus as SARS-CoV-2 and the disease COVID-19 [1-5]. The virus has not only become a public health crisis but has also affected the global economy.

### **History of pandemics:**

World has faced various pandemics in the history. Some of them are listed below [6, 7].

**Table 1: Pandemic history**

Years	Pandemics	Pathogens	Vectors	Number of Death
541–543	Plague of Justinian	<i>Yersinia pestis</i>	Fleas associated with wild rodents	3 lakhs
1347–1351	Black Death	<i>Yersinia pestis</i>	Fleas associated with wild rodents	25 million
1817–1886	cholera pandemic	<i>Vibrio cholerae</i>	Contaminated water	3–5 million people a year
1885–ongoing	Third plague	<i>Yersinia pestis</i>	Fleas associated with wild rodents	15 million
1889–1893	Russian flu (or) Asiatic flu	Influenza	Avian	1 million
1918–1919	Spanish flu	Influenza A/H1N1	Avian	500 million
1957–1959	Asian flu	Influenza A/H2N2	Avian	1.1 million
1968–1970	Hong Kong flu	influenza A/H3N2	Avian	1.5 to 2 million
2002–2003	Severe acute respiratory syndrome (SARS)	SARS-CoV	Bats, palm civets	813
2009–2010	Swine flu	Influenza A/H1N1	Pigs	284,000
2015-ongoing	Middle East respiratory syndrome (MERS)	MERS-CoV	Bats, dromedary camels	888
2019-ongoing	COVID-19	SARS-CoV-2	Bats, pangolins	54.3L (As of 31/12/2021)

**Variants of COVID-19 (or) SARS-CoV-2:**

Viruses constantly change through mutation. When a virus has one or more new mutations it's called a variant of the original virus. Several notable variants of SARS-CoV-2 emerged in late 2020. The World Health Organization has currently declared five variants of concern [8-10] and it is listed in Table 2.

**Table 2: Variants of COVID-19 (or) SARS-CoV-2**

Name of the variant (WHO label)	First outbreak	Earliest documented samples	Transmissibility	Hospitalization	Mortality rate
Beta	South Africa	May 2020	+25% (20–30%)	<i>Under investigation</i>	Possibly increased
Alpha	United Kingdom	September 2020	+29% (24–33%)	+52% (47–57%)	+59% (44–74%)
Delta	India	October 2020	+97% (76–117%)	+85% (39–147%)	+137% (50–230%)
Gamma	Brazil	November 2020	+38% (29–48%)	Possibly increased	+50% (50% - 90%)
Omicron	South Africa	November 2021	Possibly increased	–41% (37–45%)	<i>Under investigation</i>

As per the latest information on 30/12/2021, Israel reports the double infection of covid and influenza called "**Florona**". A pregnant woman in Israel was infected with 'florona' who was not vaccinated [11]. The disease is not a new variant, but it has flu and COVID-19 at the same time.

**Test to identify COVID-19:**

Persons with signs or symptoms of COVID-19 should undergo diagnostic testing. COVID-19 can be identified by antigen and antibody tests [12-13]. The list of tests to identify COVID-19 is given in Table 3.

**Vulnerable categories of Covid-19 and Omicron:**

By comparing Covid-19 and omicron, the delta variant has nine mutations. The more significant number of mutations in the omicron variant (50 mutations) may mean that it could be more transmissible and/or better at evading immune protection – a very concerning prospect. In addition, scientific experts reported that people with co-morbidities and non-vaccinated are more vulnerable to COVID-19 and Omicron [14-16].

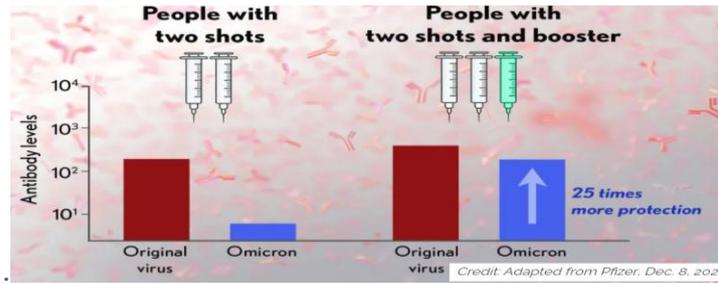
A new study conducted by doctors at a Delhi hospital revealed that people with blood groups of A, B, and Rh factor positive are "more susceptible to COVID-19 infection" than those with O or AB group and Rh-negative. In addition to that, male patients of blood group B are more prone to COVID-19 than the female patients with blood group B, and blood group AB was observed to be more susceptible to infection in patients with the age group of over 60 years. The study also claimed that blood group A and Rh<sup>+</sup> types are associated with a decrease in the

recovery period, whereas blood group O and Rh- are associated with an increase in the recovery period [17, 18],

According to Sigal and colleagues' antibody development study with the vaccine, the neutralizing ability of samples from those who had received two shots had a more than 25-fold decline relative to the original virus. Together with the South Africa data, it suggests that the two-dose series may not be enough to protect against breakthrough infections with the Omicron variant [19].

**Table 3: Variants of COVID-19 (or) SARS-CoV-2**

<b>Name of the test</b>	<b>Sample</b>	<b>Time taken to get result</b>	<b>Accuracy</b>	<b>identification</b>	<b>Cost</b>
Molecular (RT-PCR) tests (Direct test)	A nasal or throat swab sample is taken.	1 or 2 days	Most accurate, high sensitivity and specificity.	It diagnoses the active coronavirus infection. If the virus is present in the sample, the test is positive.	Rs 2000- Rs 3000.
COVID-19 Antigen Tests	A nasal or throat swab sample is taken.	1 hour or less.	Highly accurate. A negative result might need to be confirmed using a molecular test if the result is positive.	Diagnose active coronavirus in the sample.	Rs 400- Rs 500
COVID-19 Antibody Tests (or) Serology test (indirect test)	Blood sample	1-3 days	Sometimes a second COVID-19 antibody test might be needed for more accurate results.	Find out the infection with the virus causing COVID-19 in the past and now have antibodies against it.	Rs 500- Rs 600.
Lateral flow test	A nasal or throat swab sample is taken.	1 day	98% accurate	It is used to confirm the presence or absence of a target analyte, such as pathogens.	Rs 250-Rs 300.



**Figure 1: Protection against pandemic after number of vaccine doses**

**Medicines and treatment for COVID-19:**

The essential protocol and non-protocol drugs used for the management of COVID-19 [20] are listed in Table 4.

**Table 4: Essential protocol and non-protocol drugs**

Protocol drugs	Non-protocol drugs
Remdesivir	Favipiravir
Enoxaparin	Amphotericin
Methyl Prednisolone	Apixaban
Dexamethasone	
Tocilizumab	
Ivermectin	

Based on the disease severity National institute of health gave guidelines for the treatment of covid-19 [21] and listed below in the Table 5.

The most important treatment to cure coronavirus is convalescent plasma therapy. It will be given to people with COVID-19 who are in the hospital and are early in their illness or have a weakened immune system. Convalescent plasma therapy may help people recover from COVID-19. Data from several clinical trials, studies, and a national access program suggest that convalescent plasma with high antibody levels may lessen the severity or shorten the duration of COVID-19 in some people when given early in the disease or in those with weakened immune systems. However, more research is needed to determine if convalescent plasma therapy will effectively treat COVID-19 [22].

**Table 5: Guidelines for the treatment of covid-19**

Disease severity	Panel’s recommendations
Hospitalized but does not require supplemental oxygen	<ul style="list-style-type: none"> <li>• The COVID-19 Treatment Guidelines Panel recommends against the use of dexamethasone (AIIA) or other corticosteroids (AIII)</li> <li>• There is insufficient evidence to recommend either for or against the routine use of remdesivir to treat COVID-19 in hospitalized patients who do not require supplemental oxygen. However, use may be appropriate in patients at high risk of disease progression.</li> </ul>
Hospitalized and required supplemental oxygen	<p>The Panel recommends using 1 of the following options</p> <ul style="list-style-type: none"> <li>• <b>Remdesivir</b> (e.g., for patients who require minimal supplemental oxygen) (<b>BIIa</b>)</li> <li>• <b>Dexamethasone plus remdesivir (BIIb)</b></li> <li>• <b>Dexamethasone (BI)</b>;</li> <li>• For patients on dexamethasone who have rapidly increased oxygen needs and systemic inflammation, add a second <b>immunomodulatory drug</b> (e.g., <b>tocilizumab</b> or <b>baricitinib</b>) (<b>CIIa</b>)</li> <li>• If dexamethasone is not available, an alternative <b>corticosteroid</b> such as <b>prednisone, methylprednisolone, or hydrocortisone</b> can be used (<b>BIII</b>).</li> </ul>
Patients Who Require Oxygen Through a High-Flow Device or Noninvasive Ventilation	<ul style="list-style-type: none"> <li>• The Panel recommends using 1 of the following options for hospitalized patients who require oxygen through a high-flow device or NIV: <ul style="list-style-type: none"> <li>○ Dexamethasone (AI)</li> <li>○ Dexamethasone plus remdesivir (BIII)</li> </ul> </li> <li>• For patients who have rapidly increased oxygen needs and have increased markers of inflammation, add either baricitinib (BIIa) or tocilizumab (BIIa) (drugs are listed alphabetically) to 1 of the 2 options above.</li> </ul>
Patients Who Require Mechanical Ventilation or Extracorporeal Membrane Oxygenation	<ul style="list-style-type: none"> <li>• The Panel recommends using dexamethasone for hospitalized patients with COVID-19 who require mechanical ventilation or ECMO (AI).</li> <li>• The Panel recommends using dexamethasone plus tocilizumab for patients with COVID-19 within 24 hours of admission to the ICU (BIIa).</li> </ul>

**Vaccines for COVID-19:**

Vaccines are the best way to train our immune system to recognize viruses, or pieces of viruses, called antigens. Our immune system creates antibodies and other defenses to protect us. When a vaccinated person is exposed to SARS-CoV-2, their immune system will recognize the viral antigens and spring into action to keep them healthy.

All vaccine platforms are designed to train our immune system. There are two categories of COVID-19 Vaccines: Component Viral Vaccines and Whole Virus Vaccines [23].

**Table 6: Component viral vaccines:**

Protein Subunit	Contains isolated and purified viral proteins
Virus-like particles (VLP)	It contains viral proteins that mimic the structure of the virus but no genetic material.
DNA-based and RNA-based	It contains viral genetic material (such as mRNA), which provides the instructions for making viral proteins
Non-Replicated Viral Vector	Contains viral genetic material packaged inside another harmless virus that cannot copy itself
Replicating Viral Vector	Contains viral genetic material packaged inside another harmless virus that can copy itself
<b>Whole viral vaccines:</b>	
Inactivated	Contains copies of the virus that have been killed (inactivated)
Live-Attenuated	Contains copies of the virus that have been weakened (attenuated)

As of 31/12/2021, World Health Organization approved 10 vaccines for COVID-19 [24-25].

Name of the vaccine	Number of countries approved and trials
Novavax. NVX-CoV2373. Phase 1.	<ul style="list-style-type: none"> <li>• Approved in 30 countries</li> <li>• 11 trials in seven countries</li> </ul>
Serum Institute of India. COVOVAX (Novavax formulation)	<ul style="list-style-type: none"> <li>• Approved in 3 countries</li> <li>• 2 trials in 1 country</li> </ul>
Moderna. mRNA-1273.	<ul style="list-style-type: none"> <li>• Approved in 83 countries</li> <li>• 35 trials in 9 countries</li> </ul>
Pfizer/BioNTech. BNT162b2.	<ul style="list-style-type: none"> <li>• Approved in 130 countries</li> <li>• 49 trials in 23 countries</li> </ul>
Janssen (Johnson & Johnson) Ad26.COV2.S.	<ul style="list-style-type: none"> <li>• Approved in 99 countries</li> <li>• 16 trials in 18 countries</li> </ul>
Oxford/AstraZeneca. AZD1222.	<ul style="list-style-type: none"> <li>• Approved in 134 countries</li> <li>• 52 trials in 23 countries</li> </ul>
Serum Institute of India. Covishield (Oxford/AstraZeneca formulation)	<ul style="list-style-type: none"> <li>• Approved in 47 countries</li> <li>• 2 trials in 1 country</li> </ul>
Bharat Biotech. Covaxin.	<ul style="list-style-type: none"> <li>• Approved in 12 countries</li> <li>• 7 trials in 1 country</li> </ul>
Sinopharm(Beijing) BBIBP-CorV (Vero cells)	<ul style="list-style-type: none"> <li>• Approved in 80 countries</li> <li>• 19 trials in 10 countries</li> </ul>
Sinovac CoronaVac	<ul style="list-style-type: none"> <li>• Approved in 48 countries</li> <li>• 28 trials in 8 countries</li> </ul>

**Impact of COVID - 19:**

COVID-19 affects our routine life and affects nation's economy and other things [26].

Name	Impact
Healthcare	<ul style="list-style-type: none"> <li>• Challenges in the diagnosis, quarantine, and treatment of suspected or confirmed cases</li> <li>• High burden of the functioning of the existing medical system</li> <li>• Patients with other diseases and health problems are getting neglected</li> <li>• Overload on doctors and other healthcare professionals, who are at a very high risk</li> <li>• Overloading of medical shops</li> <li>• Requirement for high protection</li> <li>• Disruption of medical supply chain</li> </ul>
Economic	<ul style="list-style-type: none"> <li>• Slowing of the manufacturing of essential goods</li> <li>• Disrupt the supply chain of products</li> <li>• Losses in national and international business</li> <li>• Poor cash flow in the market</li> <li>• Significant slowing down in the revenue growth</li> </ul>
Social	<ul style="list-style-type: none"> <li>• The service sector is not being able to provide their proper service</li> <li>• Cancellation or postponement of large-scale sports and tournaments</li> <li>• Avoiding the national and international traveling and cancellation of services</li> <li>• Disruption of celebration of cultural, religious, and festive events</li> <li>• Undue stress among the population</li> <li>• Social distancing with our peers and family members</li> <li>• Closure of the hotels, restaurants, and religious places</li> <li>• Closure of places for entertainment such as movie and play theatres, sports clubs, gymnasiums, swimming pools, etc.</li> <li>• Postponement of examinations</li> </ul>
Environment	<ul style="list-style-type: none"> <li>• Air quality has improved in many cities with a reduction in greenhouse gas due to less consumption of fossil fuels.</li> <li>• Reduction of water pollution in different parts of the world.</li> <li>• Ecological restoration and assimilation of tourist spots</li> <li>• Reduction of noise pollution.</li> <li>• Reduction of resource consumption.</li> <li>• Increased biomedical waste generation due to the use of PPE (e.g., face mask, hand gloves etc.), causes soil pollution and the generation of more plastic waste.</li> </ul>
Education	<b>Students: [27-31]</b>

	<ul style="list-style-type: none"> <li>• Contract cheating.</li> <li>• Academic file sharing and exam cheating</li> <li>• Exam cheating</li> <li>• Attitude change</li> <li>• Rural students do not have the facility to learn online teaching.</li> <li>• Lack of student to teacher interaction has also led students to feel less passionate about the integrity of their work.</li> </ul> <p><b>Teachers:</b></p> <ul style="list-style-type: none"> <li>• Switch over from traditional blackboard teaching to technology-based teaching</li> <li>• Online proctoring exam</li> <li>• Online valuation</li> <li>• Attended more conferences, webinar, workshop.</li> <li>• More publication.</li> <li>• Traveling time saved.</li> <li>• More workloads.</li> </ul>
Individuals [32]	<ul style="list-style-type: none"> <li>• Altered daily routine</li> <li>• Affects mental health</li> <li>• Many people experience stress, anxiety, fear, sadness and loneliness.</li> <li>• Feel lazy</li> <li>• No physical activity</li> <li>• More work pressures</li> <li>• financial pressures</li> <li>• social isolation</li> <li>• Addicted to electronic gadgets and social media</li> </ul>

**Conclusion:**

The recent COVID-19, because of mutations, is impacting the people and economy across the globe. This paper critically analyzed the history, variants, vaccines and medicines, and impacts on society. In the current era, with the technological advancements in science, we are still fighting with a virus that is not seen through the naked eye. Though steps are being taken in the war foot, it has still not ended. Man started his progress against nature in many things. Unless steps are being taken with the foreseeing, humankind may face such disasters in the future. A suitable scientific modeling and proper causal analysis may limit the frequency of such virus attacks.

## References:

1. Muhammad Adnan Shereen et al. (2020) COVID-19 infection: origin, transmission, and characteristics of human Coronaviruses, *J Adv Res.* Vol.24: pp.91–98. DOI: <https://doi.org/10.1016/j.jare.2020.03.005>.
2. Wang Net al. (2013) Structure of MERS-CoV spike receptor-binding domain complexed with human receptor DPP4, *Cell Research.*; Vol.23(8) pp. 986.
3. Cui Jet al.(2019). Origin and evolution of pathogenic coronaviruses, *Nature Reviews Microbiology.* Vol.17(3) pp. 181-92.
4. Lai C-C et a;. (2020) Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): the epidemic and the challenges, *International journal of antimicrobial agents.* pp. 105924.
5. Organization WH. Laboratory testing for coronavirus disease 2019 (COVID-19) in suspected human cases: interim guidance, 2020. World Health Organization, 2020.
6. Jocelyne Piret and Guy Boivin (2021), Pandemics Throughout History, *Front Microbiol.* Vol.11 p.631736. DOI: 10.3389/fmicb.2020.631736.
7. Meena M and Vijayalakshmi A (2020), Pandemics / Epidemics – A causal analysis, *Interciencia Journal*, Vol.45(9), pp. 34-43.
8. World Health Organization (2021). [Tracking SARS-CoV-2 variants.](#) *World Health Organization.* Archived from the original on 6 June 2021. Retrieved 28 November 2021.
9. [SARS-CoV-2 variants of concern and under investigation in England, technical briefing 10](#) . Public Health England. 7 May 2021. GOV-8226. Archived (PDF) from the original on 8 May 2021.
10. [Weekly epidemiological update on COVID-19 - 20 July 2021](#) (Situation report). World Health Organization. 20 July 2021. Archived from the original on 23 July 2021.
11. <https://www.ndtv.com/world-news/israel-detects-first-case-of-florona-disease-report-2681965>
12. <https://www.metropolisindia.com/blog/popular-article/different-types-of-covid-19-tests-and-their-significance/>
13. [https://www.cebm.net/wp-content/uploads/2020/04/CurrentCOVIDTests\\_descriptions-FINAL.pdf](https://www.cebm.net/wp-content/uploads/2020/04/CurrentCOVIDTests_descriptions-FINAL.pdf)
14. [https://www.business-standard.com/article/current-affairs/will-new-strain-omicron-be-more-contagious-than-delta-virologist-explains-121120200238\\_1.html](https://www.business-standard.com/article/current-affairs/will-new-strain-omicron-be-more-contagious-than-delta-virologist-explains-121120200238_1.html)
15. <https://www.republicworld.com/world-news/rest-of-the-world-news/omicron-virologists-share-who-is-most-at-risk-and-vulnerable-to-new-covid-19-variant.html>

