Review

COVID 19 pandemic challenges and their management: A review of medicines, vaccines, patents and clinical trials with emphasis on psychological health issues

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ABSTRACT

The SARS-CoV-2 (COVID 19) paroxysm is a dominant health exigency that caused significant distress, affecting physical and mental health. Increased mortality, a stressed healthcare system, financial crisis, isolation, and new living and working styles enhanced societal commiseration leading to poor health outcomes. Though people try to maintain good physical health but unfortunately the mental affliction is still ignored. Poor psychological health has emerged as a burgeoning social issue and demands attention. Henceforth, the fundamental objective of this review article is to collate information about COVID-linked physical and psychological agony in diverse population groups with related symptoms and accessible diagnosis techniques. Recent studies have unraveled the fragile mental states of people who have either contracted COVID 19 or had near and dear ones falling prey to it. The impact of the epidemic on the human mind both in short and long-term, with possible risk and preventive factors together with suggested solutions for maintaining good health have also been discussed here. It also enlists the available medications, vaccines and investigational research in the form of patents and clinical trials. This article can be taken as an updated information sheet for COVID 19, accompanied by its management techniques with special emphasis on coping strategies for mental health. Further, it may also assist the policymakers to devise approaches that could enable the public to overcome the pandemic-driven adversity not only in the given situation but also futuristically.

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The COVID 19 pandemic is a major health exigency that has caused significant distress and deteriorated the quality of life (QoL) of individuals. While causing numerous fatalities across the globe and leaving many impacted by long covid effects, this pandemic has affected society in myriad ways. Although most recuperated well, its fierce emergence has left the healthcare system in shambles and ushered the world economy into the doldrums. The shutting down of small-time businesses and activities related to infrastructure has added to the rising rates of unemployment and financial insecurities posing unprecedented challenges for the entire population. One thing which is severely depreciated by this pandemic is the health of the individual which entails both physical as well as mental health. "WHO" defines health as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. It simply means good health can be achieved by maintaining both physical as well as mental health (WHO, n.d.). Additionally, emotional, spiritual, and financial well-being also contribute to the individual's general health status as these are linked to stress levels. It is apparent that this deadly virus disturbs our physical health which manifests as diverse symptoms in an infected individual whereas mental health is not outwardly noticeable, demanding special attention (Salari et al., 2020).

Good physical health is prerequisite for optimum functioning of individuals, is directly related to their overall productivity, and is the index of 'one's well-being. Any compromises thereof would reduce the 'body's inherent capacity to fight infections and may invariably lead to poor mental health. Henceforth, consuming a nutritious diet, following a healthy lifestyle, with regular physical exercise and proper sleep remains the key to and upholds good physical health. Unfortunately, the forced isolation and physical-social disconnect due to the current COVID 19 pandemic has disrupted our daily routine with adverse physical health outcomes. The Pan Global nationwide lockdowns have become the mainstay to restrict and slow down the spread of the virus, leaving no means to cater to personal health and consequently waning off public health.

The unforeseen societal changes have resulted in an emergence of “fear of unknown” which is collectively perceived by the populace and expectedly so. The primary contributors to these negative connotations include the birth of newer life realities like facing the temporary unemployment, working indoor, home-education for children, exploitation of virtual platforms, social distancing and lack of physical contact with friends and colleagues. The conjoined effect of the “pandemic stress” and “poor physical health” is causing an imbalance to the mental well-being. The situation could be scarier for those who previously suffer from mental debilitation of any kind. It has been noted that the impact on the mental health has been felt throughout the affected countries although it is much accentuated in developing countries. Therefore, it is essential to enumerate the effect of COVID 19 on stress to better deal with this situation.

COVID 19 is causing disaster worldwide, but people of developing countries are getting more frightened, unsecured emotionally, depressed, and in a stage of confusion. Most of them are unaware about symptoms of COVID 19, its preventive measures and management techniques. Sometimes they consider the infection as social stigma primarily due to lack of knowledge, which deteriorates social stigma primarily due to lack of knowledge, which deteriorates the condition. Even if the government has taken necessary steps and strict measures, people’s awareness of infection remains the most significant factor in restricting the prevalence of diseases. General knowledge and understanding about the coronavirus virus, causes of infection, symptoms, diagnostic techniques, accessible mode of treatment, and vaccines are essential to fight against the infection. Simultaneously it is important to track the investigational research such as patent and clinical trials to have an upgraded knowledge about the ongoing investigation (Singh et al., 2020; Ahmed et al., 2020; Alahdal et al., 2020; Mohapatra et al., 2021).

“Good mental health is absolutely fundamental to overall health and well-being”. In this context, the current review is an attempt to explore and update the physical and mental health status of various populations such as healthcare professionals, elderly, children, adolescents, and pregnant women, etc. for such rapidly spreading contagious illness and their management procedures. It compiles various symptoms related to physical health and enlists several risk factors for mental health issues amid COVID 19 pandemic. Further, it tries to collate the different patent, clinical trials related to COVID 19 and enlists available medications and vaccines to fight against this virus. This article discusses many challenges and suggested solutions, together with the author's views. Lastly, it may act as a platform to understand the psychiatric aspects of the COVID 19 and advocates a case for the serious intervention of psychiatrists who may propose using effective medications and other techniques for this unattended health issue.
Symptoms related to COVID-19.

Conscripts various available medications including immunomodulating drugs and supplements to manage COVID-19. This may act as a resource with all the information organized, which help doctors, pharmacists, and patients have updated treatment regimens.

Additionally, timely diagnosis and earliest therapy of COVID-19 are the key steps for superior management of the infection and is essential to reduce the fatality ratio in COVID-19 patients. Ignoring the symptoms at the initial stage and deviating the public health protocol are found to be the vital reason for spread of infection and depreciating public health; as reinforcing immunity at the initial period are easy rather than severe stages of infection. So it is essential to overcome ignorance with adequate knowledge and awareness which will be valuable to boost the febrile patients with cough to seek immediate doctor’s consultation (G. Huang et al., 2020; Peng et al., 2020; Peng et al., 2020). Fig. 1 illustrates various diagnostic tests for COVID-19.

### 3. Mental health

Mental health describes the emotional and psychological well-being that helps to lead a relatively happy and healthy life. When we go through a difficult time and facing challenges it is obvious to receive negative emotions. Even though all the individuals are different from each other, there are certain factors that will affect our mental health. Different life experiences, upbringing conditions, environment and genetic factors can influence our thinking and response to challenges and opportunities. There’s no single “right way” to react, so everyone may react differently to different events. The coronavirus (COVID-19) outbreak may cause a diverse negative impact (summarized in Table 3) that might have different contributing factors summarized in the following Fig. 2.

As a consequence of the emergence of corona virus disease public health actions, such as quarantine, social distancing, lockdown are taken into contemplation to reduce the spread, but at the same time, it also imposed persons to feel isolated and lonely and leads to the intensification of stress, anxiety and depression (Rogers et al., 2020; Wang et al., 2021a; M. L. Tee et al., 2020). Several studies have been carried out to find the consequence of quarantine on the individual’s psychological status, and the results show a much greater occurrence of psychological distress amongst the quarantined population than those who did not. So this period seems to have important and dysfunctional psychological stress on the individual’s psychological status, and the results show a much greater occurrence of psychological distress amongst the quarantined population than those who did not. So this period seems to have important and dysfunctional psychological stress on the individual’s mental health, causing anxiety, depression, anger, and stress-related disorders both in the short-term and long-term period which further worsening their overall health status (Henssler et al., 2021; Bai et al., 2004; Reynolds et al., 2008; Sprang and Silman, 2013; Hawryluck et al., 2004; R. et al., 2003; Hull et al., 2020).

### Table 1

| Common Symptoms | Other symptoms | Emergency Symptoms | Long-term symptoms | Laboratory observations in COVID 19 patients |
|-----------------|---------------|--------------------|--------------------|------------------------------------------|
| Fever           | Sore throat   | Trouble breathing  | Psychological problem | Leukopenia                               |
| Dry cough       | Chills, sometimes with shaking | Constant pain or pressure in chest | Disease linked with heart, liver, kidney, brain, or thrombotic disease | Lymphopenia                               |
| Fatigue         | Headache      | Acute respiratory symptoms | Risk of bacterial & fungal infections | Levels of aminotransferase               |
| Body aches      | Loss of smell & taste | Septic shock | Exaggerated inflammatory response | Levels of C-reactive protein, D-dimer    |
| Loss of appetite| Nausea, vomiting & diarrhoea | Mucus or phlegm | Blood clots | Level of ferritin                         |
| Shortness of breath | Congestion & runny nose | Tachypnoea | Sudden confusion | Level of lactate dehydrogenase            |

is an absolute necessity to maintain good physical health. It decreases the risk of disease by maintaining body composition, activeness, muscular strength and resilience of the individual. The current corona epoch restricts the lives of the people within their home by disturbing their lifestyle and physical health.

