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COVID 19- AN EMERGING DISEASE AND IT'S IMPACT ON SOCIO-ECONOMIC AND MENTAL HEALTH OF HUMAN CIVILIZATION IN INDIA- A REPORT

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ABSTRACT:

COVID-19 is a re-emerging disease that occurs due to mutation of spike protein of corona virus. It is a pathological viral infection. World Health Organization (WHO) declares Covid-19 as the pandemic one, on 11th March, 2020. There are spike proteins located on the upper surface of the virus that provides the virus shape like a crown. At the beginning of the pandemic situation, people thought this virus spreads from the sea food market of China, however, later-on, bats were suspected as key receptor of the virus. This virus was first found in Wuhan, China in 2019. Human transmission is very much effective for this virus. People become affected only by getting closer to the infected person and coming in contact with their sneezing, coughing etc. Some researchers showed that that virus could be spread via air. SARS-COV 2 continuously change their genetic code and cultivate new variants. For this reason development of vaccine against such virus have not discovered yet. On the other hand, COVID make a vast change in the lifestyle of human civilization. Lockdown was initiated to control the covid cases. The socio- economic condition becomes very poor due to this pandemic situation. Mental and physiological health of humans being affected. People take too much stress; some of them committed suicide due to extreme depression. In India, this sudden outbreak also causes disaster to the medical institution. Front line health workers such as doctors, nurses, others like, police and people work in emergency sector's play major role in this pandemic situation, without them, this situation could not be handled. Now, there are lot of activities such as videos, yoga session, diet education

etc should be advised to people to overcome stress and maintain a healthy lifestyle. With the help of proper Covid protocols and guidelines human beings can fight against this disease.

KEY WORDS:

Covid19, SARS, MERS, variants, mutation, lockdown, mental health.

AIMS AND OBJECTIVE OF THE STUDY:

To discuss briefly about Covid-19-its origin, symptoms, transmission, treatment, consequences etc.

To evaluate the effect of Covid-19 on the mental health of people

To evaluate the effect of Covid-19 on Indian Economy

INTRODUCTION

The corona virus disease or Covid-19 is a pathogenic viral infection that was mainly caused by severe acute respiratory syndrome coronavirus 2 or SARS-CoV-2[1]. This virus is responsible for an unexpected pandemic throughout the world which further leads to a dramatic loss in the human lifestyle. This virus is highly transmittable and mainly transmitted via coughing, sneezing, respiratory droplets or aerosols of the infected person [2]. Samples were collected from the patients for investigation about the virus. Genetic sequence of the virus was diagnosed from the collected sample. Based on the genomic sequence analysis of the isolates, the virus was identified as a novel corona virus[3]. COVID-19 is a re-emerging disease occurs due to mutation of the virus spike protein. On 30th January, 2020, The World Health Organisation (WHO) had declared COVID-19 disease as a Public Health Emergency of International Concern (PHEIC) [4]. The virus causes sicknesses which begins in the form of common cold then can convert into the more severe MERS-CoV (Middle East Respiratory Syndrome) and SARS-CoV (Severe Acute Respiratory Syndrome)[5].

Corona virus belongs to the family of *Coronaviridae* [6]. There are many spikes on the outer surface of the virus and the spikes mainly look like crown. The size of the virus is 65–125 nm in diameter [7]. The virus contains single-stranded RNA as their genetic material. During the replication, the virus continuously change their genetic code that turns into mutation [8]. Chinese researchers named the virus as Novel Corona virus. The International Committee on Taxonomy of Viruses (ICTV) named the virus as SARS-CoV-2. This committee also named the disease as COVID-19 [9]. Most of the patients suffering from Covid-19 may suffer from fever. Symptoms includes cough, loss of taste or smell, sore throat, diarrhoea, difficulty in breathing or shortness of breath, chest pain etc [10]. The socio-economic change due to this pandemic is remarkable. The COVID-19 pandemic had adverse effects on the physical and mental health of individuals as well as the health of economies across the world. Lockdown also had a long lasting effects on the Indian economy [11]. Frontline workers like doctors, nurses, hospital staffs, police, emergency sector workers etc play major role throughout the pandemic period. Various types of supportive activities should be made for the frontline workers in the pandemic situation. Due to various types of mis-informations circulated on social media people had become scared and suffered from acute mental illness. Various kinds of videos, advisories and resource materials has been made to entertain people. People are advised to do yoga and meditation for both

physical fitness and mental peace. Awareness should be made to overcome the mental ill-health occurs due to covid-19 panic [12].