16. Meena M and Vijayalakshmi A (2021) The Struggle of India in COVID-19 Combat, Indian Journal of Science and Technology, Vol. 14(25) pp. 2106-2110. <https://doi.org/10.17485/IJST/v14i25.833>
17. <https://zeenews.india.com/india/amid-omicron-scare-study-finds-people-with-a-b-blood-groups-rh-more-vulnerable-to-covid-19-2415030.html>
18. A. Vijayalakshmi et al., (2020) Statistical Analysis on Vulnerable Categories of Covid-19 - A Birds Eye View, Vol.14 (7), pp.1136-1142.
19. <https://directorsblog.nih.gov/2021/12/14/the-latest-on-the-omicron-variant-and-vaccine-protection/>
20. <https://timesofindia.indiatimes.com/india/essential-covid-19-drugs-in-india-all-you-need-to-know/articleshow/82771868.cms>
21. <https://www.covid19treatmentguidelines.nih.gov/management/clinical-management/hospitalized-adults--therapeutic-management/>
22. <https://www.mayoclinic.org/tests-procedures/convalescent-plasma-therapy/about/pac-20486440>
23. <https://covid19.trackvaccines.org/types-of-vaccines/>
24. [https://en.wikipedia.org/wiki/List\\_of\\_COVID-19\\_vaccine\\_authorizations](https://en.wikipedia.org/wiki/List_of_COVID-19_vaccine_authorizations)
25. <https://covid19.trackvaccines.org/agency/who/>
26. Abid Haleem and Mohd Javaid(2020): Effects of COVID-19 pandemic in daily life, *Curr Med Res Pract*. Vol. 10(2) pp. 78–79. doi: 10.1016/j.cmrp.2020.03.011
27. Lancaster T and Cotarlan C (2021). Contract cheating by STEM students through a file-sharing website: a Covid-19 pandemic perspective. *International Journal for Educational Integrity*. Vol.17 (1):p.3. doi:10.1007/s40979-021-00070-0. ISSN 1833-2595.
28. Chin M (2020). Exam anxiety: How remote test-proctoring is creeping students out. *The Verge*.
29. Is online learning shrinking your attention span?. *The Beacon*. Retrieved 10 December 2020.
30. COVID-19 and student performance, equity, and U.S. education policy: Lessons from pre-pandemic research to inform relief, recovery, and rebuilding. *Economic Policy Institute*. Retrieved 10 December 2020.
31. <https://assets.kpmg/content/dam/kpmg/in/pdf/2021/10/nep-covid-19-school-education-assessments-ed-tech.pdf>
32. <https://www.mayoclinic.org/diseases-conditions/coronavirus/in-depth/mental-health-covid-19/art-20482731>

## OMICRON VARIANT: A NEW CHAPTER IN THE COVID-19

Harsha D. Pardeshi<sup>1</sup>, Varsha D. Jayaswal<sup>1</sup>, Leena P. Shirsath<sup>1</sup>,  
Harshal M. Bhamare<sup>2</sup> and Sandip P. Patil<sup>1\*</sup>

<sup>1</sup>Department of Microbiology and Biotechnology,  
R. C. Patel Arts, Commerce and Science College, Shirpur-425405, India

<sup>2</sup> Department of Biotechnology,  
SSVP Sanstha's Late Karmveer Dr. P. R. Ghogrey Science College, Dhule-424005, India

\*Corresponding author E-mail: [patilsandip3@gmail.com](mailto:patilsandip3@gmail.com)

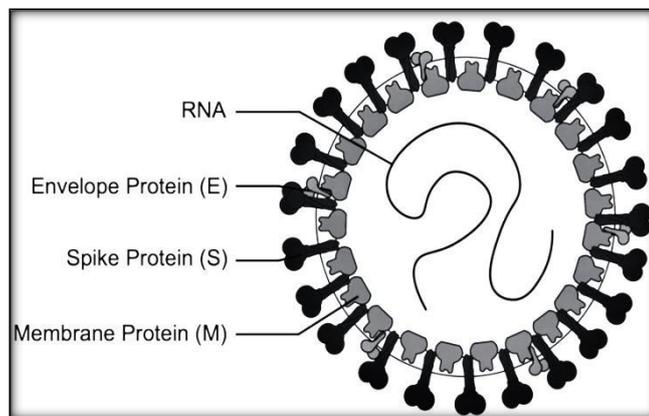
### Introduction:

A virus SARS-CoV-2, causing COVID-19 is more prone to the mutation like all RNA viruses (WHO, 2020). Due to numerous mutations in the spike protein of the SARS-CoV-2 variant the new variant of concern is Omicron (B.1.1.529) which raises serious concerns in all over world. It may significantly limit the antibody-mediated neutralization and increase the risk of reinfections (Wilhelm *et al.*, 2021). While a rapid increase in the number of cases of Omicron SARS-COV-2 is being reported worldwide, until now there has been uncertainty about the efficacy of vaccinations and monoclonal antibodies. A new variant like Omicron is the reminder that, the COVID-19 pandemic is far from over. It is a new variant of SARS-CoV-2 that has recently reported from South Africa on 24<sup>th</sup> November 2021 called as B.1.1.529 or Omicron (a Greek alphabet). This variant has shown a very large number of mutations, especially more than 30 mutations occur on the viral spike protein, which is the key target of the immune response (WHO and MoHFW, GoI). Due to numerous mutations in the spike protein (S), which is the antigenic target of vaccine-elicited antibodies, Omicron raises serious concerns of significant reduction in vaccine efficacy and an increased risk of reinfection. Compared to the parental variant (B.1), Omicron S has 30 non-synonymous substitutions, three small deletions, and an insertion. Fifteen of these mutations are in the receptor binding domain (RBD), a major target of neutralizing antibodies (NAbs). Several of the S mutations observed in Omicron were reported in preceding variants of concern like Alpha, Beta, Gamma, and Delta as well as variants of interest such as Kappa, Zeta, Lambda, and Mu that were associated with higher transmissibility and immune escape. Out of all these variants, Beta and Mu have the most severe immune evading capacities. Due to the high accumulation of these mutations in spike protein, Omicron synergistic

effects are expected and it is unclear that prior immunity protects against re-infections or not (Wilhelm *et al.*, 2021).

### Structural details of previous strains:

The coronavirus particles are organized with long RNA polymers which are tightly packed into the center and surrounded by a protective capsid, which is a lattice of repeated protein molecules referred to as coat or capsid proteins. In coronavirus, these proteins are called nucleocapsid (N). The core particle is further surrounded by an outer membrane envelope which is made of lipids (fats) with proteins inserted (Huang *et al.*, 2020). These membranes derive from those cells in which the virus was last assembled but are modified to contain specific viral proteins, including the spike (S), membrane (M), and envelope (E) proteins.



**Figure1: General structure of SARS-COV-2 virus**

An important set of the proteins in the outer membrane project out from the particle and are known as spike proteins (S). These S- proteins which are recognized by receptor proteins of the host cells that are infected. Coronavirus particles rapidly inactivated or killed by exposure to 70% ethanol or 90% isopropanol (rubbing alcohol), hydrogen peroxide solutions, hypochlorite bleach, soaps and detergents, as well as by UV light and the high temperature (WHO, 2019).

Initially, Coronaviruses infects to human lung cells through a receptor for an enzyme called Angiotensin Converting Enzyme 2 (ACE2). In the first step of viral infection, the virus spike protein recognizes and binds to the ACE2 receptor (Bosch *et al.*, 2003; Hoffmann *et al.*, 2020b). The virus is then incorporated into the lung cells through ACE2 receptor and the viral RNA is released into the cytoplasm. The viral RNA molecules recruit the cellular apparatus to make thousands of copies of the viral RNA and also instruct the cells to synthesize thousands of nucleocapsids, membranes, envelopes, and spike proteins. These assemble into new virus

particles which bud out of the cell surface membrane. The cells release the newly formed viral particles propagating the infection and eventually die (WHO, 2019).

### **Structural details and infectivity of Omicron:**

The new omicron variant is structurally similar with that of previous strains beside some important mutations. The Omicron variant has a total of 60 mutations compared to the original Wuhan variant (50 non-synonymous mutations, 8 synonymous mutations, and 2 non-coding mutations). Thirty-two mutations affect the spike protein, the main antigenic target of antibodies generated by infections and of many vaccines widely administered. Many of those mutations had not been observed in other strains like alpha, Beta, Gamma and Delta. The variant is characterized by 30 amino acid changes, three small deletions, and one small insertion in the spike protein compared with the original virus, of which 15 are located in the receptor-binding domain (residues 319–541). It also carries a number of changes and deletions in other genomic regions. Additionally, the variant has three mutations at the furin cleavage site. The furin cleavage site increases SARS-CoV-2 infectivity. The mutation in furin cleavage site play significant role in infection (Tok and Tatar, 2017).

The Omicron variant's genetic code analysis shows that it contains an unusually high number of mutations compared with other variants. Some of these individual mutations had already been seen in other SARS-CoV-2 variants, while some are new. However, Omicron has accumulated multiple mutations (~50), many of which (26–32) are located on the spike protein. The number and location of the mutations is a concern because they are related to areas of the spike protein which are involved in virus transmissibility and recognition of the virus by antibodies. Other changes concern other parts of the virus, including a special protein called a nucleoprotein that is linked with the virus's "fitness" in human cells (Saxena *et al.*, 2021).

After a COVID-19 infection or vaccination, a mixture of antibodies against the virus is made, which react to different parts of the spike protein. Therefore, if the virus has a mutation on one part of the spike protein which means that some antibodies cannot neutralize the virus, others can act on a different part of the protein. This creates redundancy in the immune response, giving people extra protection. Since Omicron has mutations at all the main sites that recognize by antibodies, scientists are concerned that the variant has the potential to evade the antibody mediated immune response. This can be tested in laboratory studies and this research is ongoing in various laboratories. However, the immune system and response is complex, with protection also mediated by other specialized immune cells. Scientists think that this part of the immune response is less susceptible to viral mutations than the antibody response.

### **Epidemiology:**

On 26 November 2021, the National Institute for Communicable Diseases in South Africa announced that, out of 30,904 COVID-tests (in one day) detected 2,828 are new COVID infections with a 9.2% positivity rate. One week later, on 3 December 2021, the NICD announced that 65,990 COVID tests had found 16,055 new infections (5.7 times as many as seven days before; positivity rate 24.3%) and that 72% of them were found in Gauteng (A province in South Africa). This province of South Africa is densely populated at about 850 inhabitants per km<sup>2</sup>. Gauteng's capital Johannesburg is a megacity (about 5.5 million inhabitants in the city itself plus 9.5 million in the urban region). In November 2021 the transmissibility of the Omicron variant, is compared with the Delta variant or other variants of the COVID-19 virus, was still uncertain. It was found that, an Omicron variant also has the ability to infect previously Covid-positive people.

It has been estimated that, the Omicron variant diverged in late September or early October 2021, based on Omicron genome comparisons. Sequencing data suggests that Omicron is the dominant variant in South Africa by November 2021, the same month where it had been first identified in the country. Data from South Africa suggests that Omicron has a pronounced growth advantage there. However, this may be due to transmissibility or immune escape related, or both.

A study suggests that, Omicron has picked up one of its mutations from HCoV-229E, a common cold coronavirus strain, a genetic sequence also present in the human genome. This appears to aid the virus in circumventing the human immune system. In the UK, the logarithmic growth rate of Omicron associated S gene target failure (SGTF) cases analyzed with S gene target positive (SGTP) cases and it was estimated that, at 35% per day which is exceptionally high. Furthermore, by mid-December Omicron will be growing past Delta. Without presuming behavior change in response to the variant, a million infections per day by December 24 are projected for a 2.5 days doubling time. Denmark, in which the logistic growth is similar (~33%/day), appears to be ahead in Europe, and the Omicron variant there may become the most prevalent strain around 14 December. Switzerland and Germany is not far behind. Omicron became the most prevalent variant in Scotland around 11 December. In Ontario, it appears to have become the most prevalent strain around 13 December. Other countries may not have enough timely information, as they may not use Thermo Fisher TaqPath Assay or equivalent for their PCR tests to indicate Omicron.

### **Symptoms:**

There is no information to suggest that Omicron causes different COVID-19 symptoms from other COVID-19 variants.

### **Diagnosis:**

The FDA has published guidelines on how PCR tests will be affected by Omicron. "*SARS-CoV-2 Viral Mutations: Impact on COVID-19 Tests*". Tests that detect multiple gene targets will continue to identify the testee as positive for COVID-19. S-gene dropout or target failure has been proposed as a shorthand way of differentiating Omicron from Delta.

The variant may be identified by sequencing and genotyping. The BA.1 lineage, but not the BA.2 lineage, can be identified by S gene target failure (SGTF) of the TaqPath assay, a trait shared with subsets of SARS-CoV-2 Alpha variant. Several other commercial assays can also be used, though they test for different amino acid substitutions.

This variant has a large number of mutations, some of which are concerning. Preliminary evidence suggests an increased risk of reinfection with this variant, as compared to other VOCs. The number of cases of this variant appears to be increasing in almost all provinces in South Africa. Current SARS-CoV-2 PCR diagnostics continue to detect this variant. Several labs have indicated that for one widely used PCR test, one of the three target genes is not detected (called S gene dropout or S gene target failure) and this test can therefore be used as marker for this variant, pending sequencing confirmation. Using this approach, this variant has been detected at faster rates than previous surges in infection, suggesting that this variant may have a growth advantage.

### **Detection:**

The PCR and antigen-based rapid diagnostic tests are widely used to detect infection of COVID-19, including Omicron.

PCR tests can easily detect Omicron infections. Experts are confident that lateral flow tests can detect Omicron infections, but this needs to be verified. PCR and lateral flow tests are molecular tests to detect active infections. PCR tests are processed in laboratories with results in 24-48 hours, whereas lateral flow tests (also called antigen tests) are used by individuals who process the sample themselves and receive a result in 20 minutes.

The World Health Organization states that PCR tests can detect Omicron infections. Most PCR tests target several parts of the viral genome; one target is the S-gene (that encodes the spike protein). As Omicron has a mutation here, that means that this part of the PCR test will fail. This is called S-gene drop-out or target failure. While not 100% accurate, it can be used as a proxy method for tracking the variant, especially if other dominant circulating variants are S-

gene positive, as the Delta variant is. Other parts of the Omicron genome will be detected by PCR tests, so labs can still identify positive cases.

**Prevention:**

- a. Wear a mask that covers your nose and mouth. Make sure that your hands are clean when you put on and remove your mask.
- b. Keep a physical distance of at least 1 metre from others.
- c. Avoid poorly ventilated or crowded spaces.
- d. Open windows to improve ventilation.
- e. Wash your hands regularly.
- f. When it's your turn, get vaccinated. WHO-approved COVID-19 vaccines are safe and effective.

**Impact of COVID-19:**

**1 Impact on economy**

The COVID-19 pandemic shows greater economic consequences beyond the spread of the disease itself and efforts to quarantine it. As the SARS-CoV-2 virus is spread around the globe, concerns have shifted from supply-side manufacturing issues to decreased business in the services sector. This pandemic is responsible for the 2nd largest global recession in history, with more than a third of the global population at the time being placed on lockdown.

During the earlier stage of the pandemic, supply shortages were expected to affect a number of sectors due to panic buying, increased usage of goods to fight the pandemic, and disruption to factories and logistics in mainland China. The widespread reports shows shortages of pharmaceuticals, with many areas seeing panic buying and consequent shortages of food and other essential grocery items. The technology industry, in particular, has been warning about delays to shipments of electronic goods.

Global stock markets fell on 24 February 2020 due to rise in the number of COVID-19 cases in China. On 28 February 2020, stock markets worldwide realized their largest single-week declines since the financial crisis of 2007-2008. This culminated in the 2020 stock market crash. Possible instability generated by an outbreak and result in temporary food shortages, price spikes, and disruption to markets. Such price rises would be felt most by vulnerable populations who depend on markets for their food as well as those already depending on humanitarian assistance to maintain their livelihoods and food access.

Many fashion, sport, and technology events canceled or changed and conducted to be online. While the monetary impact on the travel and trade industry is yet to be estimated, it is likely to be in the billions and increasing. Amidst the recovery and containment, the world economic system is characterized as experiencing significant, broad uncertainty. Economic forecasts and consensus among macroeconomics experts show significant disagreement on the overall extent, long-term effects and projected recovery. Risk assessments and contingency plans therefore must be taken with a grain of salt, given that there is a wide divergence of opinion. The record-high energy prices were driven by a global surge in demand as the world quit the economic recession caused by COVID-19, particularly due to strong energy demand in Asia.

## **2 Impact on education**

The COVID-19 pandemic also affect on educational systems worldwide, leading to the near-total closures of schools, early childhood education and care services, universities and colleges. Most governments decided to temporarily close educational institutions in an attempt to reduce the spread of COVID-19. As of 12 January 2021, approximately 825 million learners are currently affected due to school closures in response to the pandemic. According to UNICEF monitoring, 23 countries are currently implementing nationwide closures and 40 are implementing local closures, impacting about 47% of the world's student population.

In general, having fewer education options has globally impacted people with less money, while people with more money have found education. New online programs have shifted the labor of education from schools to families and individuals, and consequently, people everywhere who relied on schools rather than computers and home life have had more difficulty accessing their education. Early childhood education and care as well as school closures impact not only students, teachers, and families, but have far-reaching economic and societal consequences. School closures in response to the pandemic have shed light on various social and economic issues, including student debt, digital learning, food insecurity, and homelessness as well as access to child care, health care, housing, internet, and disability services. The impact was more severe for disadvantaged children and their families, causing interrupted learning, compromised nutrition, childcare problems, and consequent economic cost to families who could not work.

In response to school closures, UNESCO recommended the use of distance learning programmes and open educational applications and platforms that schools and teachers can use to reach learners remotely and limit the disruption of education.

### **3. Impact on society**

We are facing a global health crisis unlike any in the 75-year history of the United Nations. One that is killing people, spreading human suffering, and upending people's lives. But this is much more than a health crisis. It is a human, economic and social crisis. The coronavirus disease (COVID-19), which has been characterized as a pandemic by the World Health Organization (WHO), is attacking societies at their core.

The COVID-19 outbreak affects all segments of the population and is particularly detrimental to members of those social groups in the most vulnerable situations, continues to affect populations, including people living in poverty situations, older persons, persons with disabilities, youth, and indigenous peoples. Early evidence indicates that the health and economic impact of the virus are being borne disproportionately by poor people. For example, homeless people, because they may be unable to safely shelter in place, are highly exposed to the danger of the virus. People without access to running water, refugees, migrants, or displaced persons also stand to suffer disproportionately both from the pandemic and its aftermath - whether due to limited movement, fewer employment opportunities, increased xenophobia etc.

If not properly addressed through policy, the social crisis created by the COVID-19 pandemic may also increase inequality, exclusion, discrimination and global unemployment in the medium and long term. Comprehensive, universal social protection systems, when in place, play a much durable role in protecting workers and in reducing the prevalence of poverty, since they act as automatic stabilizers. That is, they provide basic income security at all times, thereby enhancing people's capacity to manage and overcome shocks.