Coronavirus disease is a pernicious disease caused owing to the SARS-CoV-2, a diverse family of viruses affecting humans and animals equally. Several types of corona viruses that produce mild to moderate respirational sickness in humans and recover without demanding special treatment. Others, such as SARS-CoV and MERS-CoV, can cause more acute respiratory ailments. A SARS-CoV-2 (COVID-19) is a novel strain of coronaviruses, which can have potentially major complications, such as trouble breathing and pneumonia. Patients infected with SARS-CoV-2 show a wide range of symptoms from asymptomatic cases to acute respiratory distress syndrome and many others as summarized in the Table 1. Although, many have rescued without needing special therapy but older individuals and people having other medical complications (such as chronic respiratory disease, diabetes, cardiovascular disorder and cancer) are more prone to develop critical illness even lose their life (Gasmi et al., 2021). Literature has been well established that patients having co-morbidities are seen to have a high mortality rate after COVID 19 (Bull et al., 2020; R. Huang et al., 2020; D. Wang et al., 2020; Yang et al., 2019). Further, researches have shown the connotation of reduced physical activity and lengthy sedentary behavior with poor health outcomes (Korczał et al., 2017; Chaput et al., 2020; Haapala et al., 2017; Archer and Garcia, 2014).

On the other hand, the undisciplined food habits and physical inactivity may lead to the risk of metabolic disorder (Jiménez-Pavón et al., 2020; Narici et al., 2020) and the development of lifestyle diseases such as obesity. The coexistence of these diseases impaired the person’s immunologic system, making them more susceptible to infection (Marazuela et al., 2020). Therefore, besides preventive methods (such as regular hand cleaning, using masks, and social distancing), people need to protect their physical wellbeing by doing various physical tasks. Along with exercise, proper nutrition laterally with a balanced diet and adequate rest also help us to be safe in the pandemic. Regular exercise may boost the immune system, modulates inflammation, and controls the viral gateway (Fernández-Lázaro et al., 2020; Khoramipour et al., 2021). Additionally, Yoga; chanting may also help to improve the overall health of the individual (Nagendra, 2020; Jasti et al., 2020; CTRI/2020/08/027037, 2020; Ransing et al., 2020; CTRI/2020/07/026799, 2020). The following Table 2 conscripts various available medications including immunomodulatory drugs and supplements to manage COVID-19.

| Fever | Dry cough | Fatigue | Body aches | Loss of appetite | Shortness of breath | Mucus or phlegm | Tachypnoea |
|-------|-----------|---------|------------|-----------------|--------------------|----------------|-----------|
| Sore throat | Chills, sometimes with shaking | Headache | Loss of smell & taste | Headache | Congestion & runny nose | Nausea, vomiting & diarrhoea | Blood clots |
| Trouble breathing | Constant pain or pressure in chest | Acute respiratory symptoms | Septic shock | Exaggerated inflammatory response | Mucus or phlegm | Tachypnoea | Sudden confusion |
| Psychological problem | Disease linked with heart, liver, kidney, brain, or thrombotic disease | Risk of bacterial & fungal infections | Leukopenia | Lymphopenia | Levels of aminotransferase | Levels of C-reactive protein, D-dimer | Levels of ferritin | Levels of lactate dehydrogenase |
| Classification      | Name of the Drug          | Common Brand names | Company name                                      | Route of administration | Mechanism of Action                                                                 | Side Effects                                      | Approving authority for COVID 19 | Reference                                                                 |
|---------------------|---------------------------|--------------------|--------------------------------------------------|-------------------------|------------------------------------------------------------------------------------|--------------------------------------------------|---------------------------------|---------------------------------------------------------------------------|
| Anti-Virals         | Remdesivir                | Veklury Remwin     | Gilead Sciences Sun Pharma                        | Parenteral              | A prodrug of Remdesivir triphosphate, an adenosine analogue. | hepatotoxicity, hypersensitivity/allergic reactions, nausea & bleeding | FDA & DCGI                      | (WHO, 2020) (Smith et al., 2020)                                        |
|                     |                           | Cipremi Covifor    | Cipla Hetero healthcare Rd Dr. Reddys Laboratories |                          | RNA-dependent RNA polymerase thereby viral RNA synthesis                          | anti-coagulation                                 | DCGI & FDA                      | (Munir et al., 2020)                                                       |
|                     | Favipiravir               | Avigan             | Toyama Chemical                                   | Oral                    | RNA-dependent RNA polymerase thereby viral RNA synthesis                          | anti-coagulation                                 | WHO & FDA                       | (NIH, 2020; NIH, 2021; Caly et al., 2020)                                 |
|                     |                           |                    |                                                  |                          | By the main protease enzyme of COVID 19 virus (3CLpro or Mpro) by disrupting the viral replication process & its subsequent release from the host cells | Pancreatitis, in liver enzymes, blood sugar/ diabetes, heart arrhythmia, in cholesterol level & insomnia | FDA & DCGI                      | (Jienchi and Kome, 2020) (Abrams et al., 2000; Jienchi and Kome, 2020; Abrams et al., 2000) |
|                     | Lopinavir, Ritonavir (HIV Protease inhibitors) | Kaletra Alvirin Logimmune Emiletra HIVus LR Ritonavir Ivermectol Ascapil Iverdal Forte Iverdis Iverid | Abbvie Abbott Cipla Emeriche pharma Aurobindo Hetero Sun Pharma Abbott Cadila Healthcare Bionova | Oral                    | By the host importin (α/β1) nuclear transport protein, a key transport process that has been controlled by virus during infection by host's response to antivirus | WHO & DCGI                                                                     | NIH, 2020; NIH, 2021; Caly et al., 2020 | (NIH, 2020; NIH, 2021; Caly et al., 2020) |
| Anti-Parasites**    | Ivermectin                |                    |                                                  | Oral                    | By the host importin (α/β1) nuclear transport protein, a key transport process that has been controlled by virus during infection by host's response to antivirus | WHO & DCGI                                                                     | NIH, 2020; NIH, 2021; Caly et al., 2020 | (NIH, 2020; NIH, 2021; Caly et al., 2020) |
| Anti-Protozoal*     | Chloroquine               | Nivaquine Resochin | Abbott Bayer                                      | Oral                    | By the viral RNA polymerase & of ACE2 receptors                                     | Loss of appetite, diarrhea, risk of retinal damage & seizures                   | WHO, FDA & DCGI                 | (Vincent et al., 2005)                                                     |
|                     |                           | Hydroxy chloroquine| Hydroquin HCQS RHQ                                | Oral                    | By the viral RNA polymerase & of ACE2 receptors                                     | Loss of appetite, diarrhea, risk of retinal damage & seizures                   | WHO, FDA & DCGI                 | (Abella et al., 2021; Klimke et al., 2020; Mitjà et al., 2021) |
| Anti-Bacteria       | Azithromycin              | Azro Zetorin       | Abbott Sviera health care Pfizer                 | Oral                    | By the inflammatory reactions & excessive cytokine production during viral infection thereby of mucous hyper secretion & hence the production of reactive oxygen | Abdominal pain, stomach upset & tiredness                                      | WHO, FDA & DCGI                 | (Butler et al., 2021; Echeverría-Ensal et al., 2021) |
|                     |                           | Trulimax Zithromax | Truxaf Fibra Alenab Pharmaceutical Ltd            | Oral                    | By the inflammatory reactions & excessive cytokine production during viral infection thereby of mucous hyper secretion & hence the production of reactive oxygen | Abdominal pain, stomach upset & tiredness                                      | WHO, FDA & DCGI                 | (Butler et al., 2021; Echeverría-Ensal et al., 2021) |
|                     |                           | Azax Wymesone      | Sun Pharma Wyeth Ltd                              | Oral & Parenteral       | By the enzyme phospholipase A2 & blocks the synthesis of the inflammatory mediators & counters the body's inflammatory response | in appetite, mood changes, agitation & headache                                  | WHO, FDA & DCGI                 | (Ahmed and Hassan, 2020)                                                    |
## Table 2 (continued)