Classification of variants:

Based on the findings in the human body, corona virus can be classified in some subgroups [13]. The subgroups of corona viruses family are the following:

- alpha (α) corona virus
- beta (β) coronavirus
- gamma (γ) coronavirus
- delta (δ) coronavirus.
- Omicron

Other types of human corona viruses are:

SARS-CoV - These are the type of beta corona virus which can leads to severe acute respiratory syndrome or SARS [14].

SARS-CoV-2 - This species is mainly responsible for the Covid 19 outbreak [15].

MERS-CoV- This type of virus is responsible for Middle East Respiratory Syndrome or MERS [16].

On the basis of attributes and prevalence, the variants of the virus can be also reclassified. This classification was discovered and described by the SARS-CoV-2 Interagency Group or SIG which was established by the U.S. Department of Health and Human Services (HHS) [17]. The classifications are described below:

Variants Being Monitored (VBM)– The Variants which are designated as VBM which are associated with more severe disease or increased transmission but they are no longer detected, or may be circulating at very low levels, in the United States [17].

Variant of interest (VOI) – These are the types of variants that have specific genetic markers. But recently, No SARS-CoV-2 variants are designated as VOI [18].

Variant of Concern (VOC) – Variants of Concern (VOC) are being closely monitored and characterized by federal agencies in the United States. Omicron virus belongs to this category [18].

Variant of high consequence (VOHC)– recently no SARS-CoV-2 variants are designated as VOHC [17].

ANALYSIS / DIAGNOSIS and ORIGIN OF CORONA VIRUS:

Wuhan is one of the rising business hubs of China. But at the end of the year 2019, Wuhan experienced an unexpected outbreak of a virus which further termed as novel corona virus. The specific species of the virus is called SARS-CoV 2 which is a member of the β group of corona viruses [19]. At the very beginning, mainly within the first fifty days of the outbreak of the virus, more than eighteen hundred were died and over seventy thousand individuals got infected. In the end of 2019, the Chinese Government give information to the WHO or WORLD HEALTH ORGANIZATION about various cases of pneumonia with unfamiliar etiology. On the date 12 January 2020, the National Health Commission of China released more details about the epidemic situation [20].

The Genomic analysis of the virus SARS-CoV-2 revealed that it is genetically related to severe acute respiratory syndrome-like (SARS-like) bat viruses. For this reason, bats could be the possible primary reservoir of the virus. The intermediate source of origin and transfer to humans is still unknown. The rapid human to human transfer of the virus has been confirmed through various researches [21].

In the year 2003, the Chinese population was infected with a virus that is responsible for Severe Acute Respiratory Syndrome (SARS) which termed as SARS-CoV. The virus is the member of the Beta-corona virus subgroup. The infected individuals of the SARS-CoV may reveal pneumonia symptoms along with a diffused alveolar injury. This further leads to acute respiratory distress syndrome (ARDS) [22].

The SARS virus was initially emerged in Guangdong, China. It was then globally spread rapidly. More than 8000 persons became infected by the virus and about 776 persons died [22]. After a decade, later in 2012, a couple of Saudi Arabian nationals were diagnosed to be infected with another variant of corona virus. The detected virus was confirmed as a member of corona viruses and named as the Middle East Respiratory Syndrome Corona virus (MERS-CoV). On the basis of the reports given by The World health organization, more than 2428 individuals were infected by MERS-CoV and about 838 persons were died [23].