#### **References:**

1. Antigen-detection in the diagnosis of SARS-CoV-2 infection. Interim guidance- 6 October 2021. <https://www.who.int/publications/i/item/antigen-detection-in-the-diagnosis-of-sars-cov-2infection-using-rapid-immunoassays>
2. Bosch, B. J., Van der Zee, R., De Haan, C. A., and Rottier, P. J. (2003). The coronavirus spike protein is a class I virus fusion protein: structural and functional characterization of the fusion core complex. *Journal of virology*, 77(16), 8801-8811.
3. COVID-19 Essential Supplies Forecasting Tool. [https://www.who.int/publications/i/item/WHO-2019-nCoV-Tools-Essential\\_forecasting-Overview-2020](https://www.who.int/publications/i/item/WHO-2019-nCoV-Tools-Essential_forecasting-Overview-2020)

4. COVID-19 Vaccine Effectiveness and Impact. <https://www.who.int/teams/immunization-vaccines-and-biologicals/immunization-analysis-and-insights/surveillance/covid-19-vaccine-effectiveness-and-impact>
5. Diagnostic testing for SARS-CoV-2: Interim guidance-11 September 2020. <https://www.who.int/publications/i/item/diagnostic-testing-for-sars-cov-2>
6. European Centre for Disease Prevention and Control. Threat Assessment Brief: Implications of the emergence and spread of the SARS-CoV-2 B.1.1. 529 variant of concern (Omicron) for the EU/EEA. <https://www.ecdc.europa.eu/en/publications-data/threat-assessment-brief-emergence-sars-cov-2-variant-b.1.1.529>
7. Guidance for surveillance of SARS-CoV-2 variants: Interim guidance 9 August 2021. [https://www.who.int/publications/i/item/WHO\\_2019-nCoV\\_surveillance\\_variants](https://www.who.int/publications/i/item/WHO_2019-nCoV_surveillance_variants)
8. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>.
9. Huang, Y., Yang, C., Xu, X. F., Xu, W., and Liu, S. W. (2020). Structural and functional properties of SARS-CoV-2 spike protein: potential antivirus drug development for COVID-19. *ActaPharmacologicaSinica*, 41(9), 1141-1149.
10. Maintaining essential health services during the COVID-19 outbreak. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/related-health-issues>
11. Markus Hoffmann, Hannah Kleine-Weber, Simon Schroeder, Nadine Krüger, Tanja Herrler, Sandra Erichsen, Tobias S. Schiergens, Georg Herrler, Nai-Huei Wu, Andreas Nitsche, Marcel A. Müller, Christian Drosten, Stefan Pöhlmann, SARS-CoV-2 Cell Entry Depends on ACE2 and TMPRSS2 and Is Blocked by a Clinically Proven Protease Inhibitor, *Cell*, Volume 181, Issue 2, 2020, Pages 271-280.
12. Omicron has SARS-CoV-2 Omicron has extensive but incomplete escape of Pfizer BNT162b2 elicited neutralization and requires ACE2 for infection. <https://www.ahri.org/wp-content/uploads/2021/12/MEDRXIV-2021-267417v1-Sigal.pdf>
13. Policy and technical considerations for implementing a risk-based approach to international travel in the context of COVID-19. <https://www.who.int/news-room/articles-detail/policy-and-technical-considerations-for-implementing-a-risk-based-approach-to-international-travel-in-the-context-of-covid-19>
14. Report on weekly deaths in South Africa. <https://www.samrc.ac.za/reports/report-weekly-deaths-south-africa>
15. SARS-CoV-2 variants of concern and variants under investigation in England: Omicron VOC-21NOV-01 (B.1.1.529) update on cases, S gene target failure and risk assessment.

- [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1039644/Omicron\\_SGTF\\_case\\_update\\_FINAL.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1039644/Omicron_SGTF_case_update_FINAL.pdf)
16. Saxena, S. K., Kumar, S., Ansari, S., Paweska, J. T., Maurya, V. K., Tripathi, A. K., and Abdel-Moneim, A. S. (2021). Characterization of the novel SARS-CoV-2 Omicron (B. 1.1. 529) Variant of Concern and its global perspective. *Journal of medical virology*.
  17. The daily COVID-19 effective reproductive number (R) in South Africa. <https://www.nicd.ac.za/wp-content/uploads/2021/12/COVID-19-Effective-Reproductive-Number-in-South-Africa-week-48.pdf>
  18. The dual function monoclonal antibodies VIR-7831 and VIR-7832 demonstrate potent in vitro and in vivo activity against SARS-CoV-2. <https://www.biorxiv.org/content/10.1101/2021.03.09.434607v9>
  19. Tok, T. T., and Tatar, G. (2017). Structures and functions of coronavirus proteins: molecular modeling of viral nucleoprotein. *Int J Virol Infect Dis*, 2(1), 001-007.
  20. UK Health Security Agency Risk assessment for SARS-CoV-2 variant: Omicron VOC-21NOV-01(B.1.1.529). [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1039420/8\\_December-2021-risk-assessment-for-SARS\\_Omicron\\_VOC-21NOV-01\\_B.1.1.529.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1039420/8_December-2021-risk-assessment-for-SARS_Omicron_VOC-21NOV-01_B.1.1.529.pdf)
  21. Weisblum, Y., Schmidt, F., Zhang, F., DaSilva, J., Poston, D., Lorenzi, J. C., and Bieniasz, P. D. (2020). Escape from neutralizing antibodies by SARS-CoV-2 spike protein variants. *Elife*, 9, e61312.
  22. WHO advise international traffic in relation to the SARS-CoV-2 Omicron variant (B.1.1.529). <https://www.who.int/news-room/articles-detail/who-advice-for-international-traffic-in-relation-to-the-sars-cov-2-omicron-variant>
  23. WHO Emergency Use Listing for in vitro diagnostics (IVD) Detecting SARS-CoV-2. <https://extranet.who.int/pqweb/key-resources/documents/who-emergency-use-listing-vitro-diagnostics-ivds-detecting-sars-cov-2-2>
  24. Wilhelm, A., Widera, M., Grikscheit, K., Toptan, T., Schenk, B., Pallas, C., and Ciesek, S. (2021). Reduced neutralization of SARS-CoV-2 omicron variant by vaccine sera and monoclonal antibodies. *MedRxiv*.

## **THE PSYCHOLOGICAL IMPACT OF COVID 19 AND POTENTIAL TREATMENTS**

**Ranjana Verma**

Department of Zoology,

Bherulal Patidar Govt. P. G. College, MHOW (M.P.)

Corresponding author E-mail: [vermaranjana142@gmail.com](mailto:vermaranjana142@gmail.com)

As a consequence of the coronavirus infection 2019 (COVID-19) pandemic infections all over the world, a global scenario of economical disaster and psychological agony occurred swiftly. Although most countries forbade social activities, quarantine prevented almost all non-essential individual movements, while local hospitals were swamped with thousands of severely ill COVID-19 patients and were forced to execute their emergency protocols. The public at large, as well as the majority of front-line health professionals, were susceptible to the psychological effect of COVID-19 infection in this situation (1).

On March 11, 2020, the World Health Organization (WHO) declared COVID-19 a pandemic, and as of March 24, 2020, more than 3.5 lakhs cases and more than 14,000 fatalities had been registered, affecting 190 countries worldwide.

The COVID-19 pandemic has resulted in a stunning loss of human life worldwide and poses an unprecedented challenge to global health, food systems, and the workplace. The economic due to pandemic and social impact is devastating: hundreds of millions of people are at risk of falling into severe poverty, and the number of undernourished people, which is presently estimated at almost 690 million, might rise by up to 132 million by the end of the year. Millions of businesses are facing extinction. Almost half of the world's 3.3 billion workers are at risk of losing their jobs. Workers in the informal economy are particularly vulnerable because the majority lacks social security, access to decent health care and productive assets. Many people are unable to feed themselves and their families during lockdowns because they lack the means to earn a living. For most people, no money equals any food, or at best, less food that is less healthy.

The pandemic has created havoc on the whole food chain, exposing its frailty. Border closures, trade restrictions, and confinement measures have made it difficult for farmers to access markets, including to buy inputs and sell their produce, and for agricultural workers to harvest crops, disrupting domestic and international food supply chains and reducing access to

healthy, safe, and diverse diets. The pandemic has wrecked jobs and put millions of people's lives in jeopardy. As breadwinners lose their jobs, become ill, or die, millions of women and men's food security and nutrition are jeopardized, with those in low-income nations, particularly the most marginalized populations, such as small-scale farmers and indigenous peoples, bearing the brunt of the burden.

Millions of agricultural labourers, both waged and self-employed, experience high levels of working poverty, malnutrition, and poor health regularly, as well as a lack of safety and labour protection, as well as other forms of abuse, while feeding the world. With poor and irregular salaries and a lack of social support, many are compelled to continue working, frequently in hazardous situations, exposing themselves and their families to further risks. Furthermore, when faced with income loss, individuals may resort to negative coping techniques such as distressed asset sales, predatory lending, or child labour. Migrant agricultural labourers are particularly vulnerable because they encounter risks in their transportation, working, and living conditions and struggle to get government-provided assistance. Providing for the safety and health of all agri-food workers – from primary producers to those involved in food processing, transportation, and retail, including street food vendors – as well as better pay and protection, will be critical to saving lives and protecting public health, people's livelihoods, and food security.

Food security, public health, and employment and labour issues, particularly worker health and safety, all intersect in the COVID-19 situation. Immediate and focused action to save lives and livelihoods should include expanding social protection to encompass universal health coverage and financial support for the most vulnerable. Employees in the informal economy, as well as those in poorly protected and low-paying occupations, include youth, senior workers, and migrants. Women, who are over-represented in low-wage jobs and care duties, must be given special consideration. Cash transfers, child allowances, and healthy school lunches, housing and food assistance measures, support for job retention and recovery, and financial relief for businesses, particularly micro, small, and medium-sized enterprises, are all critical. Governments must collaborate closely with employers and workers when creating and implementing such measures.

Countries that are currently coping with humanitarian crises or emergencies are more vulnerable to the consequences of COVID-19. It is vital to respond quickly to the pandemic while also ensuring that humanitarian and recovery aid reaches those in most need.

Now is the time for global solidarity and assistance, particularly for the most vulnerable members of our communities, notably those in the developing and rising worlds. Only by

working together can we overcome the pandemic's linked health, social, and economic repercussions and prevent it from escalating into a protracted humanitarian and food security disaster, potentially wiping out previously gained development gains.

As stated in the UN Secretary-General's brief, we must recognize this chance to rebuild better. We are committed to pooling our expertise and experience to assist countries in developing disaster response plans and achieving the Sustainable Development Goals. To solve the difficulties affecting the health and agro-food industries, we must build long-term sustainable plans. Priority should be given to addressing underlying food security and malnutrition concerns, combating rural poverty, particularly through more and better rural jobs, extending social protection to all, supporting safe migratory pathways, and fostering the formalization of the informal sector.

We must rethink our environment's future and address climate change and environmental degradation with ambition and haste. Only then can we safeguard all people's health, livelihoods, food security, and nutrition, and ensure that our "new normal" is a better one.

COVID-19 has a disproportionately negative impact on vulnerable people. COVID-19 has revealed ongoing inequities based on income, age, race, gender, and region. Despite recent global health advances, individuals throughout the world continue to face complex, interwoven challenges to their health and well-being, which are rooted in social, economic, political, and environmental determinants of health.

The pandemic has also exposed serious weaknesses in national health information systems. While high-resource environments have encountered challenges due to overstretching and fragmentation, weaker health systems risk undermining recent health and development gains. As household overcrowding grows, data from the COVID-19 World Symptoms survey suggest a drop in preventive behaviours such as physical distancing, mask-wearing, and hand washing.

**COVID-19's Implications for Mental Health:** During the COVID-19 outbreak, several psychological difficulties and serious consequences for mental health, such as stress, worry, sadness, frustration, and uncertainty, arose gradually (2) Common psychological reactions to the mass quarantine imposed to slow the spread of COVID-19 are generalized fear and pervasive community anxiety, which are typically associated with disease outbreaks and have increased with the escalation of new cases combined with inadequate, anxiety-provoking information provided by the media (3). The COVID-19 pandemic, as well as the ensuing economic downturn, have had a significant impact on many people's mental health and created new barriers for those who already suffer from mental illness and substance use problems. As the pandemic progresses,

continuing and required public health interventions expose a growing number of people to settings associated with poor mental health outcomes. This fact sheet looks at mental health and substance use during and before the COVID-19 pandemic. It focuses on populations that were most vulnerable to poor mental health or substance misuse repercussions during the pandemic, such as young individuals, those who had lost their jobs, parents, and children, communities of colour, and critical employees.

During the pandemic, research has revealed concerns about poor mental health and well-being for children and their parents, particularly mothers, who are facing difficulties due to school closures. Women with children are more likely than males with children to report symptoms of anxiety and/or depressive disorder. Women have often reported higher rates of anxiety and sadness than men, both before and throughout the pandemic. Those who are newly diagnosed with mental health or substance misuse issues, as well as those who were already diagnosed before the pandemic, may require mental health and drug use services but may face extra challenges as a result of the pandemic.

The COVID-19 pandemic may have caused numerous changes in your life, including uncertainty, disrupted daily routines, financial stress, and social isolation. You may be concerned about being ill, how long the pandemic will endure, whether your career will be impacted, and what the future holds. Many people may suffer tension, worry, fear, despair, and loneliness during the COVID-19 pandemic and mental health conditions, such as anxiety and depression, can deteriorate. When compared to pre-pandemic surveys, there is a significant rise in the number of individuals reporting symptoms of stress, anxiety, depression, and insomnia during the pandemic. Some people have increased their usage of alcohol or drugs in the belief that it will help them cope with their pandemic anxieties. In actuality, these substances can exacerbate anxiety and despair. People with drug use problems, particularly those addicted to nicotine or opioids, are more likely to have negative consequences if they are suffered from COVID-19. This is due to the fact that these addictions can impair lung function and weaken the immune system, resulting in chronic illnesses such as heart disease and lung disease, which raise the chance of catastrophic COVID-19 consequences.

**The psychological consequences of COVID-19 infection:**

The modern society, in which everyone has the ability to travel and communicate quickly, has rarely been pushed to the current social isolation and limits, which are associated with feelings of irritation and insecurity. This unusual circumstance surrounding the COVID-19 pandemic plainly demonstrates that people are largely and emotionally unprepared for the

negative repercussions of biological disasters, which immediately demonstrate how everyone may be vulnerable and defenceless. China was the first to implement social isolation and significant lockdown limitations.

Other research found that those who had been quarantined had a greater prevalence of psychological symptoms, (4) emotional disturbance,(5) depression,(6) stress,(7) mood changes and irritability, insomnia,(8) posttraumatic stress symptoms,(9) anger(10), and emotional weariness (4). Notably, other psychological responses to quarantine include fear, rage, anxiety, and insomnia, as well as uncertainty, grief, and numbness. Long-term behavioural changes such as cautious hand washing and crowd avoidance, as well as a delayed return to normalcy even months after the quarantine, were also recorded. (11) Thus, the quarantine period appears to have significant and dysfunctional psychological implications on an individual's mental health not just in the near term, but also in the long run.

In practice, although isolation and quarantine have different definitions, they both require the separation of an individual from their loved ones, usual activities, and routines for the aim of infection protection. The psychological effects of confinement and isolation were amplified by the negative effects of decreased physical activity and nutritional modifications. Such alterations can have a significant and long-term psychological impact. While lockdown can be a significant and successful social distancing approach to combat the rapid spread of the highly infectious COVID-19 virus, it can also have some psychological impact on the public. It is well known that quarantine/isolation for any reason, including a pandemic (Severe Acute Respiratory Distress Syndrome, 2003), has been associated with significant mental health problems ranging from anxiety, fear, depressive symptoms, sense of loneliness, sleep disturbances, anger, and so on, in the immediate few days of isolation, and later with symptoms of posttraumatic stress disorder and depression after discharge from the hospital (12). It has been reported that the COVID-19 pandemic's influence on psychological stress may be more pronounced due to continual worldwide media feeds and internet availability. As the coronavirus pandemic spreads across the globe, it is instilling significant dread, worry, and concern in the general public, as well as in specific groups such as older folks, caregivers, and people with underlying health concerns. To date, the main psychological impact on public mental health has been increased levels of stress or worry. However, as new restrictions and consequences are implemented, particularly quarantine and its effects on many people's typical activities, routines, or livelihoods, levels of loneliness, sadness, destructive alcohol and drug use, and self-harm or suicide behaviour are predicted to rise. As part of its public health response, WHO collaborated with partners to provide a collection of new resources on COVID-19's mental health and psychosocial support

features. Distinct age groups may experience different repercussions from lockdown. It may be challenging to keep the children entertained at home throughout the day. This might be stressful for the parents. Similarly, due to the elderly's vulnerability to COVID-19 infections, people would avoid meeting them, which can be a big source of pain for both the elderly and their family members. Furthermore, reports indicate that the government's abrupt implementation of lockdown has created numerous barriers for economically disadvantaged communities, as evidenced by the mass migration of migrant workers and fears of malnutrition among individuals living in slum areas (13).

COVID-19 has a global impact on people on three levels: physical health, psychological health, and economic health. Physical health is insufficient without psychological well-being, and economic disturbances can have an impact on both. Although humans have a coping mechanism to respond to the demands of the situation, adopting and adapting to the environment is futile. When the demand of the circumstance surpasses an individual's coping capability, a psycho-physical deviation known as stress occurs. Anxiety and despair are also exacerbated by stress.

The psychological effects of the pandemic are difficult to anticipate and will be determined by a variety of individual and societal factors. Loneliness, prior vulnerability, quarantine duration, resilience, and availability to and quality of treatment are among these determinants. Fear of contamination, helplessness, and boredom, brief sleep issues, concern about those close to you, anger, and feelings of irritation are all-natural. These unpleasant feelings are prevalent in the current situation and are associated with adjustment. However, such short-term moderate symptoms are likely to escalate to anxiety, depression, and adjustment disorders in the long run.

#### **Management of psychological disturbance:**

Mental health experts may treat patients who are experiencing greater emotional distress as a result of the pandemics' consequences on them, their families, or their society. If healthcare providers feel psychological distress during and after the epidemic, they may require counselling and assistance. It is critical to emphasize that addressing psychological patients in disasters should take a multifaceted approach. COVID-19 has the potential to harm patients suffering from mental illnesses. First, it is vital to plan for the inevitability of loneliness and its consequences as populations become physically and socially isolated, as well as to devise interventions. Even when physical separating measures are in place, the usage of digital technologies can cross the social distance. Normal places of worship, gyms, and yoga studios, for example, can undertake

online activities on a schedule comparable to what existed previous to social distance. Some organizations are building virtual workspaces where employees may work and connect via video connections, allowing them to feel less isolated. Employers should ensure that each employee obtains daily social contact during the workweek, either through a supervisor or a buddy system.

### **What is the mechanism of the yoga intervention?**

Yoga is an ancient Indian science whose goal is to achieve mental and physical balance by managing one's emotions. Yoga is now acknowledged as a type of alternative medicine that incorporates mind-body activities and has been understood as a process of integrating the body via mind and spirit to enhance physical and mental wellness. Asanas, or physical postures for various regions of the body, promote strength, flexibility, and endurance while also improving respiratory and cardiovascular function. It aids in the recovery from a variety of ailments and chronic pain, as well as reducing stress, anxiety, and depression, improving sleep patterns, and improving general well-being and quality of life. Breathing practices, often known as Pranayama, are various methods of controlling one's breath. Individuals experience relaxation as a result of their daily practice. Slowing down the breath helps to focus the attention in the present now, decreases the cardiac rhythm, lowers blood pressure, and lowers cortisol levels. It also promotes feelings of well-being, increased self-confidence, efficiency, attentiveness, and a happy perspective (14). Yoga began as an aspirational practice based on Indian philosophy. Its major strategies in current practice include postural exercises (asanas), breathing exercises (pranayama), and meditation (dhyana). Several studies have found that yoga improves physical and mental health by regulating the hypothalamic–pituitary–adrenal system, the sympathetic nervous system, lowering cortisol, and improving immunity, as evidenced by an increase in CD4, heart rate, fasting blood glucose, cholesterol, and low-density lipoprotein levels (15, 16) As a result, it appears that Yoga practitioners lead a healthier lifestyle than the overall population. This study looked into whether including Yoga into one's everyday routine is beneficial to one's physical and mental wellbeing. Yoga practitioners also live a healthier lifestyle, which helps their capacity to cope with the limits and stress of being under lockdown.