| Classification | Name of the Drug | Common Brand names | Company name | Route of administration | Mechanism of Action | Side Effects | Approving authority for COVID 19 | Reference |
|----------------|------------------|---------------------|--------------|-------------------------|---------------------|-------------|---------------------------------|-----------|
| **Glucocorticoids such as Prednisone, Methylprednisolone, Hydrocortisone** | Prednisone Rayos Methyl Prednisolone Medrol Predmet Hydrocortisone Primacort Inj Hisone | Harizion Pharma Pfizer Sun pharma Macleods pharmaceuticals Ltd Samarth Lifesciences pvt Ltd | Oral Oral Oral & parenteral Oral & parenteral | Prednisone and Methyl Prednisolone: intermediate acting, used for management of system inflammatory response in severe covid 19 infection that lead to injury to lungs & multiple organ dysfunction Hydrocortisone: short acting, control septic shock in COVID 19 management | Prednisone: Headache, dizziness, puffiness in face, blurred vision & weight gain Methyl Prednisolone: Stomach upset, vomiting, restlessness, acne Hydrocortisone: Headache, dizziness, muscle ache, swollen ankles & indigestion | WHO, FDA & DCGI WHO, FDA & DCGI WHO, FDA & DCGI | (Bozzette et al., 1990; Sterne et al., 2020; “Centers for Disease Control and Prevention. Parasites - strongyloides: resources for health professionals. 2020;” n.d.; Stauffer et al., 2020) |
| **Colchicine** | Zocolchin tablets Colcrys Mitigare Gloperba | Zydus Cadila Takeda Pharmaceuticals Hakma Pharmaceuticals Avion Pharmaceuticals | Oral Oral Oral Oral | Mitigates the inflammation related manifestation by ↓ the movement of neutrophils & ↓ the signalling of inflammasomes of cytokines (Interleukin-1) | | WHO, FDA & DCGI | (Reyes et al., 2021; NCT04472611, 2020; Indraratna et al., 2018) |
| **Fluvoxamine** | Fluvoxin Revlife Interferon α-2b Zavinex Eglink Interferon β-2a Rebih Betaferon Actemra | Sun Pharma Abbott Zydus Cadila Sun Pharma Merck Zydus Cadila Roche | Oral Parenteral Oral Oral | ↓ production of inflammatory cytokines Interferon α-2b & β-1α are the cytokines with anti-viral properties & also ↓inflammation | Interferon α-2b: Dizziness, blurred vision & insomnia Interferon β-2a: Loss of appetite, FLU like symptoms & fatigue | WHO, FDA & DCGI WHO, FDA & DCGI | (Rafiee et al., 2016; Lenze et al., 2020; Seftel and Boulware, 2021) (Winthrop et al., 2018) |
| **Interlekin (IL-6) Inhibitors: Taclizumab** | | Zadig Pharma | Parenteral | ↓ the release of IL-6 in bronchial cells during COVID infections thus ↓ the ↓ cytokines release during COVID linked systemic inflammation & leads to hypoxic respiratory damage | Cough, sore throat & hypercholesterolaemia | FDA & DCGI | (Marchese et al., 2020; Le et al., 2018: “Interleukin-6 Receptor Antagonists in Critically Ill Patients with Covid-19,” 2021; Rosas et al., 2021) |
| **Kinase Inhibitors: Barcitinib in combination with Remdesivir** | Oluminant Barinat | Eli Lily Natco Pharma Ltd | Oral | Interference with phosphorylation of STAT proteins leading to immune system activation | Respiratory tract & urinary tract Infection | DCGI & FDA | (“Fact Sheet for Patients, Parents and Caregivers Emergency Use Authorization (EUA) of Baricitinib,” n.d.; Richardson et al., 2020: “Fact sheet for healthcare providers: Emergency Use Authorization (EUA) of baricitinibFood and Drug Administration,” n.d.) |
| **Ruxolitinib (Janus kinase inhibitor esp JAK1 & JAK2)** | Jakavi | Novartis | Oral | Modulate downstream inflammatory responses by interfering with phosphorylation of STAT protein | Skin rashes, nausea & burning during urination | FDA | (Cao et al., 2020) |

(continued on next page)
| Classification | Name of the Drug | Common Brand names | Company name | Route of administration | Mechanism of Action | Side Effects | Approving authority for COVID 19 | Reference |
|----------------|------------------|---------------------|--------------|-------------------------|---------------------|-------------|--------------------------------|-----------|
| Monoclonal Antibodies | Neutralising Monoclonal antibody: Bamlanivimab + Etesevimab | Bamlanivimab Etesevimab Regen-cob (Casirivimab + Imdevimab) | AbCellera and Eli Lilly Eli Lilly Regeneron | Parenteral | Bamlanivimab: target the receptor binding site of spike protein Etesevimab: bind to overlapping epitome in receptor binding domain of spiked protein Casirivimab & Imdevimab: bind to non-overlapping epitome of spike protein Bind of these to spike protein prevents the COVID Infection & ↓ the progression of disease | Nausea, headache, pruritis & dizziness | WHO, FDA & DCGI | (Dougan M, Nirula A, Gottlieb RL, n. d.; Administration, n.d.; “Food and Drug Administration. Frequently asked questions on the emergency use authorization of casirivimab + imdevimab.2020.” n.d.) |
| Supplements | Vitamin C | Limcee | Abbott | Oral | A free radical scavenger having anti-inflammatory actions & ↑ cellular immunity | Although safe but mega dose can cause heart burns & abdominal cramps | WHO, FDA & DCGI | (Wei et al., 2020; Thomas et al., 2021; Fowler et al., 2020) |
| | Zinc | Mostly administered with vitamins | | Oral | Impair RNA replication | High dose ↓ cytotoxicity | WHO, FDA & DCGI | (Abd-Elsalam et al., 2020; Thomas et al., 2021; "National Institutes of Health. Office of Dietary Supplements. Zinc fact sheet for health professionals. 2020., n.d.) |
| | Vitamin D | Vitamin D plus Calcitas | Baksons Homeopathy INTAS | Oral | Modulate immune responses by activating Vit D metabolites | High dose can cause fatigue, dry mouth, anorexia, & metallic taste | WHO, FDA & DCGI | (Martineau et al., 2017; Murai et al., 2021) |
| Blood thinners | Heparin | Beparine Bio E Lupenox Nuparin | Bio E Lupin Troikaa Pharmaceuticals ltd | Parenteral | ↓ micro-thrombus development by blocking uncontrolled blood coagulation & hence ↓ the risk of major organ failure | Skin warmth or discoloration (specifically on hands & feet), shortness of breath, dizziness, anxiety, sweating, loss of appetite, nausea & vomiting | WHO, FDA & DCGI | (Huppensteel et al., 2020; Buijsers et al., 2020; Gozzo et al., 2020; Tang et al., 2020) |
| Convalescent Plasma (Currently administration of this is on hold) | Plasma containing antibodies (from person recovered from COVID 19) to Corona virus | – | – | – | Supressing the virus & inflammatory response | Transfusion-transmitted diseases such as hepatitis B, C, HIV, hypothermia, allergic & febrile nonhemolytic reactions | WHO, FDA & DCGI | (Hueso et al., 2020; Fung et al., 2021) |

# No more in use, amid serious concerns about the drug’s safety.
## No more recommended due to lower efficacy on Covid 19.

WHO: World Health Organisation.
FDA: U.S. Food and Drug Administration.
DCGI: Drugs Controller General of India.
2005). Table 4 conscripts some of the potential risk and protective factors underlying mental distress in response to the COVID 19 lockdown. The risk factors help to better recognize the reason why certain people are more predisposed to severe illness, whereas the protective factors give methods to deal with the situation with necessary precautions.

Table 4

| Feelings                                      | Reason                                                                 |
|-----------------------------------------------|------------------------------------------------------------------------|
| Negative emotions                            | Fear, worry, anger, sadness, numbness, or frustration                  |
| Fear of becoming infected                     | Restriction to go to hospital/health care facilities & other places    |
| Fear of illness & death                       | Contributed to the novelty of the illness and associated uncertainty in its treatment |
| Feeling of helplessness                       | Unable to protect the family from the deadly influence of this virus   |
| Fear associated with the past experience      | From earlier epidemic                                                  |
| Fear of losing their income                  | Unable to work through isolation or due to economic recession          |
| Fear that quarantine                          | Socially isolation from friends & family                                |
| Depression, helplessness, boredom & loneliness| Lack that kind of comfort and support during isolation                 |
| Physical agony affecting negative feelings    | Headache, body ache, stomach distress, loss of smell & rashes on skin etc. |
| ↑ urge for alcohol, tobacco & other narcotics | Depression                                                             |

Fig. 1. Various diagnostic tests for COVID 19.

Fig. 2. Major risk factors for COVID 19.
One of the recent investigations indicates that lack of social connection is linked with a variety of deprived physical and mental health consequences, even early mortality. Therefore it is an undeniable fact that physical distancing carried out to limit the spread of the corona virus has a potential negative impact on these health outcomes affecting life severely (Morina et al., 2021). According to other studies, the COVID 19 contagion increases the psychological health problems in COVID 19 patients and quarantined persons but also in health care workers and patients with non-infectious chronic disease, demanding urgent interventions of mental health management measures (Wu et al., 2021; Pappa et al., 2020; Nochaiwong et al., 2020; Kumar, 2019; Kumar et al., 2020). Another study carried out in the Indian population concluded that students and health professionals shows higher psychological distress than others and necessitate special attention as they are the main stakeholders in society (Rehman et al., 2021). A further investigation conducted to check the mental health condition of pregnant females during the COVID 19 plague and concluded that pregnant ladies are more prevalent to anxiety and depression during this period, particularly younger pregnant women (Fan et al., 2021).