MODE OF TRANSMISSION:

The key reservoirs and mode of transmission of corona viruses are:

From various studies it has been assumed that, the transmission rate of SARS-CoV-2 virus is higher than SRAS-CoV. IN SARS-CoV-2, the genetic recombination at the S protein in the RBD region have enhanced its transmission ability. Therefore, the transmission rate of SARS-CoV-2 is higher [24].

The suspected reservoirs of SARS-CoV-2 are red encircled. Among all the variations of coronaviruses, only the α and β variation of corona viruses have the ability to infect humans [25]. The main reason of the transmission of the virus from animal to human is the consumption of the infected animal as a source of food. When a healthy person come in contact with an infected person, the virus is transmitted to that healthy person and he/she become infected [26]. The common mode of transmission of the SARS-CoV-2 virus include the following: close contact of an infected person, from the droplets of the infected person, airborne, fecal-oral, blood-borne, mother to child, and animal-to-human transmission. The infected person from this virus may experience respiratory illness that is ranging from mild disease to severe disease and it can also cause death. But, sometimes the infected person shows no symptoms [27].

Samples were collected from the patients for investigation about the virus. Genetic sequence of the virus was diagnosed from the collected sample. Based upon the analysis of the isolates of the genetic sequence, the virus was identified as a novel corona virus [28]. At the initial phase of the pandemic it was assumed that the infected persons with Wuhan corona virus may have visited the seafood market in China where live animals were sold or infected animals or birds were used as a source of food [26]. The later investigations regarding this revealed that some individuals also get infected without visiting those markets. From various studies it has been observed that the human to human spreading capability of this virus is very effective and this is done due to the close contact with an infected person via coughing, sneezing, respiratory droplets or aerosols

of that infected person to a healthy individual. The aerosols can penetrate in the human body mainly in the lungs via inhalation through the nose or mouth [29].

PRIMARY RESERVOIRS AND HOSTS OF CORONAVIRUSES

At onset of research, raccoon dogs and palm civets were focused as the key reservoir of SARS-CoV infection. In the year 2001, samples that were collected from a healthy individual of Hongkong were isolated. The molecular assessment of the samples showed that the rate of anti-bodies against SARS-coronavirus was 2.5% [30]. From various studies we came to know that, Rhinolophus bats have anti-SARS-CoV antibodies for this reason bats are assumed as a source of viral replication [31]. In the camels, MERS-Coronavirus is found, hence they suspected as a zoonotic source or primary host. MERS-coronavirus was also detected in *Pipistrellus* and *Perimyotis* bats. For this reason bats are suspected to be the key host and transmitting medium of this virus [32]. Some researchers also suspect snakes as host of the virus but after doing various research regarding this and based on the genomic similarity of the novel corona virus, it was proved that snakes are not the key reservoirs, only bats could be the key reservoirs of the virus [31].

KEY FEATURES AND MECHANISM OF HUMAN CORONA VIRUSES

All the species of corona viruses contain specific genes in the ORF1 downstream regions. The genes are encode with proteins that is used for viral replication, nucleo-capsid and spikes formation of the virus. This virus contains many spikes on the outer surface. With the help of the glycoprotein spikes on the outer surface, the virus get attached to the host cell. These spikes also helps the virus to take entry in the host cells [33]. The virus may infect multiple hosts as the RBD or receptor-binding domain of the virus are attached loosely. Not like the other coronaviruses that use amino peptidases or carbohydrates as a key receptor to get entry in a human cells, the SARS-CoV and MERS-CoV use exo-peptidases as a key receptor [34]. The entry mechanism of corona virus depends upon the cellular proteases that contain human airway trypsin-like protease (HAT), cathepsins and transmembrane protease serine 2 (TMPRSS2), all these help to split the spike protein of the virus. They also helps to establish the further penetration changes. The key receptor of MERS-coronavirus is dipeptidyl peptidase 4 (DPP4). The other species of coronavirus like HCoV-NL63 and SARS-coronavirus use angiotensin-converting enzyme 2 (ACE2) as their key receptor [35].