### **Meditation is a powerful tool for improving mental stability and strength:**

Strength and endurance predict physical wellness. Meditation reduced anxiety and stress, indicating good mental abilities. Yoga is a disciplined way of living that includes Asanas, Pranayamas, and meditation. It makes a person aware of his or her own body, mind, thoughts, and soul. The concepts of Yama (restraints) and Niyama (observances) underpin Yogic teaching (17). Meditation has been demonstrated to reduce the chance of catching a cold or flu by enhancing physiological function and quality of life (18). Yogic breathing techniques increase

respiratory and heart function, making them a valuable weapon in the fight against COVID-19 (19). Yoga can assist to relax the mind and boosting immunity (20, 21).

### Strategies for Self-Care

Self-care practices are beneficial to both your emotional and physical health, and they can assist you in taking control of your life. Take care of your body and mind, and make connections with people to improve your mental health. Take good care of your physique. Take care of your physical health.

- Get enough rest. Every day, go to bed and get up at the same time. Even if you're staying at home, stick to your regular sleep-wake routine.
- Engage in regular physical activity. Physical activity and exercise regularly can help reduce anxiety and enhance mood. Find a movement-based activity, such as dance or fitness applications. Take a walk outside, such as on a nature trail or in your backyard.
- Consume nutritious foods. Choose a well-balanced diet. Limit your intake of junk food and refined sugar. Caffeine should be consumed in moderation because it might exacerbate tension, anxiety, and sleep problems.
- Avoid using tobacco, alcohol, and illegal drugs. You're already at a heightened risk of lung disease if you smoke or vape. Because COVID-19 affects the lungs, your risk is increased. Attempting to cope with alcohol can exacerbate the situation and diminish your coping skills. Unless your doctor has prescribed meds, avoid using drugs to cope.
- Limit your screen time. Turn off electronic devices at least once a day, preferably 30 to 60 minutes before bedtime. Make a concerted effort to spend less time in front of a screen (TV, tablet, computer, or phone).
- Unwind and recharge. Make time for yourself. Even a few minutes of quiet time can be rejuvenating and beneficial in calming your thoughts and reducing tension. Deep breathing, tai chi, yoga, mindfulness, and meditation are all beneficial practices for many people. Relax by taking a bubble bath, listening to music, or reading or listening to a book – whatever helps you relax. Choose a technique that works for you and put it into practice regularly. Take good care of your mind.
- Stick to your regular schedule. Maintaining a consistent daily schedule is critical for your mental health. In addition to a consistent nighttime routine, maintain predictable hours for meals, bathing and dressing, work or study routines, and exercise. Make time for hobbies that you enjoy as well. This predictability can give you a sense of control.

- Limit exposure to the news media. Constant coverage of COVID-19 in all forms of media can exacerbate anxieties about the disease. Limit use of social media, which can expose you to rumours and misleading information. Limit reading, hearing, and seeing of other news, but stay up to date on national and local suggestions.
- Distracting yourself from healthy activities might help you break the loop of negative thoughts that feed anxiety and sadness. Reading a book, writing in a journal, producing a craft, playing games, or cooking a new meal are all enjoyable hobbies that you may do at home.
- Concentrate on good thoughts. Instead of obsessing on how horrible you feel, choose to focus on the good things in your life. Consider beginning each day by making a list of things you are grateful for. Keep a positive attitude, work to accept changes as they come, and try to keep concerns in perspective.
- Seek help from your moral compass or spiritual life. When you draw strength from your belief system, it can provide you with comfort during difficult and uncertain circumstances.
- Establish priorities. Don't get overwhelmed by making a life-changing list of things to accomplish while you're at home. Each day, set acceptable goals for yourself and detail the activities you will take to achieve those goals. Give yourself credit for every modest move in the right direction. Also, accept that some days will be better than others.

**Increase your support and build your relationships by doing the following:**

Establish contacts. Avoid social isolation if you work from home or need to distance yourself from others for a length of time owing to COVID-19. Make time each day to communicate virtually via email, SMS, phone, or video chat. If you work from home, ask your co-workers how they're doing and offer coping strategies. Enjoy virtual mingling and communicating with individuals in your own house.

If you aren't fully vaccinated, try going for walks, conversing in the driveway, and other outdoor activities, or wearing a mask for interior activities.

If you are fully vaccinated, you can return to various indoor and outdoor activities that you may not have been able to do due to the pandemic, such as socializing with friends and family. Outdoor activities with plenty of space between you and others pose a reduced risk of spreading the COVID-19 virus to unprotected people than interior activities.

Help others in some way. Helping others is a great way to assist you. For example, send an email, text message, or phone call to check on your friends, family members, and neighbours, especially the elderly. Whether you know someone unable to leave, ask if there is anything that needs to be picked up, such as groceries or a prescription.

Help a family member or a friend. If a family member or acquaintance needs to be isolated at home or in the hospital due to COVID-19, devise ways to communicate with them. This could be done via electronic gadgets, the phone, or by sending a note to brighten someone's day, for example. Stay away from stigma and bigotry.

People who are stigmatized may feel alienated and even abandoned. When friends and people in their community avoid them because they are afraid of contracting COVID-19, they may feel depressed, hurt, and furious. Stigma wreaks havoc on people's health and well-being in a variety of ways. During a pandemic, stigmatized groups are frequently denied the resources they require to care for themselves and their families. People who are afraid of being stigmatized may be less likely to seek medical attention.

Persons of Asian heritage, health care workers, and people infected with COVID-19, and those freed from quarantine are among those who have faced stigma as a result of COVID-19. Stigmatized individuals may be excluded or shunned, treated differently, denied career and educational chances, and subjected to verbal, emotional, and physical violence. Stress is a normal psychological and physiological response to life's challenges. Everyone reacts differently to adversity, and it's natural to feel stressed and worried during a crisis. However, various problems, such as the consequences of the COVID-19 epidemic, can overwhelm you.

Regardless of efforts, person may feel helpless, unhappy, angry, impatient, despairing, nervous, or terrified. He or she may experience difficulties concentrating on ordinary tasks, changes in appetite, bodily aches, and pains, or difficulty sleeping, or may struggle to complete routine duties. When these signs and symptoms linger for several days in a row, make ones unhappy, and cause problems in everyday life to the point where he or she find it difficult to carry out usual responsibilities, it's time to seek medical attention.

### **Conclusion:**

The COVID-19 pandemic has resulted in a stunning loss of human life worldwide and poses an unprecedented challenge to global health, food systems, and the workplace. We must rethink our environment's future and address climate change and environmental degradation with ambition and haste. Only then can we safeguard all people's health, livelihoods, food security, and nutrition, and ensure that our "new normal" is a better one. The psychological effects of the pandemic are difficult to anticipate and will be determined by a variety of individual and societal factors. This chapter deals with different ways to mitigate the psychological stress due to COVID 19 pandemic.

**References:**

1. Xiang YT, Yang Y, Li W, Zhang L, Zhang Q, Cheung T, et al.( 2020). Timely mental health care for the 2019 novel Coronavirus outbreak is urgently needed. *Lancet Psychiatry*; 7:228–9.
2. Duan L, Zhu G. (2020).Psychological interventions for people affected by the COVID-19 epidemic. *Lancet Psychiatry*; 7: 300–2.
3. Maunder R, Hunter J, Vicent L, Bennett J, Peladeau N, Leszcz M, et al.( 2003). The immediate psychological and occupational impact of the 2003 SARS outbreak in a teaching hospital. *CMAJ*; 168:1245–51.
4. Mihashi M, Otsubo Y, Yinjuan X, Nagatomi K, Hoshiko M, Ishitake T.( 2009). Predictive factors of psychological disorder development during recovery following SARS outbreak. *Health Psychol*; 28:91–100.
5. Yoon MK, Kim SY, Ko HS, Lee MS. (2016). System effectiveness of detection, brief intervention and refer to treatment for the people with post-traumatic emotional distress by MERS: a case report of community-based proactive intervention in South Korea. *Int J Ment Health Syst*; 10:51.
6. Hawryluck L, Gold WL, Robinson S, Pogorski S, Galea S, Styra R. (2004)SARS control and psychological effects of quarantine, Toronto, Canada. *Emerg Infect Dis*; 10: 1206–12.
7. DiGiovanni C, Conley J, Chiu D, Zaborski J. (2004)Factors influencing compliance with quarantine in Toronto during the 2003 SARS outbreak. *Biosecur Bioterror*; 2:265–72.
8. Lee S, Chan LY, Chau AM, Kwok KP, Kleinman A.( 2005) The experience of SARS-related stigma at Amoy Gardens. *SocSci Med*; 61:2038–46.
9. Reynolds DL, Garay JR, Deamond SL, Moran MK, Gold W, Styra R.( 2008) Understanding, compliance and psychological impact of the SARS quarantine experience. *Epidemiol Infect*; 136:997–1007.
10. Marjanovic Z, Greenglass ER, Coffey S.( 2007) The relevance of psychosocial variables and working conditions in predicting nurses’ coping strategies during the SARS crisis: an online questionnaire survey. *Int J Nurs Stud*; 44:991–98.
11. Cava MA, Fay KE, Beanlands HJ, McCay EA, Wignall R. (2005)The experience of quarantine for individuals affected by SARS in Toronto. *Public Health Nurs*; 22:398–406.
12. Reynolds DL, Garay JR, Deamond SL, Moran MK, Gold W, Styra R.( 2008) Understanding, compliance and psychological impact of the SARS quarantine experience. *Epidemiol Infect.* ;136:997–1007.
13. The Lancet. India under COVID-19 lockdown.(2020) *Lancet*; 395:1315.

14. Oken BS, Zajdel D, Kishiyama S, Flegal K, Dehen C, Haas M, et al. (2006). Randomized, controlled, six-month trial of yoga in healthy seniors: effects on cognition and quality of life. *Alternative Ther Health Med*;12:40e7.
15. Pascoe MC, Thompson DR, Ski CF. (2017). Yoga, mindfulness-based stress reduction and stress-related physiological measures: a meta-analysis. *Psychoneuroendocrinology*. 86:152–68. doi: 10.1016/j.psyneuen.2017.08.008
16. Hendriks T. (2018). The effects of Sahaja Yoga meditation on mental health: a systematic review. *J Complement Integr Med*. 15:20160163. doi: 10.1515/jcim-2016-0163
17. Saraswati S, Saraswati SN. (2002). *Four Chapters on Freedom: Commentary on the Yoga Sutras of Patanjali*. Munger: Yoga Publications Trust
18. Obasi CN, Brown R, Ewers T, Barlow S, Gassman M, Zgierska A, et al. (2013). Advantage of meditation over exercise in reducing cold and flu illness is related to improved function and quality of life. *Influenza Other Respir Viruses*. 7:938–44. doi: 10.1111/irv.12053
19. Santaella DF, Devesa CR, Rojo MR, Amato MB, Drager LF, Casali KR, et al. (2011). Yoga respiratory training improves respiratory function and cardiac sympathovagal balance in elderly subjects: a randomised controlled trial. *BMJ Open*. 1:e000085. doi: 10.1136/bmjopen-2011-000085
20. Kiecolt-Glaser JK, Christian L, Preston H, Houts CR, Malarkey WB, Emery CF, et al. (2010). Stress, inflammation, and yoga practice. *Psychosom Med*. 72:113–21. doi: 10.1097/PSY.0b013e3181cb9377
21. Joseph B, Nair PM, Nanda A. (2015). Effects of naturopathy and yoga intervention on CD4 count of the individuals receiving antiretroviral therapy-report from a human immunodeficiency virus sanatorium, Pune. *Int J Yoga*. 8:122–7. doi: 10.4103/0973-6131.158475

## **A DISCUSSION ON THE SUSTAINABLE TOURISM: ITS IMPORTANCE AND POTENTIALITIES WITH SPECIAL FOCUS ON ASSAM**

**Papul Das and Manashjyoti Mili**

Department of Economics, Dibrugarh University

Corresponding author E-mail: [papuldas09@gmail.com](mailto:papuldas09@gmail.com), [manashj99@gmail.com](mailto:manashj99@gmail.com)

### **Abstract:**

Tourism is now one of the world 'largest industries and one of its fastest growing economic sectors. Tourism can be considered as an important tool for economic advancement of a country or a region. The main benefits of the tourism sector can be cited as, the tourism industry has an exalted the potential to generate foreign exchange earnings, create employment, promote development in various parts of the Region, reduce income and employment disparities among region etc. Apart from these positive effects of tourism industry, it some negative impacts too, these are depleting resources, increase in waste output, and impact on environment and excessive commercialization. In the contemporary days these are the serious concerns in most tourist destinations across the country or the region. This led to the emergence of sustainable tourism across the world in plausible way. Nowadays sustainable tourism is one of the most used terms in tourist industry. In the presence sense sustainable tourism is a process, whereby efforts are made to increase positive externalities in the tourist destination. The environment, culture, nature, destination attraction, bio diversity etc. being the major sources of tourist product, should therefore be protected in order to have further growth of tourism and economic development in the future. It has been cleared that to bring sustainability in the tourism industry, the development of sustainable tourism is much crucial across the tourism industry. In this paper, it is attempted to put emphasis on the importance, potentiality and also the role of government in promoting sustainable tourism with special reference to Assam.

**Keywords:** Sustainable tourism, Assam, Environment, Government etc.

### **Introduction:**

At present, tourism is one of the world's largest industries and one of the its fastest growing economic sectors. Tourism is a very crucial tool for economic advancement of India and for other countries also. It can be considered as a people oriented industry, it provides many jobs which have helped revitalize local economies. Tourism also stimulates investment in the

economy and promotes the infrastructure development, which leads to generation of employment and an increase in income for the local population. Further improvements in water and sewage systems, roads, electricity, telephone, public transport networks and improving the quality of life of people are other important benefits of tourism. In spite of these positive impacts of tourism industry, there are many negative impacts also, viz. depleting natural resources, increase in waste output, and impact on environment and excessive commercialization etc. These are the serious concerns in most tourist destinations and this lead to the emergence of sustainable tourism. Sustainable is one of the most popular terms in tourist industry. The year 2017 has been proclaimed as the year of sustainable tourism for development by united nation. Sustainable tourism covers the complete tourism experience, including concern for economic, social, and environmental issues as well as attention to improving tourists' experiences. The concept of sustainable tourism aims to reduce the negative effects of tourism activities. The concept of sustainable tourism , as developed by the world tourism organization in the context of the united nations sustainable development process , refers to tourist activities ' leading to management of all resources in such a way that economic , social , and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity and life support system'.

The north eastern region of India occupies a unique place in terms of natural beauty. Assam is located in the northeast of India. The state shares its borders with Arunachal Pradesh, Nagaland, Manipur, Mizoram, Meghalaya, Tripura, and west Bengal. The state also shares international borders with Bangladesh and the kingdom of Bhutan. With its pleasant climate and scenic landscape, Assam is a popular tourist destination. The state is the most popular tourist destination among the northeastern states. Assam is also popularly known for its tea, petroleum resources, muga silk and bio-diversity. Nowadays it is also becoming an increasingly popular destination for wildlife tourism. It is important to say that Assam has been becoming a hot spot of tourism due to its magnificently diverse landscapes, high biodiversity, enough religious tourist potential and rich cultural heritages, which has also generated a good source of income and employment to youths and rural masses. In Assam, tourism can be considered to be an important vehicle for economic and social development. The tourism industry of Assam has exalted potential to generate foreign exchange earnings, create employment, promote development in various parts of the Region, reduce income and employment disparities among region, strengthen linkages many sectors of the national as well as state economy and help to alleviate poverty. It has been observed that initiatives as per the requirement of sustainable tourism development

have not largely been seen in Assam as the main problems lies in less local population participation at tourist destinations. For bringing sustainability in tourist destinations of Assam, the development of sustainable tourism across the Assam is much crucial.

### **Objectives:**

The following are the objectives of this paper.

- a. To study the importance of sustainable tourism with special reference to Assam
- b. To make understanding about the concept of sustainable tourism.
- c. To put emphasis on the tourism potentiality in Assam.
- d. To briefly highlight the government policy towards the development of sustainable tourism in the state.

### **Methodology:**

The present study is both explanatory as well as descriptive in nature. The data has been collected from secondary sources. The secondary sources used are journals, research papers, books, and the internet.

### **Importance of sustainable tourism:**

Nowadays tourism industry as one of the fastest growing industry in the world has a significant impact on natural resources, consumption patterns, pollution and micro-economic systems. It has been observed that tourism does not have only positive impact but it has some negative impacts also, these are depleting resources, increase in waste output and impact on environment etc. Sustainable tourism is implausibly important for the continued development of the tourism industry. It has been examined that with the global emphasis on sustainability and combating climate change, the concept of sustainable tourism creates a major opportunity for Indian tourism industry. Sustainability impact in tourism sector implies that tourism resources and attraction should be utilized in such a way that their subsequent use by future generation is not compromised. The major aim of sustainable tourism is always to increase the benefits and to reduce the negative impacts caused by tourism for destinations.

There are many strong benefits to be gained from committing to sustainable tourism, the major umbrella points being helping the creating environment, its economic advantages for the destination, providing support to local communities and sustainable mobility etc.

**A. Environment Protection:** One of the main benefits of sustainable tourism is that it helps in minimizing the negative impacts of tourism industry on environment or tourist destinations. Supporting the environment is a key to sustainability in tourism. Environment or nature is the

major product of tourism industry and it is also one of the main sources for tourist attraction. For being sustainability in tourism industry, environment or nature should be protected and environment relates issues in tourism sector such as waste contamination and the use of non organic protects as well as our tourism must be considered when providing an experience to tourists.

**B. Sustainable Economic Growth:** Sustainable tourism may also focus on bringing economic sustainability in tourism sector. It has been observed sustainable tourism also supports and ensures economic development where tourism activities take place. Product quality and tourists satisfaction offered by a region is the key factor for the economic success of tourism and purchasing local products help in increasing that the financial benefits stay with the local people.

**C. Providing to Supports to Local Communities:** Local communities participation in the tourism activities is much crucial for being sustainability in the tourist destination. The particular tourism work being sustainable tourism when it will be able to protect local culture and languages, in bringing cultural integrity among tourist and host community and helps in increasing income of the local people etc.

In spite aforesaid advantages of sustainable tourism there are many advantages of sustainable tourism such as it has a lower ecological impact, it allows wildlife to stay wild, keeps the environment clean, it allows travelers to more conscious of their choices, it reduces costs, energy consumption and carbon dioxide emissions and it encourages small local activity etc.

**Potentiality of Tourism Industry in Assam:** Tourism can be used as an important tool for economic advancement of the state of Assam. The tourism potentialities in the state cannot be underestimated. It is to mention that with its pleasant climate and scenic landscape, Assam is a popular tourist destination. The north-eastern region of India , known as ‘ Land of Seven Sisters’ occupies a unique place in terms of natural beauty, the environment, the unique flora and fauna of the region, its large biodiversity, rolling hills, green valleys, virgin forest and diverse culture and tradition can make northeast the paradise for tourists. The state of Assam is located in the northeast of India. The state is the most popular tourist destination among the other states of northeast region too. The state shares its borders with Arunachal Pradesh, Nagaland, Manipur, Mizoram, Meghalaya, Tripura and West Bengal. The state also shares international borders with Bangladesh and kingdom of Bhutan. It is important to mention that the state is popularly known for its tea, petroleum resources, muga silk and biodiversity across the country as well as the world.