Evidence has been found that people having mental illness are at higher affliction of getting infected with COVID-19 (Mazeree et al., 2021). If they had any previous history of mental disorder then the relative risk of having infection is little more (Taquet et al., 2021). Hence, taking into account the higher risk for COVID 19, it has been advised that persons with mental illness should be vaccinated on a priority basis. Yet, the patients with mental diseases are reluctant to get vaccines for COVID-19. However, there is limited literature on the rates of vaccine reluctancy among people having mental illness. Further, in case of depression and schizophrenia the immune response to vaccines get reduced leading to inadequate production of antibodies, which may not give enough protection to the patient even after vaccination. Additionally, there are rising fears for hesitancy in the general public because of associated side effects and doubt about the efficiency (Khubchandani et al., 2021; Razai et al., 2021; Shacham et al., 2021). All these above experiences are factual in the face of this significant challenge of the COVID 19 pandemic. Concern for one’s own and one’s loved ones, rapid modifications in one’s way of life (e.g., education, employment, social get-togethers), interrupted plans caused by travel restrictions, social isolation, and quarantine are some of the population’s new-fangled challenges. Thus it’s essential to recognize the seriousness of the situation. At this point, the authors want to highlight that the emergence of psychiatric conditions and mental health were identified as the 10th most frequently investigated subject in the course of the COVID 19 pandemic (Tran et al., 2020). Thus to understand and accept the fact we have to first analyze the mental status of the individual population with their mindset for such pandemic, which is imperative to meet the global crisis. A startling observation in regard with the covid impact is its potential to exacerbate health issues amongst vulnerable groups like mental health sufferers, geriatric population, pregnant women and even less privileged unemployed members of the community (Holmes et al., 2020; Power et al., 2020; OECD, 2020). This emergence warrants attention and indicates the collusion and discussion of the COVID – 19 data related to psychological stress in the various population (enlisted in the Table 5). Furthermore, concerted efforts towards accumulation of real world evidence (RWE) with a focus on their possible management procedures, is highly desirable. This repository of information will act as a resource for the patients, clinicians, regulators,
and policymakers who would be better equipped to deal with the present scenario of crisis and any future pandemics.

The following section elucidates the psychological agony in diverse population groups along with suggested solutions.

3.1. Healthcare professionals

The COVID 19 outbreak 2019 evolved to be one of the central health crises affecting people of all continents, realms, races, and socioeconomic groups and posed an increasing challenge for healthcare professionals who are designated as the front-line workers (Q. Chen et al., 2020; Shi et al., 2020). Understandably, in this pandemic, health professionals are experiencing the same situations as other individuals but are burdened with insurmountable mental and physical stress (Petzold et al., 2020). In the perspective of any epidemic, health workers are expected to have long working hours without availing any leave. Massive workload, an growing figure of infected cases, rise in the death rate, risk of being infected while treating patients, lack of any specific medication, extensive social media reporting, shortage of personal protective equipment, lack of preparedness and every day's new challenges can contribute to various psychological and mental illnesses (NCT04497415, 2020; Lai et al., 2020). Further morals and medical ethics that emphasize self-sacrifice as a vital principle of this noble profession, may add to job pressure. According to past reports, health care workers having a high risk of contamination have persistent stress and higher degrees of anxiety and depression (McAlonan et al., 2007). The study carried out to investigate stress reactions among staff members in a hospital involved in the outbreak of severe acute respiratory syndrome (SARS) located in east Taiwan concluded that 5% of this group suffered from an acute stress disorder, 20 % felt stigmatized and debarred in their neighborhood since they involved in hospital job and 9% reported reluctance to work (Bai et al., 2004). Research on the occurrence of anxiety, depression, stress and restlessness during the COVID 19 eruption among healthcare workers suggested that a significant percentage of them experienced mood and sleep problems in this situation. Additionally, female healthcare staff, nurses, younger medical staff, and workers in this area have shown higher rates of emotional symptoms than, than males and other counterparts (Collins and Gibbs, 2003; Grover et al., 2020). Further, women professionals who are designated as the front-line workers have persistent stress and higher degree of anxiety and depression (McAlonan et al., 2007).

3.1.1. Management

Appreciation by the supervisors, public and patients is one of the powerful motivational tools for reducing stress in health care workers. It helps to boost the kindness and sacrifices of health workers who risk their lives to serve the infected patients. Such gestures may support overcoming empathetic distress and fear to provide care under challenging clinical conditions of the COVID 19 pandemic. Various stress management methods such as training and educational programs may be beneficial for this outbreak (Chua et al., 2004). Personal coping methods such as positive thinking, problem-solving, seeking social support, along with institutional measures such as self-care, infection control, safety, staff support and gratitude, and clear communication are helpful measures for managing stress (Chew et al., 2020). It is advisable to the head, managers, and policymakers to implement supportive, protective, encouraging & motivational, training, and educational interventions, at a regular interval to reduce the psychological stress in front-line workers (Vizheh et al., 2020).

3.2. Police personnel

Similar to health care personnel, police are also listed as the “corona warriors” and acted as front-line workers in this pandemic. During this epidemic outburst in populous countries like India, the primary responsibility of the police personnel is to implement the national lockdown and safeguard physical distancing by enforcing laws (Epidemic Disease Act, 1987, and the Disaster Management Act, 2005) along with other social responsibility apart of their regular work profile. This can result in a greater possibility of developing a range of psychological, emotional and perturbation amidst this group. There is adequate prove to document the intensification of depression, anxiety, drug abuse, and suicide among this population (Grover et al., 2020; Di Nota et al., 2020; Edwards and Kotera, 2020). It is evident from the past research that organizational culture and workload are the main issues for boosting stress in police personnel. Stress concerning to job among the police personnel may be attributed to nearly similar factors as discussed above, the reason being participation as front-line workers in the COVID 19 outbreak. Further, susceptibility in female officers is comparatively more than their male counterpart (Collins and Gibbs, 2003; Grover et al., 2020).

3.2.1. Management

Spreading awareness among the staff about mental health complications, conducting training and motivational sessions to develop constructive coping skills, and building resilience can alleviate mental distress. Teaching relaxation practices such as yoga or meditation can also help them to cope with stress positively. Regular physical exercise can also solve the purpose along with special appreciation and support. Regular communication (online medium) with the family members is an effective way to strengthen their support system, especially those who work away from their homes or undergo quarantine. Additionally, persons with a previous history of mental disorder should pay special attention to timely and reasonable consultation (Khadse et al., 2020).

3.3. Children and adolescents

COVID 19 contagion is causing interruptions in the universal social structure leading to socioemotional complications. Many countries maintain social distancing and observe the quarantine with government-imposed mandatory restrictions on many outside activities. As a result of which children and adolescents have had their schools closed, and outdoor home activity and social interactions abridged many fold. These restrictions limit this group’s physical movement, which further leads to irritability, lethargy, anxiety, depression, stress, and inattention and fear of infection in them (Nearchou et al., 2020; Meherali et al., 2021). Such public restrictions promote stress in this youth population and in their parents and can become a barrier in the normal growth and development of children (Araújo et al., 2020) and may intensify as this isolation continues. Additionally, poor diet, confinement to a place, and increased screen time may cause cases of obesity, eyesight complications, stroke, heart attack and many other ailments (Spitzer, 2021). The declining QoL of young children cannot be ignored and demands special attention as they are the main stakeholders of any country. There is sufficient evidence of the correlation between physical activity and psychological status in the literature (Saxena et al., 2005; Sagatun et al., 2007; Ahn and Fedewa, 2011; Okuyama et al., 2021). Study outcomes concluded that the COVID 19 pandemic is responsible for the new onset of psychological problems among children. The current scenario has taken a heavy toll on differently-abled children. Autistics and ADHD sufferers have emerged as a highly vulnerable group whose mental
health deterioration could be detrimental for their future (Panda et al., 2021).

3.3.1. Management

This epidemic outbreak demands immediate action by preparing novel strategies for early psychological interventions to decrease its influence on the mental health of the youth. There is an utmost emergency for establishing an on-demand clinical support facility for better amelioration of these problems. The distress quotient among these populations can be reduced by maintaining social networking with friends and relatives, positive thinking, physical exercise and avoiding false social media information. Online resources such as information about psychological health and preventive measures, video counselling, tele-psychiatry and telemedicine services, can be useful to lessen the imaginary fears and ultimately psychosocial stress (Deolmi and Pisani, 2020; Loades et al., 2020; Prisco et al., 2020). It is advisable to the psychologist, doctors, and policymakers to develop new and innovative policies that help them compete with this corona epidemic-driven adversity and ensure normal physical and mental development in children and adolescents (Araújo et al., 2020).