SARS-CoV-2 contain spike protein, other polyproteins, nucleoproteins, and membrane proteins such as RNA polymerase, 3-chymotrypsin-like protease, papain-like protease, helicase, glycoprotein, and accessory proteins [36]. The spike protein of SARS-CoV-2 contains a 3-D structure in the RBD region which helps to maintain the van der Waals forces. In the host cell, the life cycle of SARS-CoV-2 starts as the S protein binds to the cellular receptor ACE2. After the binding of the receptor, the conformation change in the S protein facilitates viral envelope fusion with the cell membrane via the endosomal pathway. Then the RNA from the SARS-CoV-2 releases into the host cell. The Genome RNA is translated into viral replicase polyproteins pp1a and 1ab, which are then cleaved into small products via viral proteinases. Viral proteins and genome RNA are subsequently assembled into virions in the Endoplasmic Reticulum and Golgi Bodies and then these are transported via vesicles and then released out of the cell [37].

The severe acute respiratory syndrome coronavirus (SARS-CoV), H5N1 influenza A, H1N1 2009 and Middle East respiratory syndrome coronavirus (MERS-CoV) cause acute lung injury (ALI) and acute respiratory distress syndrome (ARDS) to the infected patients which further leads to pulmonary failure and often results in fatality. In the year 2002, there was a sudden outbreak occurred due to SARS-CoV virus in Guangdong, China. After a decade, another endemic occurs due to Middle East respiratory syndrome coronavirus (MERS-CoV) in the Middle Eastern countries. Patients infected with MERS-coronavirus suffer from pneumonia that is followed by ARDS and renal failure [38].

Clinical presentation

There are no proper and effective antibody test is identified for the covid-19 virus. Nasopharyngeal and oropharyngeal swab samples from the infected persons are collected and then these are diagnosed on the basis of reverse-transcription PCR [39]. The clinical spectrum of the covid-19 disease presents in the form of a mild, moderate or severe illness. In Covid-19 pandemic, most patients are asymptomatic carriers. Most of the patients suffering from Covid-19 may suffer from fever. Some other symptoms include cough, loss of taste or smell, sore throat, diarrhoea, difficulty in breathing or shortness of breath, chest pain etc [10]. The patients who are suffering from moderate and severe illness need to be hospitalized or sometimes they also require intensive therapy which includes non-invasive and sometimes invasive ventilation, this therapy also requires drugs like antipyretics, antivirals, antibiotics and steroids. Some kinds of Immuno-modulatory drugs and plasma exchange therapy is required in complicated cases [40].

Pathogenesis

COVID-19 can be divided into three phases which is based upon the infected cells. These phases include different clinical stages of the disease.

I. Stage 1 or the Asymptomatic state

This state initiates within the 1-2 days of getting infected. After inhaling, SARS-CoV-2 virus binds to the epithelial cells in the nasal cavity. After that, the virus starts replicating. The main receptor for both of the SARS-CoV2 and SARS-CoV virus is ACE2. At this stage the virus can be detected by the samples collected from nasal swabs [41].

II. Stage 2 or the Upper airway and conducting airway response

This state initiates within the next few days of the asymptomatic state. In this stage, the virus cultivates and also migrates down in the respiratory tract along with the conducting airways of the infected person. After that a strong innate immune response is triggered. At this stage, the disease COVID-19 is clinically exposed. Research has shown that, the disease is mild for about 80% of the infected patients. The patients can be monitored at home with the help of conservative symptomatic therapy [42].

III. Stage 3 or Hypoxia, ground glass infiltrates, and progression to ARDS:

Nearly about 20% of the infected individual can progress to the stage of the disease. The infected individuals may experience pulmonary infiltrates and some of them also experience very severe disease. At this stage hypoxia may be developed in the infected person. The aberrant wound healing procedure of the patient may

lead to more severe scarring and fibrosis than other forms of ARDS. The recovery process will require a vigorous innate, acquired immune response and epithelial regeneration [42].