The whole tourism potentialities of the state can be grouped together under the categories: a) Wildlife & natural tourism b) Tea tourism c) Ecotourism d) Cultural tourism e) Pilgrim tourism and f) Adventure tourism

**Eco-tourism in Assam as a way of sustainable tourism:** Nowadays eco-tourism has been emerging as an important concept in tourism sector across the world. It is one of the fastest growing tourism segments and therefore the government of Assam has also given tremendous thrust with relevant to scenic natural beauty and bounty.

Eco-tourism has twin objectives: Firstly conserving environment and secondly improving the welfare of people. Assam has immense potentialities for eco-tourism. Assam is generally free from industrial pollution. Its blue hills, green forests, enchanting rivers are the basis for which eco-friendly tourism can be developed in Assam. With its 7 national parks and 18 wildlife sanctuaries, Assam is a popular tourism destination.

**Role of Government in Promoting Sustainable Tourism:** Tourism is a multi-sectoral activities and the industry is affected by many other sectors of the rational economy. Being sustainability in tourism sector is much crucial for an economy. Government participation is necessary in developing economies like Indian economy where tourism planning and promotion tend to be controlled directly by governments. It is important to mention that for building sustainable tourism; positive intervention of the government is a necessary step. In the regard of bringing sustainability in tourism sector central, state and local government have to play pivotal role in the name responsibility. There should be creation of an atmosphere where not only the government but other stake holders need to influence tourism in more sustainable way.

After emerged of sustainable tourism in popular way across the country in India, in Assam's tourism sector also there are many efforts to have been made through the government for being sustainable tourism development in the state.

Assam government has introduced the tourism policy for the first time in the year 2008 for improving the tourism sector in the sector. The 2008 tourism policy has underlined the importance of public private partnership which has considerably increased the tourist footfalls to place. The policy also gave a special emphasis on sustainable tourism development in the state. Through this policy local communities will be encouraged to adopt the global code of ethics adopted by the UNWTO as relevant to them.

It is important to mention that the state government of Assam launched a new tourism policy "Tourism policy of Assam 2017" on 19 October 2017. The policy especially brings a new concept of the tourism sector of Assam which is commonly known responsible tourism. Responsible tourism is the preserving environmental ecosystem keepings with sustainable goal.

The new tourism policy also has an importance to increase local participation on tourism sector of the state. The new tourism policy has also taken many steps for increasing the participation of local masses in tourism activities and on improving rural development.

**Suggestions for advancement of sustainable tourism in the state of Assam:**

- a) Spread awareness of sustainable tourism: The sustainable tourism has been emerging as an important concept across the tourism activities in the world. For the better understanding about sustainable tourism more awareness among the people is required.
- b) Take care of Heritage places: The heritage sites are the backbones for the tourism industry. In Assam also there are many heritage sites like Kaziranga national park, Manas national, Kamakhya temple, Rong Ghar etc. which attract tourists to come to Assam.
- c) Support Community based tourism and initiatives: For growing tourism activities across the tourism perspective destination, local people participation is much essential.
- d) Proper Infrastructural Facilities: Adequate infrastructural facility is one of the most important elements for development of tourism in any region. The government as well as local communities must come forward to ameliorate infrastructural facilities.
- e) Role of Government: Without intervention of any government the development of sustainable tourism is not much possible. For promoting sustainable tourism in the state, the government should bring an effective tourism policy.
- f) Respect the practices of local people: Assam is the state of diverse ethnic groups. Each ethnic group possesses different languages, cultures, food habits and festivals etc.

**Conclusion:**

Assam with its rich biodiversity, scenic natural environment, exotic flora and fauna, dark green forests, tea gardens, blue hills, streams and salubrious flowing of rivers bears the optimum potentiality for flourishing sustainable tourism. Assam has always been the traction of both domestic and foreign tourists in large numbers. In the time of rapid environmental degradation and industrialization, sustainable tourism draws utmost attention across the globe. Sustainable tourism generates responsible travelling of tourists with the aim of natural conservation, sustainable development, socio-economic and cultural advancement and promotion of local communities living in tourist destination.

**References:**

1. Uttaran. In D. O. administration, world tourism day 2017.
2. Beg, F. B., Rehman, D. s., & shafi, D. s. (2012). Sustainable tourism development in India with Special Reference to Nainital- Uttarakhand. international journal of advanced and innovative Research , 34-41.
3. Choudhary, R. (2014). sustainable tourism in india; Collective efforts of tourism stakeholders. international journal of business management , 77-82.
4. Das, D. D. (2013). prospects and problems of tourism industry in ASSAM. GLOBAL research methodology journal , 1-6.
5. Devi, M. K. (2012). Ecotourism in Assam: a promising opportunity for development. SAJTH , 2-14.
6. Singh, M. (2018). sustainable development of tourism in Uttarakhand, India. International journal of academic Research and development , 828-831.

## **CORONA VIRUS DISEASE 2019 - CURRENT SITUATION**

**Siddharth Chatse\*, Shubhangi Deshmukh, Shruti Dake, Priyanka Manmode,**

**Ankita Giramkar, Bhagyashali Pawar and Ganesh Tapdiya**

Shreeyash institute of Pharmacy, Aurangabad

\*Corresponding author E-mail: [siddharthchatse92@gmail.com](mailto:siddharthchatse92@gmail.com)

### **Abstract:**

COVID-19 is a type of corona virus disease belonging to the family Coronaviridae. The disease is thought to originate from bats and was spread to people through an unknown medium in Wuhan, China. Ideally, the condition is spread by inhalation or close interaction with infected droplets that have an incubation period between two and fourteen days. Today, there are thousands of infections and deaths that have been caused by the disease. Moreover, the symptoms of the disease include fever, cough, sneezing, sore throat, difficulty breathing, and tiredness. Additionally, the diagnosis of the disease starts by gathering samples of the upper and lower respiratory tracts of the infected person. Also, chest X-rays and CT scan are used in the diagnosis stage. Basically, there is no precise treatment for the ailment, and this calls for the need to prevent the disease from spreading. Notable prevention strategies are isolation of the infected persons, proper ventilation, hand hygiene and use of personal protective equipment. Therefore, this paper provides in-depth information on COVID-19 as it discusses the disease epidemiology, transmission, clinical features, diagnosis, treatment and prevention.

**Keywords:** COVID-19, Acute respiratory syndrome, diagnosis

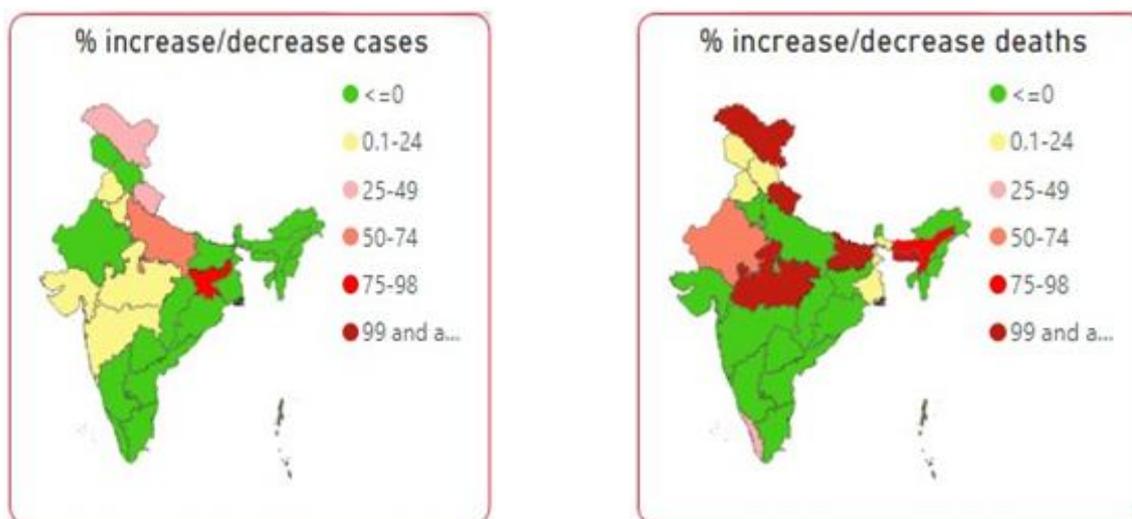
### **Introduction:**

Family of corona virus has significant human and animal pathogens. At the end of December 2019, a novel coronavirus was recognized as the reason of a group of pneumonia cases of unidentified etiology in Wuhan, Huanan Seafood Wholesale Market, the preliminary site to which cases of coronavirus disease 2019 (COVID-19) were related, a city in the Hubei Province of China. The novel coronavirus has quickly become widespread, resulting in an epidemic throughout China, followed by a pandemic, an increasing number of cases in various countries throughout the world. Since the first reports of COVID-19, the infection has spread to contain more than 81,552 cases in China and growing cases (>1,400,000) worldwide, prompting the World Health Organization (WHO) to announce a public health emergency in late January

2020 and describe it as a pandemic in March 2020. Currently, as epidemics have developed in different nations, escalating numbers of cases have also been described in other countries from all continents, excluding Antarctica. The velocity of new cases outside of China, including the USA, Italy and Spain, has overcome the rate in China. In February 2020, the WHO named the disease as COVID-19. The virus that causes COVID-19 is nominated as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2); it was formerly described as 2019-nCoV (the novel corona virus). Our aim is here to discuss the COVID-19 disease (SARS-CoV-2 infection) beginning from virology, epidemiology and continuing with clinical manifestations, diagnosis, its complications and to finish with available therapeutic options and conclusion.

### Situation in India:

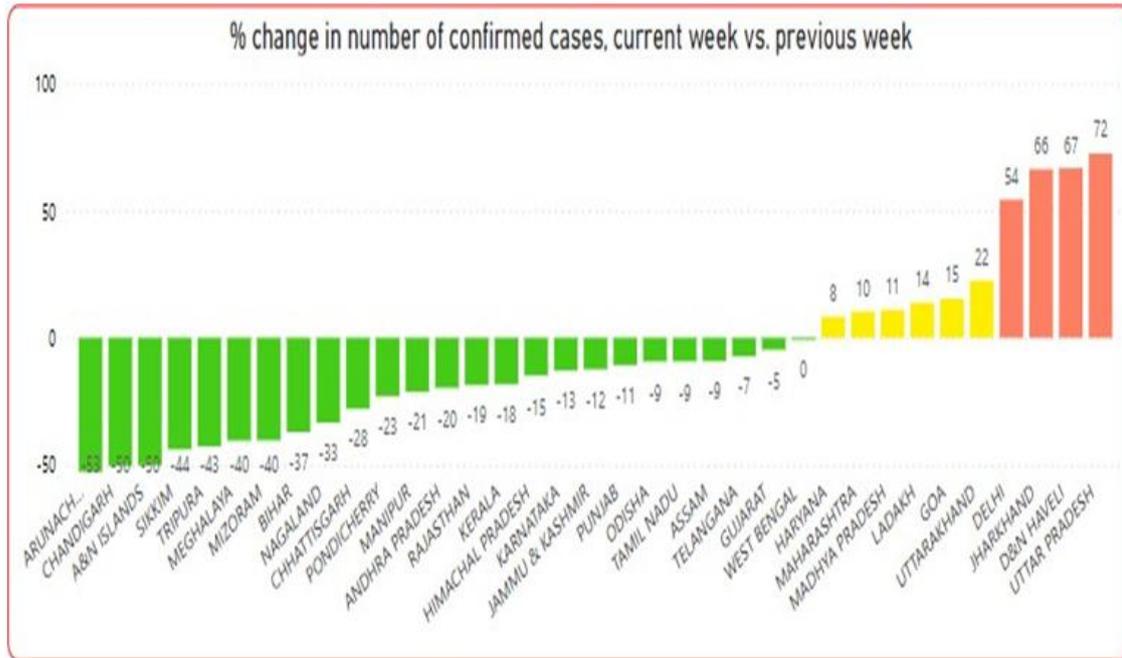
As of 21 December 2021, India reported a total of 34,752,164 confirmed cases. In the past 24 hours, 5,327 confirmed cases have been reported, this is the lowest single day cases after second wave. Currently cases per million is 24,457 (7DMA). Percentage increase/ decrease in cases and deaths during last 7 days are depicted in the map below:



Top five states, namely, Maharashtra, Kerala, Karnataka, Tamil Nadu, and Andhra Pradesh are contributing 57% of total cases. During last seven days 48,520 cases reported in country with Kerala reporting highest number of cases (22,780, 47% of total cases) followed by Maharashtra (5,688) and Tamil Nadu (4,365). As on 22 December, a total of 213 cases of Omicron variant have been reported from the states of Delhi, Maharashtra, Telangana, Karnataka, Rajasthan, Kerala, Gujarat, Jammu and Kashmir, Odisha, Uttara Pradesh, Andhra Pradesh, Chandigarh, Ladakh, Tamil Nadu & West Bengal.

The WHO India Weekly COVID-19 Situational Report provides a comprehensive summary of the COVID-19 situation in India. The report provides an epidemiological overview

of India, highlights WHO India operational updates on risk communication and community engagement, infection prevention and control, clinical management, operation support and logistics. The WHO Situational Report summarizes the severity of public health and social measures implemented in India and provide an update on pandemic vaccine deployment in the country.



### Diagnosis:

The United States Centers for Disease Control and Prevention has developed criteria to use for a person under investigation. Ideally, if an individual is under investigation, immediate control and management measures are commenced. Simultaneously, clinical factors are utilised to evaluate the necessity for testing. This involves close interaction with a disease-confirmed client within fourteen days of symptoms. Also, it may include travel history to an infected region within fourteen days of symptoms beginning. Precisely, WHO endorses gathering samples from individuals with COVID-19. Then, the samples are evaluated for viral RNA by means of the polymerase chain reaction. When the test outcome shows positive, it is suggested to repeat the test for the purpose of verification. On the other hand, if the test confirms negative, this warrant repeat testing. Also, chest X-ray and CT imaging are used to identify COVID-19 in suspect individuals with adverse molecular diagnosis.

### **Treatment:**

The initial step in treating those suspected to have COVID-19 is adequate isolation in order to prevent spread to other contacts, clients, and healthcare providers. The mild disease should be administered at home through staying hydrated, proper nutrition, monitoring fever and cough. Besides, the repetitive usage of antibiotics and antivirals, mainly oseltamivir, should be evaded among those with COVID-19 symptoms. This portrays that there is no specific treatment for this ailment.

### **Prevention:**

Since there is no precise treatment for this disease, prevention is critical. In the first place, isolation of the suspected cases with the minor disease at home is suggested [24]. Again, proper ventilation with good sunlight to destroy the virus is recommended at home [25]. Further, individuals suspected to have the disease should be asked to wear a surgical mask and to rehearse cough hygiene. Primarily, healthcare workers should wear a surgical mask when in the same area as a client and utilize hand hygiene in every 15 minutes. This is because the most significant risk of the

### **Conclusion:**

COVID-19 outbreak has challenged almost all sectors due to the spread of the disease at an alarming rate across the globe. Notably, COVID-19 is an RNA virus that poses a threat to public health. Currently, the disease has caused thousands of infections and deaths. Ideally, the rapid spread of the ailment calls for strong investigation and isolation protocols to avert additional spread. Fundamentally, no confirmed medicine or vaccine has been created to improve the health of patients with the condition. Therefore, individuals need to take measures such as isolation, proper ventilation, hand hygiene and use of personal protective equipment, mainly surgical masks, eye protection, gloves, and gowns to safeguard themselves from the disease.

### **References:**

1. Hassan S, Sheikh FN, Jamal S, Ezeh JK, Akhtar A (2020) Coronavirus (COVID-19): A Review of Clinical Features, Diagnosis, and Treatment. *Cureus* 12: e7355.
2. Singhal T (2020) A Review of Corona virus Disease-2019 (COVID-19). *Indian J Pediatr* 87: 281-286.
3. Anjorin AA (2020) the corona virus disease 2019 (COVID-19) pandemic: A review and an update on cases in Africa. *Asian Pac J Trop Med* 13: 199-203.

4. Aluga MA (2020) Coronavirus Disease 2019 (COVID-19) in Kenya: Preparedness, response and transmissibility. *J Microbiol Immunol Infect.*
5. Clerkin KJ, Fried JA, Raikhelkar J, Sayer G, Griffin JM, et al. (2020) COVID-19 and Cardiovascular Disease. *Circulation* 141: 1648-1655.
6. National Health Commission of the People's Republic of China. New coronavirus cases rise to 571 in Chinese mainland. Available from: URL: [http://en.nhc.gov.cn/2020-01/23/c\\_76004.htm](http://en.nhc.gov.cn/2020-01/23/c_76004.htm). Accessed, January 23, 2020.
7. European Centre for Disease Prevention and Control. Geographical distribution of 2019-nCov cases. Available from: URL: <https://www.ecdc.europa.eu/en/geographical-distribution-2019-ncov-cases>. Accessed, January 26, 2020.
8. World Health Organization. Novel coronavirus situation report -2. January 22, 2020. Available from: URL: <https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200122-sitrep-2-2019-ncov.pdf>. Accessed, January 23, 2020.
9. World Health Organization. Director-General's remarks at the media briefing on 2019-nCoV on 11 February 2020. Available from: URL: <https://www.who.int/dg/speeches/detail/who-director-general-s-remarks-at-the-media-briefing-on-2019-ncov-on-11-february-2020>.

## **AIMS AND OBJECTIVES OF COOKING**

**Mandeep Dhiman**

Department of Hotel Management,  
IES University, Bhopal

### **Abstract:**

Culinary art is the art of cooking. The word "culinary" is defined as something related to or connected with cooking or kitchens. A culinarian is a person working in the culinary arts. A culinarian working in restaurants is commonly known as a cook or a chef. Culinary artists are responsible for skillfully preparing meals that are as pleasing to the palate as to the eye. Increasingly they are required to have knowledge of the science of food and an understanding of diet and nutrition. They work primarily in restaurants, fast food franchises, delicatessens, hospitals and other institutions and corporations. Kitchen conditions vary depending on the type of business, restaurant, nursing home etc.

### **Introduction:**

Cooking is the act of preparing food for eating by the application of heat. It encompasses a vast range of methods, tools and combinations of ingredients to alter the flavor or digestibility of food. It is the process of selecting, measuring and combining of ingredients in an ordered procedure in an effort to achieve the desired result. Factors affecting the final outcome include the variability of ingredients, ambient conditions, tools, and the skill of the individual doing the actual cooking.

Cooking is an art. It is linked with the dietary habits and cultural pattern of people. The intention of cooking is to see that the food cooked undergoes a physical and a chemical change at the end result is edible and acceptable. Applying heat to a food usually, though not always, chemically transforms it, thus changing its flavor, texture, consistency, appearance, and nutritional properties.

The art of cooking is ancient. There is archaeological evidence of roasted foodstuffs, both animal and vegetable, in human camp sites dating from the earliest known use of fire, some 800,000 years ago. Other methods of cooking that involve the boiling of liquid in a receptacle have been practiced at least since the 10th millennium BC, with the introduction of pottery.

### **Cooking:**

Cooking is the application of heat to food for the purpose of making it more digestible, safer to eat, more palatable and to change its appearance. To cook food, heat must be introduced.

In the cooking process the heat breaks down the cellulose in the plant, softens some of the connective tissues in the meat, changes and blends flavors within the food and destroys bacteria, makes food more acceptable to human beings and their digestive system.