3.4. Geriatrics persons

Although people of all ages are affected by the rage of corona, geriatrics are more prone to the negative consequences, which results in decreased QoL and poor mental health. The rapid rate of geriatric mortality in the COVID 19 outbreak may be attributed to compromised immunity, pre-existing ailments such as diabetes, hypertension, thyroid, cardiovascular, menopause, and other chronic conditions that make them more susceptible to viral infections (Sepúlveda-Loyola et al., 2020; Nanomedicinal Approaches Towards Cardiovascular Disease, 2021). Usually, older adults suffer from age-related mental stress: a condition which further worsens in this corona age due to restrictions in movement, limited social participation and reduced autonomy. Rapidly growing risk of social isolation, worry and loneliness induced by the pandemic is resulting in various severe short and long-term negative mental health impacts (Bansod et al., 2021). Additionally, QoL has deteriorated and often ends with mortality in this populace. The condition worsens for menopausal females and individuals with a history of psychological illness as they have already strived with poor QoL. (Mohapatra et al., 2020; Sradhanjali Mohapatra, 2022). It is reported elsewhere that there is a strong positive relation with social participation and geriatric health (Douglas et al., 2017; Carver et al., 2018; Sepúlveda-Loyola et al., 2020; Perez et al., 2021). Deprivation of social participations of different forms leads to augmented depression, anxiety and cognitive dysfunctions. Nonetheless it is heartening to know that a study conducted on 1,000 U.S. adults claim that though the older population faces stress, anxiety, and depression, but they exhibit better-coping capability with COVID 19 stress in comparison to young adults and have reported to have comparatively less depression and anxiety (“The Older You Are, the Better You May Cope With Pandemic Stress,” n.d.).

3.4.1. Management

Even though there are several recommendations for the elderly to deal with this emerging COVID 19 pandemic, the major management method is to offer adequate emotional support that boosts them to cope with this situation. Family members and caregivers need to be actively and emotionally involved in elderly care focusing more on mental health. Connecting with family and friends over the internet and phone is a better way to ventilate thoughts and helps to deal with isolation. But at the same time, the digital screen time for the news media should be reduced to avoid misinformation and dread statistics. Descriptive news or information with illustrations from authentic sources may help. Maintaining a proper routine, healthy nutrition habits and daily physical activity may improve resilience in older people. Avoidance of self-medications, virtual consultations and telemedicine, tele-psychiatry, proper health education, and psychological counseling could also be beneficial, particularly for individuals having a previous track record of mental ailments (Ahn and Fedewa, 2011; Lebrasseur et al., 2021; Prisco et al., 2020; Gillman-Wells et al., 2021). Further implementing home-delivered settings that enhance mental security may be advantageous in this population (Tegeler et al., 2020). Additionally, stakeholders and policymakers need to take collective action to deal with this challenge ensuring better psychological well-being.