TREATMENT : As there are many researches done on covid-19, but there is no specific clinically approved antiviral drug or vaccine for covid-19 invented till date. Main reason behind this is the covid virus continuously make changes in their genetic code and day by day new variations of Covid are discovered. Some kinds of broad-spectrum antiviral drugs have been evaluated against COVID-19 and after clinical trials they results in clinical recovery.[43]There are mainly three types of vaccine developed such as Inactivated Vaccine, Live- attenuated Vaccine and Viral-vector vaccine. WHO recommends various types of vaccines that are validated for use.After so many clinical trial, following are some vaccines that are suggested by WHO :

- The Pfizer/ BioNTech Comirnaty Vaccine- this vaccine was introduced on 31st december,2020.
- The SII/COVISHIELD and AstraZeneca/AZD1222 vaccines - this vaccine was introduced on 16 February 2021.
- The Janssen/Ad26.COV 2.S vaccine - this vaccine was introduced on 12th March,2021 and developed by Johnson and Jhonson
- The Moderna COVID19 Vaccine - this vaccine was introduced on 30 April,2021
- The Sinopharm COVID-19 Vaccine - this vaccine was introduced on 7th May, 2021
- The Sinovac-CoronaVac vaccine - this vaccine was introduced on 1st June,2021
- The Bharat Biotech BBV152 COVAXIN Vaccine - this vaccine was introduced on 3rd November,2021
- The Covovax Vaccine - this vaccine was introduced on 17th December,2021
- The Nuvaxovid Vaccine - this vaccine was introduced on 20th December,2021

With the support of the Strategic Advisory Group of Experts or SAGE,the WHO or World Health Organization recommends the need for booster doses of covid 19 vaccine. The main objective of the booster dose is to restore the effectiveness of vaccine [44].

IMPACT OF COVID-19 ON HUMAN PSYCHOLOGY

Covid-19 pandemic has an adverse effect on the mental health of human civilization. Due to Covid-19, the most exposed groups that face a lot of psychological problems includes children, college students and health workers [45]. Due to this pandemic many people lost their jobs. School, colleges, institutions, theaters, malls, markets were closed. People have to follow the covid protocols such as wearing masks, maintain social distancing and maintain proper hygiene. As a result of social distancing and all of the above people start to face stress, anxiety, depression, loneliness etc. Due to this pandemic everyone starts to become panic. As a result of this, people also starting to face various diseases and physiological complications [46]. As the outbreak occurs suddenly so people don't get any time for survive .Insufficient beds in the hospitals, insufficient medical facilities, poverty, increasing rate of affected persons day by day etc made people more panic about the disease [47].

In India people are thought to be more social than any other countries in the world. They engaged in more social networks, several religious festivals, and get-togethers throughout the year. For this reason complete lockdown had a downgrading effect on the mental health of people. Lockdown also had a long lasting effect on the Indian economy [11]. Due to Covid-19 pandemic, the problems occurs regarding mental health in Indians is more complex as in India socially and economically vulnerable population such as children, geriatric, migrant laborers, etc. present in a large proportion.[48]To support the mental and psychological health of people, Department of Mental Health of WHO developed a series of guidelines that give details about the mental and psychological problems occurs during the covid-19 pandemic and these guidelines also help and support people to fight against the sudden outbreak of the pandemic situation.[49]IEC materials for the mental health care of the elderly and children was published by the Ministry of Health and Family Welfare which helps people to get proper idea about the lockdown situation, how to handling isolation, how to deal with mental health issues after recovering from COVID-19 disease. Various types of portals and institutions like The National Institute of Mental Health, Neuro-Sciences (NIMHANS), All India Institute of Medical Sciences, Indian Psychiatric Society plays major role in promoting and how to manage mental health issues during the COVID-19 pandemic.These institutions works in the form of online services, telemedicine services, etc.Healthcare professionals also face a lot of mental stress due to this pandemic situation [50]. During Covid-19 pandemic the main mental health manifestations are - Stress, anxiety, depressive symptoms, insomnia, denial, anger, fear. Reports collected from Newspapers and other sources express that due to staying long period in quarantine and isolation, some people commit suicide from depression [51].