**Aims and objectives of cooking food:**

1. Cooking increases palatability. Cooking pleases the eye and is receptive to the palate and helps to stimulate the digestive juices, thereby creating an appetite.
2. Cooking helps to provide a balanced meal. The different ingredients combined together in one dish make it easier to provide a balanced meal.
3. Cooking sterilizes the food partially. Cooked food can be stored for a longer time and it prevents food poisoning and diseases when stored properly. Some of the disease producing germs is killed by cooking. They are killed because of high temperature during the cooking process. A temperature of 600°C applied over 30 or more minutes, kills most of the pathogenic germs.
4. Cooking retains, as far as possible, the nutritive and flavoring ingredients. The flavors depend upon the amount and kind of extractive present, and the acids developed. Nutritive value is enhanced if the fat proportion in the meat is more. While cooking, the nutrition could be preserved by using the cooking liquor.
5. Cooking gives a variety to the menu, as one food item could be cooked in various ways and given different textures, e.g. mutton in a soup, roast joint, croquettes, stews, keema, sookha meat, botikababs, etc. Different methods of cooking when used make the menu interesting and enhance variety. It is, therefore, easier to plan a balanced diet.
6. Cooking preserves food for a longer time. The high temperature destroys bacteria and limits spoilage. It is economical as the cooked leftovers could be utilized and new dishes could be prepared.

**Advantages of cooking:**

The following are the advantages of cooking:

- Cooking makes the food easy to chew.
- Cooking softens the connective tissues in the meat and makes animal foods more digestible.
- Cooking makes the complex foods split into simpler substances.
- Cooking helps to kill harmful bacteria. It makes the food safe to eat.
- Cooking preserves the food.
- Cooking increases palatability. It improves taste and enhances the flavour.

- A wide variety of dishes can be made by different methods of cooking viz .boiling, frying, roasting, microwaving, baking, smoking, etc.
- Cooking makes the dish more colorful. It develops new flavors in food.
- Cooking makes the food to appreciable texture.
- Cooking makes food more appetizing
- Cooking provides balanced meal.
- Cooking adds more nutritive value to food.

**Food constituents:**

Food is composed of the following five constituents: Carbohydrates, Fats, Proteins, Minerals, and Vitamins

**Carbohydrates**

Carbohydrates used in cooking include simple sugars such as glucose (from table sugar) and fructose (from fruit) and starches from sources such as cereal flour, rice, arrowroot and potato.

**Fats**

Fats and oils come from both animal and plant sources. In cooking, fats provide tastes and textures. When used as the principal cooking medium (rather than water), they also allow the cook access to a wide range of cooking temperatures.

Common oil-cooking techniques include sauteing, stir-frying, and deep-frying. Commonly used fats and oils include butter, olive oil, sunflower oil, lard, beef fat (both dripping and tallow), rapeseed oil or canola, and peanut oil. The inclusion of fats tends to add flavour to cooked food.

**Proteins**

Edible animal material, including muscle, offal, milk and egg white, contains substantial amounts of protein. Almost all vegetable matter (in particular legumes and seeds) also includes proteins, although generally in smaller amounts. These may also be a source of essential amino acids.

**Minerals**

Minerals are the chemical elements required by living organisms, other than the four elements carbon, hydrogen, nitrogen, and oxygen which are present in common organic molecules. Sometimes these "minerals" come from natural sources such as ground oyster shells. Sometimes minerals are added to the diet separately from food, such as mineral supplements, the most famous being iodine in "iodized salt."

Other minerals are calcium, chloride, magnesium, phosphorus, potassium, sodium and sulphur. These minerals are obtained from milk, other dairy products, cereals, legumes, bone meal, meat, fish, all fruits, vegetables, table and sea salt etc.

### **Vitamins**

Vitamins are essential for the normal growth and development. It is a key nutrient that the body needs in small amounts to grow and stay strong. Examples are vitamins A, C, and E. Vitamins are found in many fruits and vegetables; especially green peppers, citrus, strawberries, tomatoes, broccoli, leafy greens, potatoes, animal foods; such as liver, whole eggs and milk.

### **Effects of cooking:**

The effect of cooking upon the food constituents are discussed below:-

#### **1. Action of heat on carbohydrates**

The interaction of heat and carbohydrate is complex. Long chain sugars such as starch tend to break down into more simple sugars when cooked, while simple sugars can form syrups. If sugars are heated so that all water of crystallization is driven off, then caramelization starts, with the sugar undergoing thermal decomposition with the formation of carbon and other breakdown products producing caramel.

An emulsion of starch with fat or water can, when gently heated, provide thickening to the dish being cooked. In European cooking, a mixture of butter and flour called a roux is used to thicken liquids to make stews or sauces. In Asian cooking, a similar effect is obtained from a mixture of rice or corn starch and water. These techniques rely on the properties of starches to create simpler mucilaginous saccharides during cooking, which causes the familiar thickening of sauces. This thickening will break down, however, under additional heat.

#### **2. Action of heat on proteins**

When proteins are heated they become de-natured and change texture. In many cases, this causes the structure of the material to become softer or more friable - meat becomes cooked. Cooking at ordinary temperatures renders protein foods more digestible. At high temperatures the protein itself gets denatured thus making it of nutritive value. In some cases, proteins can form more rigid structures, such as the coagulation of albumen in egg whites.

#### **3. Action of heat on fats**

Fat melts when it comes in contact with heat. If heated to a very high degree for a long time, fats undergo partial decomposition and fatty acids and glycerol are produced. Glycerol further decomposes into acrolein which is an irritating compound to the digestive system. When

fat heated for long time at too slow temperature it thickens, becoming gummy. This condition is known as polymerization, and fat that has reached this stage is no longer fit for use.

#### **4. Action of heat on minerals**

There is no appreciable loss of minerals due to cooking. Some minerals are made more readily available by cooking.

#### **5. Action of heat on vitamins**

There is some unavoidable loss of vitamins during cooking. The loss is considerable in respect of thiamine and vitamin C. Vitamin A and D are not destroyed by the ordinary methods of cooking. Vitamin B may be destroyed during cooking if cooked at high temperature. The use of baking soda in cooking causes further destruction of vitamins.

#### **Effects of cooking on different types of ingredients:**

##### **Cereals**

Rice is washed before cooking. Excessive washing removes the water-soluble vitamins and mineral. The practice of cooking rice in large quantities of water and draining away the excess of water at the end of cooking leads to further loss of B-group vitamins and minerals. Rice, therefore, must be cooked with just enough water so that all the water is absorbed at the end of cooking-this is usually 2 or 2 ½ times the volume of rice. All cereals (eg. water flour) absorb water and during cooking the starch granules swell up and burst. This renders the digestion of starch rapid and complete.

##### **Pulses**

Pulses are rich in protein (20 to 25 per cent). They also contain small quantities of starch. It is very important to boil pulses very thoroughly. This destroys the antitryptic substance present in them.

##### **Green leafy vegetables**

Green leafy vegetables are prized for vitamins and minerals. The vitamin A which occurs in the form of thiamine and vitamin C are partially destroyed by cooking. If the cooking water is drained away, there will be loss of not only vitamins but also minerals. It is therefore recommended that green leafy vegetables should be cooked in a small amount of water and for the proper length of time. Baking soda should not be used to hasten cooking.

##### **Other vegetables**

Vegetables like potatoes should be cooked with their outer skin intact; this retains all the vitamins and minerals contained in them. As a rule, vegetables should be cooked in a small amount of water to prevent loss of vitamins and minerals. They can also be cooked by steaming.

### **Cooking of fruits**

Most fruits are eaten fresh and raw. This makes the vitamins present in fruits easily available. Fruits can also be cooked by stewing; this will result in loss of some vitamins, particularly, vitamin C.

### **Cooking of meat**

Meat is cooked in a number of ways. While cooking, meat coagulation of protein is at 60°C.

- There is reduction in water content; consequently, there is shrinkage of meat,
- Collagen which is a protein of the connective tissues is changed into gelatin,
- Elastic, which is also component of connective tissue is not affected,
- The fat of meat melts,
- There is loss of mineral in cooking water but this water can be used as soup or gravy,
- Loss of B-group vitamins especially thiamine.

### **Cooking of fish**

Fish contains so little connective tissue, that the cooking time is very short. The proteins coagulate at 60°C.

### **Cooking of milk**

When milk is heated, a scum consisting of fat, forms on the surface. This makes it difficult for steam to escape; hence milk boils over easily. Some of the lactalbumin sticks to the sides and bottom. Prolonged boiling alters the taste of milk. The cooked flavour is due to burning or caramelization of milk sugar. There is destruction of thiamine and vitamin C during boiling. Milk, which is already a poor source of vitamin C becomes poorer at the end of boiling. Boiling destroys enzymes and the useful lactic acid bacteria present in milk.

### **Cooking of eggs**

The albumin of the egg begins to coagulate at 60°C; and solidifies at 64°C – 65°C. At boiling point (100°C), the albumin becomes tough. However, there is little change in the nutrients present in the egg.

### **References:**

1. <https://www.ihmnotes.in/assets>
2. <https://hospitalitystudy.wordpress.com>
3. <https://www.wellandgood.com>
4. <https://resources.hkedcity.net/>

## **IMPACT OF COVID-19 ON THE FOOD INDUSTRY**

**Lovely Singhal**

Department of Hotel Management,  
IES University, Bhopal

### **Abstract:**

Pandemics are not a new event in human history, as humans have faced various pandemics throughout history. What pandemics have in common is a negative impact on the world economy. Considering the food supply chain, one of the most valuable sectors of the economy, COVID 19 has been visible to affect the entire process from field to fork. The results are that the short-term impact of this pandemic, B. phase-out of the product, lack of working capital, limited distributor operations are serious, but the medium- to long-term impact is complex and uncertain. Expected in the long run, various key performance indicators such as an organization's return on investment, its contribution to gross domestic product (GDP), and the number of employees may decline. In addition, companies may need to rebuild their supply chains and establish relationships with new distributors and trading partners. This study suggests several strategies that managers in this sector can adopt to improve resilience during and after the COVID 19 era. This research is novel and contributes to both theory and practice, but does not take into account SMEs in the food and beverage industry. Therefore, the impacts and strategies we have identified may not apply to SMEs.

**Keywords:** Covid-19, pandemic, food supply chain, impact

### **Introduction:**

The new coronavirus disease, also known as COVID19, was first identified in December 2019 in Wuhan, Hubei Province, China. In a short period, the COVID 19 epidemic spread over all the countries and became a true pandemic that had a serious impact on almost every country.

WHO pointed out that this outbreak is not just a public health disaster, but a crisis that affects all sectors? Therefore, all sectors and all individuals need to be involved in this battle (WHO, 2020c). As of Aug 5, 2020, the count of cases per million people in various regions was reported to be 9,613.03 in the United States, 3,694.43 in Europe, 1,136.41 in Southeast Asia, 2,167.25 in the Eastern Mediterranean, 742.75 in Africa, and 176.36 in the Western Pacific. The global total of confirmed cases reached 17,528. 223 per million people, 687.64 per million

equivalent deaths Postpone preparations and emergency response plans for future food system threats. One Health states, "Health at the human-animal-environment interface, based on collaboration, communication, and coordination across all relevant sectors and disciplines, with the ultimate goal of achieving optimal human and animal health results. The concept is to deal with the threat. The one-health approach is applicable at the local, national, regional, and global levels (9). Ultimately, COVID19 provides an opportunity to look at the overall planetary health approach, defined as the well-being of human civilization and the state of the natural system on which it depends.

### **Effects of a pandemic on food supply chain**

The food supply chain can diverge into five phases: agricultural production, post-harvest handling, processing, distribution/retail/service, and consumption. There are two systems used in the food supply chain related to food quality and safety. The first is related to regulations and legislation that use mandatory standards reviewed by government agencies. The second relies on market law or voluntary standards defined by the International Association (Bendekovic *et al.*, 2015). Safety measures to ensure continuity of food flow at all stages include health issues for food workers, personal hygiene, use of personal protective equipment such as helmets and gloves, surface and work environment includes disinfection. You can safely handle, cook, and deliver food. Maintain social distance. Protecting the final stages of the food supply chain is very important. As we approach the final stage, more people may be affected (Rizou *et al.*, 2020).

### **Impacts on food safety**

The risk of COVID 19 exposure and infection due to contact with livestock producing foods such as chickens, ducks, other poultry, pigs, cows, horses, sheep, or exposure to contaminated food consumption or food packaging is currently present. It is believed to be negligible (25). However, there is growing concern about the risk of human exposure to COVID 19 from the ingestion of aquatic animals such as fin whales, crustaceans, soft animals, and amphibians (26). Beijing recently registered dozens of new cases, all of which are associated with the large wholesale fresh food market, raising concerns about the recurrence of the disease through this transmission route.

### **Disruption in the food and beverage industry**

Like any other industry, the food and beverage industry is constantly facing a variety of turmoil. Potential disruptions related to the food and beverage industry arise from many sources in the supply chain, including customers, demographics of different suppliers, and internal production processes.

### **Effects of a pandemic on consumer behaviour**

Looking at how the COVID 19 pandemic affects consumer food demand, demand depends on food prices, consumer income levels, socio-demographic conditions, consumption, shopping preferences, and time pressure. I understand this. In addition, the number of grocery visits and grocery spending per visit changed (Bakalis *et al.*, 2020; Cranfield, 2020).

### **Effects of a pandemic on global food trade**

The current situation may seem unusual, but the vulnerability of the food system to climate and disease-related issues was experienced long before the COVID 19 crisis. The food system has become unstable due to various events and shocks, such as the oil crisis of the 1970s, the outbreak of SARS and Ebola, and the food crisis of 2006-2008. African swine fever struck the global commodity market just a year ago and became a progressive epidemic in Eastern Europe and Asia. China, the world's largest producer of pigs (1/3 of the world market) and the largest exporter lost 37% of its pigs by the end of 2019 (IPES, 2020)

### **Management strategies for dealing with the impacts**

In addition to investigating the short-term and medium- to long-term impacts of the COVID 19 pandemic on the food and beverage industry, interviews with respondents will also consider strategies for managing or addressing these impacts. When respondents mentioned the effects of a pandemic, they were asked about possible strategies to minimize each effect. These strategies cannot completely counteract their effects, but they may reduce their severity. In this way, strategies can improve the resilience of your business in a rapidly changing environment. Based on interviews with respondents

### **Conclusions:**

Maintaining supply flows in the agri-food sector, one of the most important sectors alongside the health sector, during the pandemic is important to prevent food crises and reduce the negative impact on the global economy. So far, we haven't seen any major problems in our food supply chain, but it's still uncertain because the future is uncertain. As a result, countries must be aware of the seriousness of the situation and need to strengthen or mitigate measures as the pandemic spreads. The supply chain also needs to be flexible enough to meet the challenges of the food supply chain.

**References:**

1. Adeleke OM, Daniel AO, Ojeleke OM (2020) Supply chain risk management and performance of quoted food and beverage firms in Nigeria Opaleye. *Ilorin J Hum ResourManag* 4(1):237–246
2. Agrilinks. (2020). Preventing global food security crisis under COVID-19 [Online]. <https://www.agrilinks.org/post/preventing-global-food-securitycrisis-under-covid-19-emergency>. Accessed on Mar.20, 2020.
3. Aldaco, R., Hoehn, D., Laso, J., et al. (2020). Food waste management during the COVID-19 outbreak: a holistic climate, economic and nutritional approach. *The Science of the Total Environment*, 742: 140524.
4. Almena, A., Fryer, P. J., Bakalis, S. (2019a). Centralized and distributed food manufacture: a modeling platform for technological, environmental, and economic assessment at different production scales. *Sustainable Production and Consumption*, 19: 181–193.
5. Ambulkar S, Blackhurst J, Grawe S (2015) Firm resilience to supply chain disruptions: scale development and empirical examination. *J OperManag* 33:111–122. <https://doi.org/10.1016/j.jom.2014.11.002> Bao X, Diabat A, Zheng Z (2020)
6. An ambiguous controller disruption decisions with insufficient data in a recovery phase. *Int J Prod Econ* 221:107465. <https://doi.org/10.1016/j.ijpe.2019.07.038> Bruzzone AG, Massei M, Agresta M, Ferrando A (2013) Modelling fresh goods supply chain contaminate
7. UN. The Sustainable Development Goals Report. New York, NY: UN (2019). Available online at: <https://unstats.un.org/sdgs/report/2019/The-Sustainable-Development-Goals-Report-2019.pdf> (accessed September 18, 2020).
8. Whitmee S, Haines A, Beyrer C, Boltz F, Capon AG, de Souza Dias BF. (2015). Safeguarding human fitness in the Anthropocene epoch: report of The Rockefeller Foundation-Lancet Commission on planetary fitness. *Lancet*. (2015) 386:1973–2028. DOI: 10.1016/S0140-6736(15)60901-1

## **IMPACT OF COVID-19 PANDEMIC ON MENTAL HEALTH**

**Rumana Amanullah Khan**

J. A. T. Arts, Science and Commerce College, (For Women) Malegaon

Corresponding author E-mail: [khan.rumana1967@gmail.com](mailto:khan.rumana1967@gmail.com)

### **Abstract:**

To completely understand the mental health crisis that India faces on the subject of COVID-19, we have to start with recognizing the serious problems that existed even before the covid-19 pandemic. The government's National Mental Health Survey pronounced that approximately 10 percentages of adults get treatment for mental health issues like temper, depression and anxiety problems and extreme mental illness. The Global Burden of Disease study envisioned that almost two hundred million people in India have experienced a mental disorder, and nearly half of them have suffered from depressive or anxiety problems. India accounts for more than one third of the female suicides globally, and almost one fourth of all male suicides. Suicide has been the main cause of death in younger Indians. Yet, the authorities has spent little or no on mental healthcare (less than 1% of total healthcare buget), and this expenditure has been spent totally on doctors, drugs, and hospitals in urban areas. There are very less community-orientated mental healthcare anywhere in the country. Unsurprisingly, among 71 to 90 percent of the affected people haven't received any care or medication from any source, of any kind, for his or her mental health conditions.

**Keywords:** mental health, Global Burden, medical care, local community

### **Effect of COVID-19 pandemic on the mental health of general population**

COVID-19 is the third major Corona virus outbreak in recent years that has significant socio-economic effects. It is the first time in the 21st century to affect nations across all mainlands aside from Antarctica. Misery, vulnerability, sadness and irritability because of the absence of endpoint of the COVID-19 pandemic while therapy is as yet no longer in sight, have prompted the development of mental health issues, (like frenzy, anxiety, nervousness, depression and sadness) and in the combination with delay in treatment of genuine persistent illnesses have prompted setting off of substantial indications and intensification of common pathologies. Besides, repeated media pictures of seriously sick individuals, dead bodies and final resting places and knowledge that individuals will be unable to bid farewell to their perishing friends

and family have amplified social trouble and created a chaos. Aside from that, the newness to severe quarantine measures that infringe on individual freedom joined with the augmenting financial emergency and joblessness principally influencing those with casual, daily wage occupations, which includes a considerable extent of the labor force for lower-pay nations, have brought about different hazardous methods of adapting to everyday stressors, like liquor, drugs, tobacco misuse, also the addictive practices like gambling, and web-based gaming and rise in paces of aggressive behavior at home and sexual harassment.

Indians are facing a second health crisis brought on by the Covid pandemic. Dread and uneasiness about the sickness and the overwhelmed medical services framework have spread through the populace, causing a decrease in mental wellness all through the country.