3.5. Obstetrics patients

Pregnancy is believed to be a triumphant phase in women’s life but a few are predisposed to negative emotions that lead to psychological distress. Women consecrated with pregnancy are more prone to face psychological agony during their prenatal period. It may increase up to 25% more than the prevailing mental disorder at their reproductive age where the problem is found to be common (Brooks et al., 2020; Howard et al., 2018; Howard et al., 2014; Kendig et al., 2017). Perinatal depression is especially dangerous for women who are carrying a medically high-risk pregnancy (Fairbrother et al., 2017). The pregnancy-induced physiological changes greatly affect the various body system including the immune system of the females. The present COVID –19 era further adds trauma to the condition by exaggerating the damaging effect on this vulnerable population. Although pregnant women have a greater predilection to psychological problems, the COVID 19 outbreak and associated factors further accelerate the condition. Moreover, reduced access to reproductive health services, increased socioeconomic scarcity and social cut-off may worsen the situation. It is well established that expectant females have always been regarded a highly susceptible community. Various findings have been described the vulnerability of expecting females to their emotional insecurity (Stein et al., 2014) and routine trauma (Loomans et al., 2013). It was observed that the pregnancy period during the past pandemic was related with additional adverse clinical outcomes and a higher rate of death (Chui et al., 2004; Mosby et al., 2011). Some investigations conclude that maternal mental health is adversely influenced by the social distancing and impacts of infectious outbreaks. There is an influx of studies stating that the SARS quarantine has led to significant upsurges in levels of anxiety (Dodgson et al., 2010), depression (Linde and Siqueira, 2018) and stress (Davis et al., 2014). Evidences of deteriorating mental health of expectant women and their offsprings due to extreme stress conditions, natural disasters or emergencies, have also been reported well (King et al., 2009; Laplante et al., 2004; Cao-Leti et al., 2015). Some of the current studies depict that this pandemic and related factors have negatively affected pregnant women with depression and anxiety and lower quality of mental life and reasonable psychological impact due to isolation (Sacco et al., 2020; Corbett et al., 2020; Basu et al., 2020; Thapa et al., 2020; Ali and Shahil Feroz, 2020; Brooks et al., 2020; Panda, 2021; Zakir et al., 2020). Nevertheless, there is no recent indication for the susceptibility of pregnant women towards COVID 19 illness or those suffering from COVID 19 are more predisposed to develop acute pneumonia, however, compromised immunity may be concluded to be the critical factor (Eastin and Eastin, 2020; Durankus and Aksu, 2020; Kotabagi et al., 2020; Durankus and Aksu, 2020; C. H. Liu et al., 2021; Ceulemans et al., 2021; Medina-Jimenez et al., 2020; Berthelot et al., 2020).
| Name | Innovator/Manufacturer | Mode of action | Efficacy | Side-effects | No. of dose | Approving authority | Reference |
|------|------------------------|----------------|----------|--------------|-------------|-------------------|-----------|
| Comirnaty | Pfizer, BioNTech | mRNA vaccine that express the SARS-CoV-2 S antigen, eliciting an immune response | About 95% (clinical trials) | Injection site pain, headache, arthralgia, myalgia, fatigue, chills, pyrexia, injection site swelling or redness, & nausea | 2 with 21 to 28 days’ interval | FDA, WHO & EMA | (“pfizer-specific-training_full-deck_27-january-final.pdf” e., n.d.) |
| Moderna mRNA vaccine | Moderna | mRNA vaccine that allows the expression of the SARS CoV 2 spike antigen, provoking an immune response | About 94.1% (phase 3 clinical trials) | Reactogenicity & pain, swelling & erythema at the area of injection, fever, headache, fatigue, myalgia, arthralgia & nausea/ vomiting | 2 with 30 days interval | FDA, WHO & EMA | (Baden et al., 2021) (“Moderna COVID-19 Vaccine Health Care Provider Fact Sheet,” n. d.) |
| Janssen/JNJ-78436735, Ad26.COV2.S | Johnson & Johnson | Adenovirus vaccine (Non-replicating) that delivers genes & produce an immune response | About 86% (clinical trial) | Injection site pain, headache, fatigue, myalgia, & nausea | Single dose | WHO, FDA & EU | (“Johnson & Johnson’s Janssen COVID-19 Vaccine Overview and Safety,” n.d.) |
| Covishield / AZD1222/ AstraZeneca vaccine/ Vaxzevria | Oxford university-Astrazeneca/ Serum Institute of India (SII) and Indian Council of Medical Research | Adenovirus vaccine that stabilizes the expressed S-protein by not modifying the coding sequence, leading to release of antibodies & hence ‘immunity’ | About 79% effective (randomized control trial) | Pain at the injection area, fever, chills, headache, myalgia, fatigue, malaise, arthralgia, diarrhoea, nausea etc. | 2 doses | WHO & being used in many countries around the globe | (“COVID-19 Vaccine AstraZeneca. (n.d.),” n. d.) |
| Sputnik V | Gamaleya Research Institute, Acellena Contract Drug Research & Development in Russia | Adenovirus vaccine that initialize the production of the new coronavirus’s covering proteins by providing the coronavirus gene to cells & → the immunity | About 79.4% after 1st dose & 91.6% after 2nd doses & → the immune system using 2 different formulae even more than using the same version twice & may give longer-lasting protection(in a clinical trial) | Injection site reactions, flu-like illness, headache & asthena | 2 doses with 3 weeks interval | DCGI, India | (“Sputnik V Vaccine. Welcome to Precision Vaccinations. (n.d.),” n.d.) |
| Sinopharm/BBIBP-CorV/ Sinopharm WIBP | Beijing Institute of Biological Products; China National Pharmaceutical Group (Sinopharm) | Inactivated vaccine, that cannot replicate but the presence of spike protein causes an immune response; | About 78.1% | Mild-moderate effects such as headache, fatigue, & pain at injection site | 2 doses with 3-4 weeks interval | WHO | (“WHO. (n.d.). Evidence Assessment: Sinopharm/BBIBP COVID-19 vaccine,” n. d.) |
| CoronaVac | SinoVac Biotech Corporation | Displays its action by introducing killed viral particles to the body’s immune system without causing a serious disease response | About 50.7%-62.3% against infections | Pain at the site of injection, headache, tiredness, & myalgia | 2 doses with 21 days apart | WHO & China National Medical Products Administration Uzbekistan & China | (“CoronaVac. Drugbank Online. (n.d.),” n. d.) |
| ZF2001 | Anhui Zhifei Longcom Biopharmaceutical, Institute of Microbiology of the Chinese Academy of Science in China | Recombinant vaccine that uses a COVID 19 spike protein as the antigen against Coronavirus | About 82% against disease of any severity; efficacy was 93% against the 2 variant & 78% against the 5 variant | Well tolerated & immunogenic | 3 doses | (Yang et al., 2021) (“Yang et al., 2021”) | (continued on next page)
| Name                  | Innovator/Manufacturer | Mode of action                                                                 | Efficacy                                                                 | Side-effects                                                                 | No. of dose | Approving authority | Reference                                                                                           |
|----------------------|------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------|------------------------------------------------------------------------------|-------------|---------------------|-----------------------------------------------------------------------------------------------------|
| Covaxin (BBV152)     | Bharat Biotech, ICMR, NIV, India | Inactivated vaccines do not replicate but able to instruct the immune system to produce a defensive reaction against the infection | About 77.8%, 93.4%, 63.6% efficient against symptomatic, severe symptomatic & protection against asymptomatic COVID-19 respectively | Injection area pain, swelling, redness, & itching accompanied by fever, headache, body ache, nausea, vomiting, weakness, stiffness & malaise | 2 doses / 4 weeks | DCGI & WHO          | (“COVAXIN (BBV152) for the Treatment of Covid-19. Clinical trials arena...” n.d.)                     |
| Convidecia/Ad5-nCoV  | CanSinoBio’s adenovirus-based viral vector vaccine technology platform & the Beijing Institute of Biotechnology | Recombinant vaccine (with type 5 vector of adenovirus) that act through heparin-responsive receptor which intermingles with the Ad5 fiber shaft, leading to immunity | About 65.7% (Phase 3 trial) | Pain, fever, fatigue, headache & muscle pain | Single dose | China,              | (Cheng et al., 2007)                                                                                                |
| NVX-CoV2373           | Novavax                | Stable, prefusion protein nanoparticle | 96.4% against the original SARS-CoV-2 (Phase 3 UK trial) & 55.4% against the B.1.351 variant (Phase 2b trial) | Headache, muscle pain, & fatigue | 2 doses / 3 weeks apart | WHO                  |                                                                                                                   |
| ZyCoV-D/Zydus’ COVID 19 vaccine | Zydus Cadila, | Plasmid DNA vaccine formed the spike protein of the virus & produced an immune response after administration; mediated by the cellular & humoral immunity | 66.6 % for symptomatic RT-PCR positive cases |                                                                 | 3 doses | DCGI                |                                                                                                                   |
| Corbevax or Biological E’s novel COVID 19 vaccine | Biological E | Recombinant-protein technology, that involves incorporating DNA encoding an antigen to stimulate an immune response in cells | Phase III clinical trial | No data available | 2 doses at 28 days interval | CDSCO, India |                                                                                                                   |
| BBV154 - Intranasal vaccine | Bharat Biotech | Intranasal replication-deficient chimpanzee adenovirus SARS-CoV-2 vectored vaccine prevent viral illness, by creating an immune response in the nose | Phase II clinical trial | No data available | No data available | Not yet approved |                                                                                                                   |
| Gennova Biopharmaceuticals Limited | | mRNA based vaccine | Not reported | Demonstrated safety, immunogenicity, neutralization antibody activity in the rodent & non-human primate models | No report available | Not yet approved |                                                                                                                   |
| EpiVacCorona          | Vector state Research centre of Virology and Biotechnology in Russia | Peptide vaccine that based on 3 chemically synthesized antigen of the COVID 19 protein attached to a carrier protein & adsorbed on aluminium hydroxide | Overall 79% in Phase-III clinical trial | Severe fever | 2 doses | Approved for use in Bealrus, Russia, Turkmenistan |                                                                                                                   |
| CoviVac               | Chumakov Federal Scientific Center for R&D of Immune & Biological Products | Inactivated, viral vector, egg-based vaccine | Efficacy has not yet been established in a phase III clinical trial | No data available | 2 doses / 2 weeks apart | approved for use in Russia |                                                                                                                   |
| QazVac                | Research Institute for Biological Safety Problems in Kazakhstan | Inactivated vaccine | 96% efficacy (in the phase-2) | No serious side effects | 2 doses | Approved for use in Kazakhstan & Kyrgyzstan |                                                                                                                   |
| Patent No.          | Title                                                                 | Application                                                                                   | Details                                                                                                                                 |
|-------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| CN111217917B China | Novel coronavirus SARS-CoV-2 vaccine and preparation method thereof  | Generate immune response for treating and/or preventing infection of SARS-CoV 2 after immunizing organism | This form of vaccine comprises RBD fusion protein subunit vaccine/mRNA vaccine/adeno virus vector vaccine containing RBD fusion protein of the SARS-CoV-2 as core antigen |
| RU2738081C1 Russia | Peptide immunogens and a vaccine composition against coronavirus infection COVID 19 using peptide immunogens | Used as an constituent of a vaccine against COVID 19 infection | Immunogenic peptides characterized by the amino acid sequence, encompassing antigenic T- and B-cell epitopes of protein S of SARS Cov 2 coronavirus having capability of inducing formation of antibodies, possessing antigen-specific, virus-neutralizing & protective activities |
| RU2743595C1 Russia | Vaccine composition against COVID 19                                 | A vaccine against COVID 19                                                                     | Peptide immunogens & a carrier protein, that carry the minimum necessary antigenic determinants for the formation of a specific immune response & induce protective immunity against COVID 19 |
| CN11133704B China | Novel coronavirus COVID 19 vaccine, preparation method and application thereof | Novel coronavirus COVID 19 vaccine                                                           | Acquires the dominant antigen (RBD) epitope of the novel coronavirus, then connected with immunoglobulin to prepare RBD-Fc fusion protein, & can be used for developing the protein vaccine of the novel coronavirus COVID 19 & medicaments for preventing/treating the COVID 19 |
| CN111088283B China | mVSV viral vector, viral vector vaccine thereof and mVSV-mediated novel coronavirus pneumonia vaccine | A viral vector vaccine for coronary pneumonia                                                | Based on mVSV mediation (obtained after multiple modification mutations occur to M protein amino acid site of wild Indiana strain VSV). The mVSV viral vector is embedded or fused with the dominant antigen of the spike protein S of the COVID 19 viral pathogen having better prevention/treatment effect on a new coronary pneumonia virus infected individual |
| CN110974950B China | Adenovirus vector vaccine for preventing SARS-CoV-2 infection        | An adenovirus vector vaccine                                                                  | Used to prevent SARS-CoV2 infection comprising 5 protein nucleic acid sequence which is easy to express in human cells & is anticipated as a recombinant virus vaccine for preventing SARS-CoV2 infection |