SOCIO-ECONOMIC CONDITION DUE TO OUTBREAK OF COVID-19

The Covid-19 pandemic not only affects the health and mental conditions of human civilization. But it also affects the Indian economy and society adversely [52]. Due to this outbreak social distancing protocols and lockdown was initiated. As a result of this the tourism industry runs into losses. Due to various restrictions on tourism, mobility, transports, shutdown of school, colleges, institutions, shopping malls, theatres, restaurants, markets etc the Indian GDP has been hit hardly. Due to lockdown small vendors also affected adversely. Their business run into losses as people started taking online services due to lockdown [53]. There was remarkable change seen in the share markets. Covid-19 pandemic triggers a fall in the share prices. Due to this pandemic many people loss their jobs [54].

Recent reports suggest that, due to the government's sudden announcement of lockdown, many hurdles has been created to the economically disadvantaged populations in India.From the mass exodus of migrant workers to the people in slum areas all are affected. The people in slum areas faced a lot of starvation problem due to lockdown situation [55].

Based on the data of recently published sentiment analysis of lockdown through twitter (analysis as evident from tweets which were extracted from 25th to 28th March 2020) is has been seen that, the prominent sentiment was positive and people showed trust on the government. But many of the respondents reported sadness and worries about the problems of daily wage laborers during the lockdown period [56].

DISCUSSION

The corona virus disease or Covid-19 is a pathogenic viral infection that is mainly caused by severe acute respiratory syndrome corona virus 2 or SARS-CoV-2. This virus is responsible for an unexpected pandemic throughout the world which further leads to a dramatic loss in the human lifestyle. On 30th January, 2020, the World Health Organization (WHO) has declared COVID-19 disease as a Public Health Emergency of International Concern (PHEIC). The virus causes sicknesses which begins in the form of common cold then can convert in to the more severe MERS-CoV (Middle East Respiratory Syndrome) and SARS-CoV (Severe Acute Respiratory Syndrome). Samples are collected from the patients for investigation about the virus. Genetic sequence of the virus was diagnosed from the collected sample. Based upon the analysis of the isolates of the genetic sequence, the virus was identified as a novel corona virus. Most of the patients suffering from Covid-19 may suffer from fever. Some other symptoms includes cough, loss of taste or smell, sore throat, diarrhoea, difficulty in breathing or shortness of breath, chest pain etc.

Due to various types of mis-informations on social media people also become scared and sometimes suffering from high mental illness. To help people during the pandemic situation, a toll free helpline number for 'Behavioural Health' was issued by the MOHFW-GOI. The Psycho-Social toll-free helpline number is - 08046110007. Various kinds of videos, advisories and resource materials has been made to entertain people. People are advised to do yoga and meditation for both physical fitness and mental peace.

Various types of supportive activities should be made for the frontline workers in the pandemic situation. Awareness should be made to overcome the mental ill-health occurs due to covid-19 panic.

CONCLUSION

Although waves of Covid-19 adversely affect the human civilization, but we have to keep in mind that Covid is not a panic disease and we should also aware people not to get panic. Corona virus continuously make changes in their variations and day by day it's new variations are discovered, so proper study regarding this disease have not completed yet. But, if we follow proper Covid protocols like maintain proper hygiene, keep ourselves neat and clean, wear mask properly and avoid too much public places, consume healthy foods, vitamin rich fruits etc, then we can easily fight against the disease. We all should show humanity and help people in this situation. By maintaining proper guidelines we should also keep appreciating local vendors. We should keep in mind if we follow proper guidelines we can again lead a healthy lifestyle. We should also encourage people not to give up. Things will become easier for all of us if we help each other and give support ourselves, then we can easily fight against the pandemic situation.

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