The effect of COVID-19 has not quite recently been the undeniable obvious one. It is encircled by agony, isolation and demise. It is enormously affecting individuals' psychological well-being as well.

### **The pandemic is influencing various groups in explicit ways**

#### **Women:**

According to general studies, many women suffer anxiousness, despair, and anxiety. This might be due to a rise in domestic duties and violent behaviour at home during the lockdown.

#### **Young individuals:**

One study announced that 75% of almost 7,000 young aged (18-32 years) felt loneliness during the lockdown period, and 37 percent felt that their mental health had been strongly affected. This isn't shocking given that 27 million youngsters lost their jobs in April 2020 alone, and 320 million of students have been severely affected by the closing of schools and colleges, and also the delay in examinations.

#### **Children:**

After speaking with 1,205 parents, guardians and essential parental figures, it was observed that more than 50% of youngsters had experienced depression, agitation, and anxiety during the lockdown. Certain media reports states that they might be encountering fears about the virus have stress about accessing to online classes, and stress and irritability from being not able to go out. Lots of them have suffered from domestic violence or have been the victims of cyber bullying.

#### **Migrant laborers and daily wage workers:**

Although there are no investigations explicitly with migrant workers, panic reactions have been seen in the millions of individuals who have lost their jobs and employments due to

covid-19 pandemic as they made desperate attempts to safely return to their rural homes. Daily wage workers have also been intensely impacted. A study of 1,200 auto drivers observed that 75% were restless with regards to their work and funds.

**Doctors and frontline workers:**

A study with 152 specialists saw that more than 33% of them are experiencing depression and anxiety because of the pandemic. Forefront laborers are allegedly troubled by over-work, and are restless with regards to getting the infection.

**People with pre-existing psychological health conditions:**

The anxieties portrayed prior have been overwhelming for individuals with pre-existing mental health conditions. These issues may have been becoming far more serious for people due to the non-availability of mental health care services and the, problems regarding travelling which prompted individuals to decrease the dosages of recommended prescribed medicines.

**People with substance use disorders:**

The sudden closure of all alcohol shops in the nation and the reduction in the drug supplies has brought about withdrawal symptoms in many individuals with liquor and substance use reliance, for instance, wooziness and seizures. Numerous liquor addicts are troubled by their craving have devoured toxic substances, for example, hand sanitizers as substitutes and died, or died because of suicide.

**Senior Citizens:**

India's senior residents are struggling severely. Senior residents are in the most in danger from Covid, having seen their psychological wellness fall apart essentially in the previous months. There has been an increment of more than half among senior residents with regards to mental wellness issues. This includes nervousness, restlessness, anxiety, depression, awful dreams, discouragement just as shortcoming and exhaustion.

In conservation with about 5000 old individuals in India it was revealed that around 63% of these individuals showed indications of depression. This was to some degree because of social disconnection and loneliness brought about by limitations acquired to control the spread of the infection. Old individuals having pre existing mental conditions like schizophrenia, depression, dementia and obsessive compulsive disorders have shown intensification in their conditions

It isn't only the older who are languishing. Youngsters have lost positions and work openings. They have also seen their academic education getting disrupted. The drawn out effect of the pandemic will be extremely serious and consume a large chunk of the day to fix. The extent of youthful laborers impacted by the crisis has all the earmarks of being considerably higher.

### **Effect of COVID-19 pandemic on the mental health of homeless individuals and refugees**

Homeless and refugees most often live in conditions that are prone to illness scourge, for example, COVID-19, as they stay in gathered residing settings, like asylums, shelters, settlements, encampments or deserted structures and lack of ordinary admittance to essential cleanliness supplies or showering offices. Additionally, a large number of them highly suffer from the physical and psychological health issues. They engage themselves in situations like substance abuse and have less admittance to medical services making them more prone to the infection. Their higher risk of getting covid-19 infection appears to cause significant higher levels of stress and anxiety which could intensify or incite new mental health disorders.

### **Effect of COVID-19 pandemic on the psychological well-being of individuals with pre-existing mental health conditions**

Patients with pre-existing mental health conditions appears to be extremely vulnerable to relaps during the COVID-19 pandemic, as SARS-CoV-2 can worsen hidden mental effects, like depression, panic, anxiety, delirium, psychosis and suicides. In addition, patients with severe mental problems, like schizophrenia, who are normally financially impeded, are additionally undermined by stay-at-home requests and ensuing decreased access to job opportunities, as a result, they have less access to job options, exacerbating their financial situation. Mentally ill patients, on the other hand, face considerable reduction in treatment available at a time when they are in greater distress. According to a recent WHO assessment, the COVID-19 pandemic has caused significant disruptions in MNS services, including school and work-related mental health programmes, services for children, adolescents, and elderly folks, primary caregiver interventions, psychotherapy/counseling/psychosocial therapeutic approaches, home or community engagement services, critical harm reduction services, mental health interventions during the prenatal and postnatal period, self harm and homicide prevention, Suicide and overdose prevention and management programmes, narcotics agonist maintenance treatment for opioid addiction, and emergency MNS manifestation management are all available. Finally, premature discharge from psychiatric facilities can result in relapse, suicidal behavior, anxiety, depression, and post-traumatic incidents such as insomnia.

### **Effect of COVID-19 pandemic on people with and without mental health issues before COVID-19 pandemic**

Up until now, most proof on the effect of the COVID-19 pandemic on people with and without prior psychological well-being conditions depends on cross-sectional and not on longitudinal investigations with comparable pre-pandemic data. Among a couple of led

longitudinal investigations, McGinty *et al.* and Pierce *et al.* detailed an ascent in mental trouble among US and UK grown-ups, individually, in the COVID-19 contrasted with the pre-COVID-19 period. Moreover, Pan *et al.* using longitudinal information from three existing Dutch psychiatry case-control associates, incorporating individuals with and without psychological health disorders (depression, anxiety, or obsessive-compulsive disorders) noted that during the COVID-19 pandemic, those with no or mild mental health illnesses had an increase in depressed feelings, anxiety, fear, and loneliness. Individuals with the most severe and persistent mental health issues, on the other hand, had negligible or even negative reductions in symptom levels. Similarly, Pinkham *et al.* found no significant differences in mood experiences, psychotic symptoms, or sleep duration among people with severe mental illnesses like schizophrenia, schizoaffective disorder, bipolar disorder (I or II) in the COVID-19 period, with or without psychotic characteristics, or serious depression with psychotic elements. Surprisingly, individuals reported a considerable rise in well-being following the outbreak of the pandemic. As a result of the aforementioned investigations, persons with pre-existing mental health disorders appear to have fared very well during the COVID-19 pandemic. Individuals with severe mental health conditions may have some sense of calm as their surroundings and routines got more in tune with the isolated culture, according to possible explanations for these findings. Furthermore, being at home might assist kids in developing a regulated routine. Furthermore, being at home may assist them in developing an organised and consistent daily routine, which has been described as a preferred environment for providing a sense of security. There are also certain elements that appear to safeguard against the negative impact of stress. This is known as resilience, which is defined as the ability to sustain or swiftly regain mental health during and after hardship.

### **Conclusion:**

During the early stages of the COVID-19 pandemic, the study discovered an increased incidence of stress, anxiety, and depressed symptoms. Given the findings, it is critical to create and execute appropriate community-based mental health services for people who have had COVID-19 symptoms and are at risk of developing negative mental health consequences.

From June 18 to July 15, 2020, the poll was conducted using a questionnaire and social media platforms such as WhatsApp and Facebook. Kuwait people over the age of 21 who live in Kuwaiti territory were the target group. Finally, 679 cases were examined (57.9% of females and 42.1 percent of males; 67.7% of Kuwaiti citizens and 32.3 percent of non-Kuwaiti nationals).

### **The state of mental health in the aftermath of the COVID-19 epidemic**

- Depressive disorders affect 59.8% of females and 51.0 percent of males.
- Extremely severe depression affects 20.4 percent of females and 13.6 percent of males.
- Psychological discomfort affects 42.0 percent of females and 37.8% of males. In addition, 15.1% of girls and 9.1% of males are suffering from serious or extremely severe psychological discomfort.

### **References:**

1. Barbisch D, Koenig KL and Shih FY: Is there a case for quarantine? Perspectives from SARS to Ebola. *Disaster Med Public Health Prep.* 9:547–553. 2015.
2. Correia T. SARS-CoV-2 pandemics: the lack of critical reflection addressing short- and long-term challenges. *Int J Health Plann Manage.* 2020;35:1-4. 10.1002/hpm.2977. Accessed May 03, 2020.
3. Correia T. SARS-CoV-2 pandemics: the lack of critical reflection addressing short- and long-term challenges. *Int J Health Plann Manage.* 2020;35:1-4. 10.1002/hpm.2977. Accessed May 03, 2020.
4. Javed B, Sarwer A, Soto EB, Mashwani Z-R. Is Pakistan's response to coronavirus (SARS-CoV-2) adequate to prevent an outbreak? *Front Med.* 2020;7:1-4. 10.3389/fmed.2020.00158. Accessed May 03, 2020
5. Mental health and coping during COVID-19. Centers for Disease Control and Prevention 2020. <https://www.cdc.gov/coronavirus/2019-ncov/about/coping.html>. Accessed May 03, 2020.
6. Mental health and coping during COVID-19. *Centers for Disease Control and Prevention* 2020. <https://www.cdc.gov/coronavirus/2019-ncov/about/coping.html>. Accessed May 03, 2020.
7. Moukaddam N, Shah A. Psychiatrists beware! The impact of COVID-19 and pandemics on mental health. *Psychiatric Times* 2020. <https://www.psychiatristimes.com/psychiatrists-beware-impact-coronavirus-pandemics-mental-health>. Accessed May 03, 2020.
8. Rogers JP, Chesney E, Oliver D, Pollak TA, McGuire P, Fusar-Poli P, Zandi MS, Lewis G and David AS: Psychiatric and neuropsychiatric presentations associated with severe coronavirus infections: A systematic review and meta-analysis with comparison to the COVID-19 pandemic. *Lancet Psychiatry.* 7:611–627. 2020.

9. Templin C, Hänggi J, Klein C, Topka MS, Hiestand T, Levinson RA, Jurisic S, Lüscher TF, Ghadri JR and Jäncke L: Altered limbic and autonomic processing supports brain-heart axis in Takotsubo syndrome. *Eur Heart J.* 40:1183–1187. 2019.
10. Troyer EA, Kohn JN and Hong S: Are we facing a crashing wave of neuropsychiatric sequelae of COVID-19? Neuropsychiatric symptoms and potential immunologic mechanisms. *Brain Behav Immun.* 87:34–39. 2020.PubMed/NCBI
11. Tsamakidis K, Dimitrakakis G, Stefanadi E, Tsiptsios D, Dimitrakaki IA, Mueller C, Spandidos DA, Stefanadis C and Rizos E: [Comment] The challenges of planetary mental health in the COVID-19 era. *Exp Ther Med.* 20:1843–1844. 2020
12. Tsamakidis K, Triantafyllis AS, Tsiptsios D, Spartalis E, Mueller C, Tsamakidis C, Chaidou S, Spandidos DA, Fotis L, Economou M, et al: COVID-19 related stress exacerbates common physical and mental pathologies and affects treatment (Review). *Exp Ther Med.* 20:159–162. 2020.
13. WHO warns on lockdown mental health. *Euobserver* 2020. <https://euobserver.com/coronavirus/147903>. Accessed May 03, 2020.
14. World Health Organisation (WHO): WHO announces COVID-19 outbreak a pandemic. <https://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/news/news/2020/3/who-announces-covid-19-outbreak-a-pandemic>. Accessed March 12, 2020.
15. Wu T, Jia X, Shi H, Niu J, Yin X, Xie J and Wang X: Prevalence of mental health problems during the COVID-19 pandemic: A systematic review and meta-analysis. *J Affect Disord.* 281:91–98. 2020

## COVID-19: A THREAT TO THE WELL-BEING OF SENIOR SECONDARY STUDENTS?

Meenu<sup>1</sup> and Nirpendra Pratap Singh\*<sup>2</sup>

<sup>1</sup>Mahatma Jyotiba Phule Rohilkhand University (MJPRU), Bareilly, U. P.

<sup>2</sup>Banasthali Vidyapith, Rajasthan

\*Corresponding author E-mail: [nikk1189bly@gmail.com](mailto:nikk1189bly@gmail.com)

### Abstract:

This paper presents and discusses the impact of the Covid-19 pandemic on the well-being of senior secondary students. The present investigation is an attempt to understand the possible challenges students are facing in this crucial situation of a pandemic. The sample comprised of 140 students of CBSE board studying in class 12th. A self-made questionnaire comprising 20 items assessing the four domains of well-being i.e. mental-emotional, social, academic, and physical was administered through online mode. Data were analyzed by using the mean percentage of scores. The findings of the study reflected an adverse impact of the covid-19 on the well-being of secondary school students. This paper delineates the problem, rationale, existing situation, and prospects that have vital implications to academicians, parents, students and researchers to understand its influence and consequences on students.

**Keywords:** Pandemic, well-being, domains

### Introduction:

To understand the effects of lockdown, one first needs to acknowledge the situation of the pre-covid nation. India was very enthusiastic about becoming a 5 trillion dollar economy and people were trying to become self-reliant due to the "Atmanirbhar Bharat" scheme initiated by the Indian government. Amongst all this development, a piece of news about the outbreak of a virus in the Wuhan city of China broke out and took no time to become a reality all over the world. "Lockdown and staying home strategies have been put in place as the needed action to flatten the curve and control the transmission of the disease" (Sintema, 2020).

By June 25 2021, the virus had already affected more than 17 crore people, and around 37 lakh people have lost their lives due to the pandemic all over the World. Due to the insight of the Indian government, India somehow managed to control the damage during the first wave, and on January 16 2021, the Indian government introduced its first vaccine. It was a piece of great news for all of us but almost all of a sudden the month of April 2021 started with the stressful news that there had been a second outbreak of covid-19 and this time the virus affected

thousands and lakhs of people within days due to which a several states announced lockdown with immediate effect, which affected everyone, and arguably, one of the sections of the society most affected, were students which this study focuses on.

Their studies shifted from offline to online, and all the other activities, like exams, were postponed and there is still uncertainty among them. There are students of class 10<sup>th</sup> and 11<sup>th</sup>, who were promoted to the next class without any logical or official process.

The government has now decided that 12<sup>th</sup> class boards will also be canceled but this has also led to uncertainty about admission into certain colleges and as a result, the students' futures are balancing on a tightrope.

They are in no condition to plan for their future, and to add to the misery, they have no clue about what is happening. Parents are not willing to send them to other cities for preparations due to the fear of the third wave hence they find themselves unable to do anything but waste their precious time. It has made them puzzled; They find themselves in an indecisive stage and are facing several mental and emotional issues because of such a period of uncertainty. "University students are at risk of psychological distress in the case of traumatic events. The evolution of the pandemic is uncertain and may have long-term effects on mental health", Pastorino *et al.* (2021) in their study reported.

At a time, where one desires the most to be outdoors and have fun with friends, they have been forced to adjust within their own homes for a prolonged amount of time. Schools are being continued online and frequently the classes are suspended due to government orders. The children have to adjust to deal with this anomaly, all the while trying to study and preparing for the various exams they will be facing in a few months. This has laid an extra burden on their minds, and there is the occurrence of distress amongst them. "The inferential statistics suggests that the level of depression was as high as 43% among the students". Biswajit Satpathy and Esrafil Ali (2020), in their study mentioned. Teachers also aren't tech-savvy and therefore they are not very comfortable in teaching online classes, which just lead to more loss for the student.

Students cannot go outside for exercise, to meet their friends, or try to find out other activities in their surroundings for amusement. Online gaming and social media sites have also become monotonous and almost still as compared to the normal life of the average teenager.

Students find themselves enclosed within four walls for no reason. Their social lives have become stagnant, and the excessive use of mobile phones laptops and other electronic devices has made our students lethargic while also risking their health. Stress, anxiety, eye pain, headache, and absent-mindedness are some common mental illnesses students are going through. This can ultimately lead to a low achievement level. Kuhfeld (2020), in their findings has mentioned that "Missing school for a prolonged period will likely have major impacts on student achievement".

Their lives have become static as they have faced a huge setback which has affected not only their physical, mental, and emotional well-being but also their social well-being.

**Statement of the problem:**

"Covid-19: A threat to the well-being of senior secondary students."

**Objectives:**

- To study the impact of covid-19 pandemic on the mental-emotional well-being of senior secondary students.
- To study the impact of covid-19 pandemic on the social well-being of senior secondary students.
- To study the impact of covid-19 pandemic on the academic well-being of senior secondary students.
- To study the impact of covid-19 pandemic on the physical well-being of senior secondary students.

**Hypotheses:**

- Covid-19 has no adverse impact on the mental well-being of senior secondary students.
- Covid-19 pandemic has no adverse impact on the social well-being of Senior Secondary students.
- Covid-19 pandemic has no adverse impact on the academic well-being of senior secondary students.
- Covid-19 pandemic has no adverse impact on the physical well-being of senior secondary students.

**Delimitations:**

- For the current study, well-being has been restricted to social, emotional, mental, physical, and academic aspects of students.
- In this study, only the 12th class students who are studying in Bareilly district and are enrolled with CBSE have been taken as the population of the study.

**Research methodology:**

The study is concerned with assessing the adverse impact of the Covid-19 pandemic, so to fulfil the objectives of the study the researchers have chosen the descriptive survey method, it would be the best-suited method for the study as it does not aspire to develop an organized body of specific laws rather provides information useful to the solution of the problem and make out clear inferences from the results.

**Population:**

All the senior secondary students studying in the CBSE affiliated Inter colleges of Bareilly district have been taken as population for the current study.

### **Sample and sampling method:**

A total of 140 senior secondary students have been considered as the sample for the current study. The sample has been collected by the grapevine method of sampling, and for the fulfilment of its purpose, researchers selected 12 CBSE schools of Bareilly district on random basis and sent Google form (questionnaire) to 1 student from each school and asked each one of them to forward it to 3 more students, simultaneously those 3 students would forward it to another 3 of the same class, so that we may get approximately 150 responses.

When researches got the required number of responses within a fixed time and date, only 140 forms were found suitable as rest were not up to the mark (they were not filled properly).

### **Tool:**

The researchers developed a questionnaire to access the well-being of senior secondary students including four domains i.e. Social, Mental-Emotional, Physical, and Academic Well-being.

The researchers formed 40 statements related to the various aspects of wellbeing in the preliminary draft, after that the researchers sent it to 10 subject experts, they have validated the questionnaire through face validity and content validity, as per their instructions the researchers exempted 20 statements, hence, there remained a total of 20 statements in the final draft in which 4 questions were related to mental/emotional well-being, 5 were related to social well-being, 5 were related to academic well-being and 6 were related to physical well-being keeping in mind the adverse situation of the lockdown and pandemic, the questionnaire was prepared through goggle forms so that it could spread through online mode. Reliability

Researchers proved the reliability of the questionnaire through split-half method calculated with the help of Karl Pearson coefficient of correlation and the score is 0.76.