| WO2021045836A1WIPO (PCT) | Anti-sars-cov-2-spike glycoprotein antibodies and antigen-binding fragments | An isolated antigen or antibody binding portion                                             | Neutralizing human antigen-binding proteins which bound explicitly to the virus's spike protein & related methods of using such antibodies & fragments to treat/prevent infections |
| CN111729079A China | DC vaccine for novel coronavirus, preparation method and application thereof | Dendritic Cells (DC) vaccine aiming at novel coronavirus                                       | Comprises an S protein of COVID 19 & a chemokine CCL 19 having long duration, can quickly recognize antigens, starts the killing function of T cells & generates antibodies |
| US20200407402A1 United States | Stabilized Coronavirus Spike (S) Protein Immunogens and Related Vaccines | Nanoparticle vaccines                                                                         | Contain the redesigned soluble S immunogens displayed on self-assembling nanoparticles & also provides oligonucleotide sequences encoding the redesigned immunogens. Further providing methods of using the vaccine compositions for preventing/treating coronaviral infections |
| CN111995672A China | Coronavirus SARS-COV-2S protein specific antibody and use mRNAs encoding SARS-CoV-2 virus antigen and vaccine and preparation method of vaccine | For treating COVID 19 or as diagnostic tools for assessing COVID 19 infection Vaccine     | Specific antibody of coronavirus SARS-COV-2S protein & its use as therapeutic agents The invention relates to the vaccines/mRNA for coding SARS-CoV-2 virus antigens containing coding region of at least one protein of S protein and N protein of SARS-CoV-2 virus and/or at least one protein fragment & the mRNA; can be delivered into body to produce immune reaction |
| CN111218458B China | Biological product for preventing novel coronavirus                  | A biological product for preventing new coronavirus (COVID 19)                               | Biological pharmaceutical products for preventing novel coronavirus, used for developing a gene vaccine product for preventing novel coronavirus by utilizing gene synthesis, codon optimization & gene cloning (continued on next page) |
| Patent No. | Title                                                                 | Application                                                                 | Details                                                                                                                                                                                                 |
|-----------|----------------------------------------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RU2723008C9 | Immunobiological agent and method of use thereof for inducing specific immunity against the severe acute respiratory syndrome virus SARS-CoV-2 | Immunobiological agent can be used to prevent the infections caused by the virus of severe acute respiratory syndrome SARS-CoV-2 | Administering one or more immunobiological agents to the mammalian body and allows effectively induce specialized immunity for SARS-CoV-2 virus                                                                 |
| CN111298048A China | Traditional Chinese medicine composition for treating novel coronavirus pneumonia and application thereof | Used to treat COVID 19 pneumonia & has curative action on other common COVID 19 syndrome | Has the properties of dispelling wind, clearing heat, cleaning lung, relieving exterior syndrome & relieving asthma & has obvious curative effect on the common COVID 19 syndrome of pathogenic heat obstructing the lung |
| CN111450244A China | Cell composition for preventing and treating coronavirus infection and application thereof | Preventing and/or treating coronavirus infection | Provides an application of DC cells and/or NP protein in preparation of an immune cell composition and/or a kit for preventing and/or treating coronavirus infection |
| CN111620952A China | Novel coronavirus vaccine based on chimeric virus-like particles | The invention reveals a novel coronavirus vaccine | Comprising the chimeric virus-like particles as an effective component & can generate stronger immune response in human bodies, that can resist the infection after immunization |
| CN111569058A China | SARS-CoV2 inactivated vaccine & its preparation method | SARS-CoV-2 inactivated vaccine | A SARS-CoV2 inactivated vaccine & its preparation method |
| CN111518175B China | SARS-CoV-2 antigen polypeptide and its recombinant adeno-associated virus and application in preparing vaccine | Used for immunization aiming at COVID 19 new coronary pneumonia on human | Can delivered & expressed in vivo to generate fusion antigen polypeptide, induces & generates serum neutralizing antibody, having neutralizing titer on SARS-COV-2 & is expressed continuously |
| CN111265500A China | Pharmaceutical composition for preventing and treating COVID 19 and preparation method thereof | A pharmaceutical composition to prevent & treat COVID 19 | A new way for clinically preventing & treating COVID 19 & other respiratory virus infections conveniently & cost effective manner with minimum treatment time by atomization inhalation mode |
| CN111346108A China | Preparation method of virus inactivated plasma for treating COVID 19 | Treating COVID 19 | Preparation method by collecting the blood plasma of the convalescent COVID 19 patient or the blood plasma after the immunization of a SARS-CoV-2 vaccine |
| CN111560354A China | Recombinant novel coronavirus and preparation method and application thereof | A new milestone in the field of coronavirus vaccine that can protect people from influenza virus & SARS-CoV-2 | It works on SARS-CoV-2 epitope & influenza virus genome from gene level & applied to prevent and/or treat diseases produced by influenza virus and/or SARS-CoV2 |
| CN111592395A China | Neutralizing antibody against novel coronavirus SARS-CoV-2 and application thereof | This invention provides an effective alternative antibody medicament for detecting, preventing & treating COVID 19 | A neutralizing antibody for resisting SARS-CoV2 using phage display technology to target SARS-CoV2-RBD & SARS-CoV1-RBD to carry out differential antibody screening, acquires a neutralizing antibody for resisting SARS-CoV2, can block combination of SARS-CoV2-RBD & ACE2 positive cells, has noticeable virus neutralization effect on SARS-CoV2 in the research & development of diagnostic reagents |
| US20200237689A1 United States | Prevention and treatment of coronavirus and other respiratory infections using nanoemulsion compositions | Preventing and/or the risk of infection by nasal administration of nanoemulsion | Nanoemulsion with certain surfactant that impart permeability & are useful for mucosal & intranasal applications that allow for the delivery of one or more active agents to the application site for preventing infection by coronavirus |
| CN111671880A China | Traditional Chinese medicine preparation for treating fever caused by coronavirus pneumonia | Effectively relieve the COVID 19 fever symptom, can recover the lung function to a certain extent & improve the respiratory quality of patients | A traditional Chinese medicine preparation for treating fever caused by coronavirus pneumonia, having suitable compatibility & curative outcome |
| CN111925440A China | New coronavirus RBD specific monoclonal antibody and application | To prevent & treat of diseases caused by the SARS-CoV2 | A new coronavirus RBD specific monoclonal antibody used for the prevention & clinical handling of ailments produced by the SARS-CoV2 in the research & development of diagnostic reagents |
| US20200179367A1 United States | Method of Treating Coronavirus | Treatment of COVID 19 | Administration of a composition containing a therapeutically effective quantity of isomyosmine or its pharmaceutically acceptable salt |
| CN110960532A China | Composition of anti-coronavirus macleaya cordata benzylisoquinoline alkaloid and resveratrol and application thereof | Used for preparing medicaments for resisting diseases caused by coronavirus infection | Composition made up of a bocicloram acceptable salt benzyl isoquinoline alkaloid & resveratrol for resisting coronavirus & can be anticipated to become a raw material to treat pneumonia produced by COVID 19 |
| Patent No.   | Title                                                                 | Application                                                                 | Details                                                                                                                                                                                                 |
|------------|----------------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CN1113032979A China | Single-domain antibody for novel coronavirus and application thereof | To Prevent and treat ailments caused by the SARS-CoV2                      | A humanized single-domain antibody targeting at SARS-CoV-2, having good affinity with RBD antigen & high neutralizing activity on SARS-CoV-2 pseudotype virus                                                                 |
| CN111620945A China | Monoclonal antibody or derivative thereof for resisting novel coronavirus | Preventing/treating the infection of the novel coronavirus                  | Discloses the preparation process of the antibody & the sequences of amino acid present in the light chain & heavy chain variable region of antibody                                                                 |
| BR112019018251A2 Brazil | Coronavirus, vaccines understanding the same, and methods for the prevention of disease | Prevention of disease                                                        | Relates to vaccines having a live, attenuated virus encoding a variant replicase gene encoding polypeptides                                                                                                 |
| CN111303280A China | High-neutralization-activity anti-SARS-CoV2 fully human monoclonal antibody and application | Used to manufacture medicament for treating COVID 19                        | Used for resisting SARS-CoV2, obtained by screening through a flow sorting-single cell PCR technology & having unique CDR partition. Further, having the characteristics of high-efficiency & specific SARS-CoV-2 virus resistance, with good stability & suitable for industrial production |
| CN111499765A China | Coronavirus fusion protein and preparation method and application thereof | Use for preparing antibody test kits, vaccines, antibodies & diagnostic antigen applications | Antigen preparation processes, particularly relates to a coronavirus fusion protein having remarkable sensitivity, specificity & detection rate                                                                             |
| CN111217919B China | Novel coronavirus S protein double-region subunit nano vaccine based on pyrococcus ferritin | To the immunogenicity of coronavirus antigen                                 | A receptor binding domain & fusion peptide of the virus both used as double antigens & are fused with a Pyrococcus furiosus _Ferritin to form a new fusion protein that acts as the antigen |
| CN111218459B China | Recombinant novel coronavirus vaccine taking human replication-defective adenovirus as vector | A recombinant novel coronavirus vaccine taking human replication-defective adenovirus as vector having aims to prevent a novel coronavirus epidemic situation | Having good immunogenicity & can induce organisms to generate strong cellular & humoral immune responses in a short time further the virus load in lung tissues can be obviously after a single immunization in 14 days & has a good immune protection having scalability in a short time A neutralizing antibody for SARS-CoV2 by taking SARS-CoV-25 protein as target to screen human antibody, single-chain antibody fragments & obtain an antibody with stronger neutralization function on virus |
| CN111333722A China | SARS-CoV-2 inhibitor and its application                               | Used to treat diseases caused by novel coronavirus infection, & has good clinical application | Produced by adopting Bat-derived coronavirus Bat/CovRaTG13 (closest to the genetic fingerprint present in SARS-CoV2) to control & prevent the incidence of COVID 19 pandemic & future disease epidemic; can be equipped into 3 types of vaccines such as live, recombinant and/or inactivated vaccines |
| CN111437384A China | Batwing-derived coronavirus vaccine for preventing COVID 19            | A bat-derived coronovirus vaccine for preventing COVID 19                   |Produced by adopting Bat-derived coronavirus Bat/CovRaTG13 (closest to the genetic fingerprint present in SARS-CoV2) to control & prevent the incidence of COVID 19 pandemic & future disease epidemic; can be equipped into 3 types of vaccines such as live, recombinant and/or inactivated vaccines |
| CN111603556A China | Preparation and application of novel coronavirus subunit nano vaccine | Used for preventing or treating COVID 19 formed by SARS-CoV-2               | A new coronavirus subunit nano vaccine having capability of activating humoral and cellular immunity than the other groups in animal experiment                                                                 |
| RU2743594C1 Russia | Peptide immunogens used as components of vaccine composition against covid-1 | Preventive against coronavirus infection COVID 19                          | Having antigenic T & B-cell epitopes of protein 5 of SARS CoV2 coronavirus, that encourage the formation of antibodies possessing antigen-specific, virus-neutralizing & protective activities |
| US10973908B1 United States | Expression of SARS-CoV-2 spike protein receptor binding domain in attenuated salmonella as a vaccine | Preventive against coronavirus infection COVID 19                          | Live bacterial vectors as vaccines & more specifically to a live attenuated bacteria expressing a portion of the SARS-CoV2 protein receptor linking area, meant for oral administration to a human without considerable injury & to induce an efficient preventative vaccine response |
| RU2745626C1 Russia | Method of creating a live vaccine against COVID 19 based on the probiotic strain enterococcus faecium 13 and a live vaccine enterococcus faecium 13-pentf-COVID 19 | Stimulating humoral & cellular immunity counter to the SARS-CoV2 virus & stop inducing infection | Oral administration of the Enterococcus faecium pentf-COVID 19 vaccine stimulates the development of cellular & humoral immunity, manifested by the production of specific immunoglobulins of classes G and A, besides production of interferon gamma in vaccinated animals |
Table 7 (continued)