### **Variables:**

Independent variable: Covid-19 pandemic

Dependent variable: Well-being of students

### **Statistical techniques:**

Percentage, Tables and diagrammatic representation

### **Analysis and interpretation of data:**

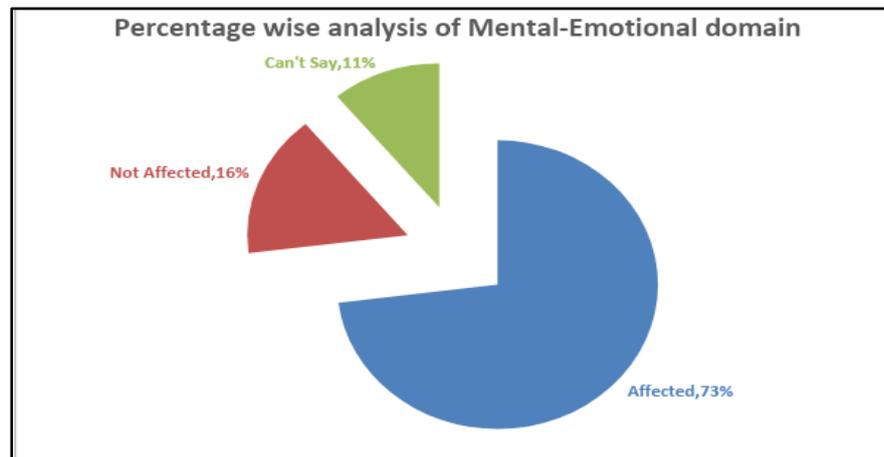
#### **H01: The covid-19 pandemic has no adverse impact on the mental-emotional well-being of senior secondary students.**

The researcher got 140 responses on 4 questions related to mental-emotional well-being. On aggregate, a total of 73% of students admitted that they have faced mental-emotional challenges during this phase. 57% students among them feel aimless. When they were asked if they feel monotonous then 50% of them admitted it to a greater extent, more than 38% said they sometimes feel monotonous while only 11% said they don't feel like that. 68% of students

amongst them accepted that they are experiencing Short temperateness in their behavior. More than 76% of students feel this situation very challenging for them as its leading them to feel mentally drained. So the null hypothesis is not accepted as it's been visible that covid 19 has impacted their mental and emotional well-being adversely.

**Table 1: Percentage wise Analysis and Interpretation of Statements related to Mental-Emotional Well Being**

Question	Response	Percentage
Q1 I feel monotonous during Covid.	A Lot	50%
	A Little	38.2%
	Doesn't Affect Me	11.8%
Q2 Spending all my time indoors makes me more prone to a short temper.	Agree	68.1%
	Disagree	15.3%
	Can't Say	16.7%
Q3 I feel aimless due to Covid.	Agree	56.9%
	Disagree	25.7%
	Can't Say	17.4%
Q4 I feel mentally drained really often these days.	Agree	76.4%
	Disagree	12.5%
	Can't Say	11.1%



**Figure 1: Mean of the percentage wise analysis related to mental-emotional domain**

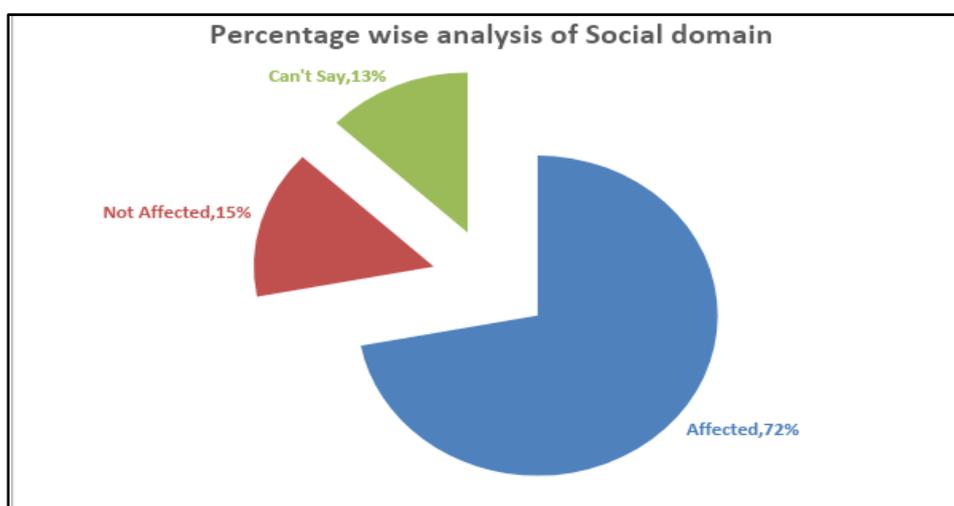
**H02: The covid-19 pandemic has no adverse impact on the social well-being of senior secondary students.**

Out of the 140 responses, on average more than 72% of students have admitted that they have faced challenges in their social life. When they were asked about how do they feel? More

than 75% of them reported that they feel lonely nowadays. 67% have accepted that they are puzzled about their future initiatives; 86% admitted that their dependency on gadgets specifically for entertainment has increased. Simultaneously more than 63% of students accepted that they are less interested in talking to people these days. On a good note, 66% of students agreed that this lockdown Period has allowed them to connect more with their family and they have come closer than before. So the null hypothesis is not being accepted as there are clear signs that the social life of these students has been adversely affected by the Covid-19 pandemic.

**Table 2: Percentage wise Analysis and Interpretation of Social Well-being**

Question	Response	Percentage
Q5 I feel lonely as I can't meet my friends.	Agree	75%
	Disagree	16%
	Can't Say	9%
Q6 Concern about the future has impacted my wellbeing.	A Lot	67.4%
	A Little	24.3%
	Not at all	8.3%
Q7 I feel I have connected a lot with my family over the course of the Lockdown	Agree	66%
	Disagree	18.8%
	Can't Say	15.2%
Q8 My dependency on gadgets for entertainment	Has Increased	86.1%
	Has Decreased	2.1%
	Is the Same	11.8%
Q9 I don't feel like talking to people nowadays.	Agree	63.2%
	Disagree	20.1%
	Can't Say	16.7%

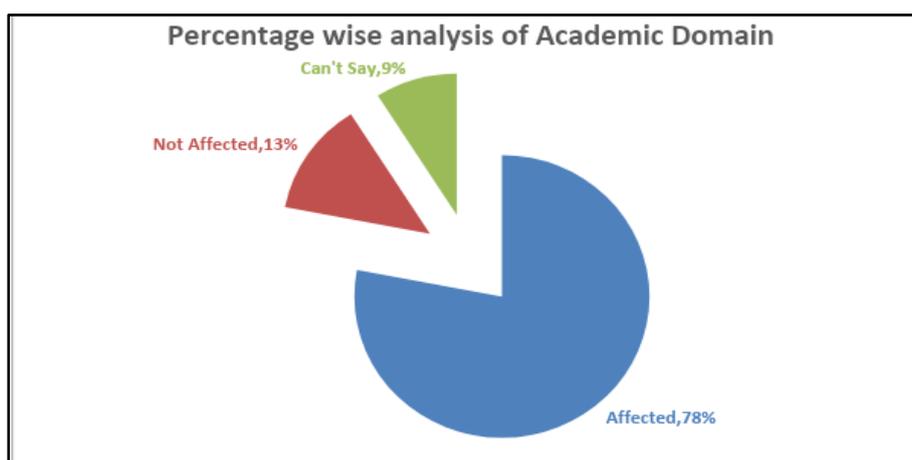


**Figure 2: Mean of the percentage wise analysis related to social domain**

**H03: The covid-19 pandemic has no adverse impact on the Academic well-being of senior secondary students.**

**Table 3: Percentage wise Analysis and Interpretation of Statements related to Academic Well-being**

Question	Response	Percentage
<b>Q10</b> Enthusiasm for my studies	<b>Has Increased</b>	<b>81.3%</b>
	<b>Has Decreased</b>	<b>7.6%</b>
	<b>Is the Same</b>	<b>11.1%</b>
<b>Q11</b> Online studies are ___ as compared to traditional studies	<b>Better</b>	<b>7.7%</b>
	<b>Worse</b>	<b>83.2%</b>
	<b>Same</b>	<b>9.1%</b>
<b>Q12</b> I take my online classes without any distractions.	<b>Agree</b>	<b>14.6%</b>
	<b>Disagree</b>	<b>71.5%</b>
	<b>Can't Say</b>	<b>13.9%</b>
<b>Q13</b> In comparison to previous classes, my academic achievement	<b>Has Increased</b>	<b>13.2%</b>
	<b>Has Decreased</b>	<b>67.4%</b>
	<b>Is the Same</b>	<b>19.4%</b>
<b>Q14</b> I don't follow a proper schedule due to Covid.	<b>Agree</b>	<b>77.8%</b>
	<b>Disagree</b>	<b>16%</b>
	<b>Can't Say</b>	<b>6.2%</b>



**Figure 3: Mean of the percentage wise analysis related to academic domain**

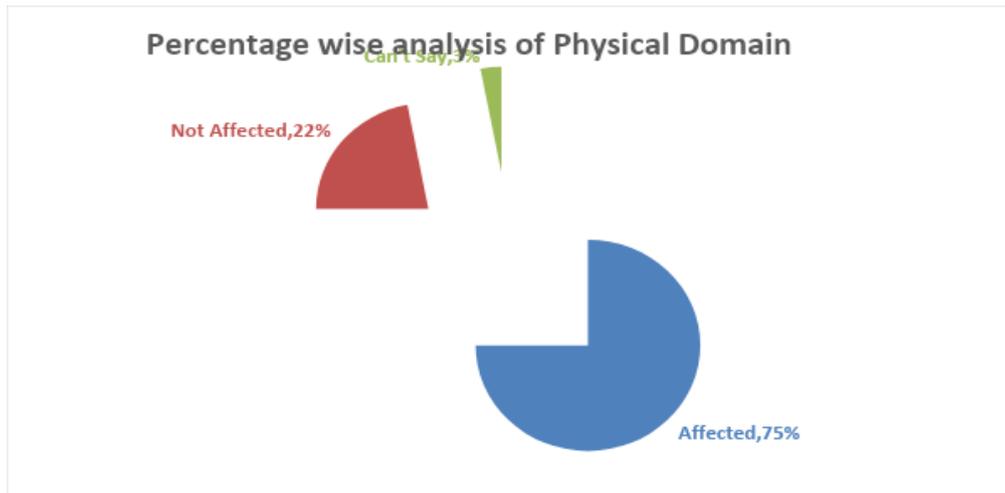
The analysis for the academic domain has come up with an alarming sign as more than 78% of students have felt that their studies have been badly affected by the pandemic. The students are very shocking as 81.3% of students have expressed that they have lost their

enthusiasm towards their studies. When they were asked to compare the online and traditional classes, 83.2% of students said that online studies are worse as compared to its counterpart. Only 7.7% of students chose online classes over traditional classes while 71.5% of students complained they feel distracted while attending the online classes. Around 78% of students admitted that they are not able to follow a proper schedule under this specific situation, and more than 67% of students felt a degradation in their academic achievement in comparison to their previous performance. So the null hypothesis is not being accepted as the covid 19 pandemics have adversely affected the educational well-being of near about 80% of students.

**H04: The covid-19 pandemic has no adverse impact on the physical well-being of senior secondary students.**

**Table 4: Percentage wise Analysis and Interpretation of Statements related to Physical Well-being**

<b>Question</b>	<b>Response</b>	<b>Percentage</b>
<b>Q15</b> Covid has disrupted my fitness.	<b>A Lot</b>	<b>47.9%</b>
	<b>A Little</b>	<b>37.5%</b>
	<b>Doesn't Affect Me</b>	<b>14.6%</b>
<b>Q16</b> Compared to normal days, I sleep	<b>More</b>	<b>72.2%</b>
	<b>Less</b>	<b>13.9%</b>
	<b>Same as Before</b>	<b>13.9%</b>
<b>Q17</b> I feel lethargic during the pandemic.	<b>A Lot</b>	<b>60.4%</b>
	<b>A Little</b>	<b>35.4%</b>
	<b>Doesn't Affect Me</b>	<b>4.2%</b>
<b>Q18</b> The frequency of my headaches has increased during Covid.	<b>Agree</b>	<b>53.5%</b>
	<b>Disagree</b>	<b>27.8%</b>
	<b>Can't Say</b>	<b>18.8%</b>
<b>Q19</b> Compared to normal days, I eat	<b>More</b>	<b>34.7%</b>
	<b>Less</b>	<b>31.3%</b>
	<b>Same as Before</b>	<b>34%</b>
<b>Q20</b> During the course of the pandemic, my weight	<b>Has increased</b>	<b>41%</b>
	<b>Has decreased</b>	<b>22.9%</b>
	<b>Is the same</b>	<b>36.1%</b>



**Figure 4: Mean of the percentage wise analysis related to physical domain**

The results have shown that even the physical well-being of students has not remained untouched by the pandemic. As 75% of students have reported that they feel affected and facing several health issues. 48% felt a lot of disruption in their physical fitness, while 37.6% felt a moderate level of fitness disruption. When they were asked if their sleeping pattern is the same as before? 72% of students reported that they have started sleeping more while 13.9% complained of insomnia (lack of sleep). 60.4% of students feel lethargic on the high side while 35.4% have felt the same on a moderate scale.

53.5% of students have complained of headaches. Not only this but the pandemic has also disturbed the eating pattern of students as 34.7% of students have started eating more, while 31% of students have complained of loss of appetite as compared to normal days. 41% of students have reported that they have increased in their weight and have put on extra kilos while 22.9% are facing weight loss issues.

So the null hypothesis that the covid19 pandemic has not adversely impacted the physical well-being of students is not being accepted. As they have complained about numerous physical issues that they have faced during the lockdown.

### **Conclusion:**

This Covid 19 pandemic is seriously affecting the well-being of the student's community whether in terms of mental-emotional well-being or the physical aspect. Not only has it been a rollercoaster ride of turmoil for them but their social lives have turned practically non-existent. Simultaneously, due to a lack of studies, they are facing serious challenges as far as their academic part is concerned.

So this is high time for every stakeholder whether it be the government, academicians, parents, or students themselves, to come forward, spread awareness and make some effort to root out these issues.

**References:**

1. <sup>1</sup>World Corona live update (worldOmeter), retrieved from [https://www.worldometers.info/coronavirus/?utm\\_campaign=homeAdUOA?Si](https://www.worldometers.info/coronavirus/?utm_campaign=homeAdUOA?Si)
2. Evans, S., Alkan, E., Bhangoo, J. K., Tenenbaum, H., and Ng-Knight, T. (2021). Effects of the COVID-19 lockdown on mental health, wellbeing, sleep, and alcohol use in a UK student sample. *Psychiatry Research*, 298, 113819.
3. Kuhfeld, M., Soland, J., Tarasawa, B., Johnson, A., Ruzek, E., and Liu, J. (2020). Projecting the potential impact of COVID-19 school closures on academic achievement. *Educational Researcher*, 49(8), 549-565.
4. Nuryana, Z., Mu'tafi, A., and Iskarim, M. Student Well-Being in Online Learning during the Covid-19 Pandemic: Voice in the Field.
5. Pastorino, R., Villani, L., Mariani, M., Ricciardi, W., Graffigna, G., and Boccia, S. (2021). Impact of COVID-19 pandemic on flu and COVID-19 vaccination intentions among university students. *Vaccines*, 9(2), 70.
6. Satpathy, B., and Ali, E. (2020). A study on psychological well-being of final year management students during COVID-19 pandemic lockdown in India. *International Journal of Indian Psychology*, 8(2), 1-25.
7. Schwartz, K. D., Exner-Cortens, D., McMorris, C. A., Makarenko, E., Arnold, P., Van Bavel, M., and Canfield, R. (2021). COVID-19 and Student Well-Being: Stress and Mental Health during Return-to-School. *Canadian Journal of School Psychology*, 36(2), 166-185.
8. Sintema, E. J. (2020). Effect of COVID-19 on the performance of grade 12 students: Implications for STEM education. *Eurasia Journal of Mathematics, Science and Technology Education*, 16(7), em1851.

# COVID 19: Impact and Response Volume VII

ISBN: 978-93-91768-52-2

## About Editors



Dr. Shweta Rani is currently working as Assistant Professor in the Department of Geography at Dyal Singh College, University of Delhi. She holds 'Masters in Geography', and 'PhD' (Geography) from Department of Geography, Delhi School of Economics, University of Delhi. She has a rich and varied teaching experience of almost 12 years at University of Delhi and her keen research interests includes, Urbanization and Development, Advanced Statistical Methods in Spatial Analysis, Geoinformatics, Hydrology and Water Resource Management. She possesses an exceptionally high and commendable academic excellence and achievements. She is the recipient of "Shanti Lata Memorial Award" in 2002, "Mother Theodosia A.C. Memorial Award" in 2005, "Smt. Draupadi Ishwari Prasad Bhargava Memorial Gold Medal" from University of Delhi in 2008 and award for meritorious students in Science by UGC in 2012. She grabbed the prestigious award for National level "Geographer's Youth Conclave" for two consecutive years in 2019 and 2020. She has been immensely recognized and appreciated for her research work with more than 30 research papers to her credit in Reputed Journals in India and abroad including her contributions as chapters in edited books by well-known scholars. Dr. Rani presented over 50 Research Papers in several Conferences/ Seminar/ Workshops in India and Abroad and received numerous awards for Best Research Paper Presentations both at the international and national level. She has delivered more than 20 invited talks at different institutions of higher learning in India. She is also the Executive Member for International Academic and Research Consortium (IARC), Nakuru, Kenya and Elite Member for International Women's Commission (IWC), Switzerland.



Dr. Vinod Kumari is currently working as an Associate Professor, Department of Applied Sciences and Humanities, Panipat Institute of Engineering and Technology, Panipat. She is having fifteen years of teaching experience and has proven her abilities as she is receiving appreciation certificates regarding the same for the past eight years. She completed her doctorate from Amity Institute of Applied Sciences, Amity University, Noida. Her area of interest is Nano-formulation of herbal plants, with a specific focus on therapeutic species of plants so that the nano-formulations could be helpful to mankind and the healthcare sector in the upcoming future. She has already authored two books on Engineering Chemistry. She is credited with 26 research papers in peer-reviewed national and international journals and conferences of high repute, also authored 05 book chapters, and recently filed a patent. She is the editor and reviewer of various distinguished national and international science journals and books. She is a lifetime member of The Indian Society for Technical Education. She has been graced with the "Best Teacher Award" in 2017 and has the Certificate of Excellence to her credit.



Dr. Radhika P. C. working as an Assistant Professor in the Department of Commerce, Sacred Heart College, Thevara. She completed MTA (Master of Tourism Administration), UGC NET in Tourism Administration, MBA in marketing management and Ph.D. in Management Science. She has been working as an external examiner at various universities. She has presented 15 papers in various international conferences including the Second PAN IIM World Management Conference and also attended 6 FDP and published 17 journal articles in various national and international journals, and a book titled "Fundamentals of Tourism". She has also completed a minor project (UGC) titled "The effective implementation of Swatch Bharath Mission at tourism destinations in Kerala. Her research interests include topics such as service marketing, Sustainable Tourism Development, Community Support in Tourism development, Marketing Mix, The role of government in tourism, Responsible Tourism, and Tourist satisfaction. Received best presentation award for the paper presented at International Conference on Business, Management, Social and Economical Advancement (ICBMSEA-2021) organized by Management Institute, Warsaw University of Life Science – SGGW, Poland.



Ms. Jaspreet Kaur is presently working as Assistant professor (Management) with Chandigarh University, Gharuan. She is an MBA from Panjab University (Chandigarh), UGC Net and JRF Qualified (HRM) and pursuing Ph.D. from Chandigarh University in Business Management. Her Teaching and research expertise areas include Human resource management, Organizational behavior and Training and Development. She has received award of "Best Teacher of the Department" in 2019 and 2021. She has more than 12 publications to her credit in various national and international journals and has presented papers in more than 20 national and international conferences.