| Patent No.        | Title                                                                 | Application                                                                                                                                                                                                 | Details                                                                                     |
|-------------------|----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| CN111778264A     | Novel coronavirus pneumonia vaccine based on novel adenovirus vector | Stimulating humoral & cellular immunity in against the SARS-CoV2 virus & prevent spreading infection                                                                                                       | Based on a new adenovirus vector Sad23L and/or Ad49L capable of inducing & generating high-level cellular & humoral immunity in animals, having no side effect & are safe 8 effective having γ scalability |
| China            | sad23L & Sad49L                                                        |                                                                                                                                                                                                           |                                                                                              |
| CN112048007A     | Universal novel coronavirus vaccine and preparation method thereof   | Broad-spectrum immune stimulation effect; having high safety, low cost & speedy scalability                                                                                                                  | It is an artificial antigen presenting cell of a fusion protein for expressing novel coronavirus structural protein & non-structural protein, simulating the natural immune system of an organism, generating immune response & form immune memory |
| China            |                                                                      |                                                                                                                                                                                                           | A novel recombinant subunit vaccine of coronavirus & more specifically relates to a method for expressing recombinant subunit protein with immunocompetence in eukaryotic cells with the help of virus genes artificially synthesized by a genetic engineering means & developing the vaccine by using the expressed recombinant protein |
| CN112480268A     | Novel recombinant subunit vaccine of coronavirus and application thereof | Improved immune property & stability                                                                                                                                                                       | A polypeptide, vaccines & pharmaceutical compositions containing T &/or B cell epitopes which are immunogenic in a large percentage of human |
| China            |                                                                      |                                                                                                                                                                                                           | This is stable, durable having safe immunity & like by using AAV as a vector vaccine, & overcomes the problem by generating the anti-SARS-CoV2 antibody inside the body having short maintenance time, usually 1–3 months |
| US10973909B1     | Coronavirus vaccine                                                  | Use for preventing or treating of SARS-CoV2 infection                                                                                                                                                        | A polypeptide, vaccines & pharmaceutical compositions containing T &/or B cell epitopes which are immunogenic in a large percentage of human |
| United States    |                                                                      |                                                                                                                                                                                                           |                                                                                              |
| CN112245578A     | COVID 19 virus preventive vaccine and preparation method thereof      | Use for the prevention of SARS-CoV2 infection                                                                                                                                                              | A conjugated compound, consisting an antigen & virus particle mixed to form a conjugate mixture, in such a way that the conditions & steps of forming these products allow for use of the conjugate mixture as a vaccine |
| China            |                                                                      |                                                                                                                                                                                                           | A pseudo virus of a COVID 19 coronavirus, can ; the risk of virus research to the maximum extent |
| US2021000942A1   | Vaccines formed by virus and antigen conjugation                      | A vaccine against various pathogens including for treatment of diseases caused by novel coronaviruses (including SARS-COV 2)                                                                               | A conjugated compound, consisting an antigen & virus particle mixed to form a conjugate mixture, in such a way that the conditions & steps of forming these products allow for use of the conjugate mixture as a vaccine |
| United States    |                                                                      |                                                                                                                                                                                                           |                                                                                              |
| CN112375768A     | Pseudo-virus of COVID 19 coronavirus, preparation method and application thereof | Used for screening antiviral drugs, measuring the titer of neutralizing antibodies in infected persons, searching epitopes bound by the neutralizing antibodies on the surface antigen of the COVID 19 coronavirus & evaluating the immune effect of the vaccine | A pseudo virus of a COVID 19 coronavirus, can ; the risk of virus research to the maximum extent |
| China            |                                                                      |                                                                                                                                                                                                           |                                                                                              |
| US10953089B1     | Coronavirus vaccine formulations                                     | Used to prevent novel coronavirus (SARS-CoV-2) infection                                                                                                                                                      | Nanoparticle formulations comprising of coronavirus spike proteins that act as antigen & linked with a detergent core resulting in stability & good immunogenicity & fit for use in vaccines |
| United States    |                                                                      |                                                                                                                                                                                                           |                                                                                              |
| CN112552413A     | Novel coronavirus recombinant protein subunit vaccine                 | Used to prevent novel coronavirus (SARS-CoV-2) infection                                                                                                                                                     | A polypeptide, a fusion protein of the polypeptide & helicobacter pylori ferritin, & a subunit vaccine prepared by the polypeptide that can generate high-titer neutralizing antibody targeting at SARS-CoV-2 after immunizing animals |
| China            |                                                                      |                                                                                                                                                                                                           |                                                                                              |
| CN111892648A     | Novel coronavirus polypeptide vaccine coupled with TLR7 agonist and application thereof | Can be used to prevent & treating novel coronavirus pneumonia in animal models                                                                                                                                | A novel coronavirus polypeptide vaccine coupled with a TLR7 small-molecule agonist for coronaviruses pneumonia & are able to produce stronger cellular & humoral immunity by generating a neutralizing antibody |
| China            |                                                                      |                                                                                                                                                                                                           |                                                                                              |
| CN112592390A     | Novel coronavirus specific antigen peptide and use thereof           | Used in disease diagnosis, preparing COVID 19 vaccine, & preparing medicaments to prevent & treat COVID 19                                                                                                    | A polypeptide, which is an antigenic peptide of SARS-CoV-2 virus                                                                                   |
| China            |                                                                      |                                                                                                                                                                                                           |                                                                                              |
| CN112439058A     | Recombinant novel coronavirus nano vaccine method based on exosome as vector | Can well stimulate the immune system of a human body to recognize & generate immunity & has wide market application                                                                                         | A method of preparation of a novel recombinant coronavirus nano vaccine based on exosome as a vector; where nanoscale exosomes, are used as vehicles to load & the in vivo delivery of antigenic proteins |
| China            |                                                                      |                                                                                                                                                                                                           |                                                                                              |
| CN112300290A     | Novel coronavirus polypeptide vaccine using papillomavirus viroid particle presentation antigen | Used for preventing novel SARS-CoV2 infection                                                                                                                                                              | It uses Papillomavirus -like virus particles to present antigens where the papillomavirus L1 protein is chimeric with SARS-COV-2 spike protein epitope polypeptide |
| Patent No.     | Title                                           | Application                                                                 | Details                                                                                                                                                                                                 |
|---------------|-------------------------------------------------|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CN111978398A  | Antibody against coronavirus, SARS-COV2 & medical use thereof | Antibodies are useful as active agents to treat or as diagnostic tools to assess COVID 19 related infection in an individual | This mainly relates to virus antibody particularly SARS-CoV-2 monoclonal antibody & its medical use. A novel coronavirus vaccine & particularly relates to a novel coronavirus recombinant protein vaccine(a RNA vaccine & an mRNA vaccine); are injected into human body directly or with adjuvant to express corresponding antigen & induce organism to generate immune response. |
| CN11200498A  | Novel coronavirus vaccine and preparation method and application thereof | Has wide application prospect in the area of COVID 19 prevention and treatment | A novel coronavirus vaccine & particularly relates to a novel coronavirus recombinant protein vaccine(a RNA vaccine & an mRNA vaccine); are injected into human body directly or with adjuvant to express corresponding antigen & induce organism to generate immune response. |
| CN112386684A | COVID 19 vaccine and preparation method and application thereof | To get the protective immune capacity counter to SARS-CoV2 | A vaccine which constructs recombinant T cell expressing SARS-CoV-25 protein with virus system, & the recombinant T cell is re-infused into body to express S protein continuously & induce body to generate specific cellular & humoral immune response. |
| CN111529701A | Preparation for producing novel coronavirus antibody after oral administration and preparation method thereof | To achieve the effect of immunity against COVID 19 | A novel coronavirus antibody uses attenuated salmonella as a carrier to transmit DNA vaccine, expresses specific molecule COVID 19-S, that can be recognized by immune cells, & thus producing specific antibody & neutralize the COVID 19-S protein in mammals. |
| CN112300274A | Human source antibody of novel coronavirus specific antigen peptide, preparation method and use | It can be use in disease diagnosis, for preparing vaccines & medicaments for prevention & treatment of COVID 19 | It relates to novel coronavirus specific antigen peptide-bound human antibodies particularly, relates to a monoclonal antibody, which precisely binds to an antigenic peptide, & application of the antigenic peptide in preparing COVID 19 vaccine & medicament. |
| CN112535730A | Novel coronavirus polypeptide vaccine and application thereof | Used for preventing or treating new coronavirus infection | A vaccine composition containing the polypeptide that can stimulate both production of binding antibodies to the S1 protein & to the S2 protein & simultaneously, can stimulate a T cell response. |
| CN112546213A | Method for preparing novel coronavirus vaccine and evaluation method aiming at effectiveness of novel coronavirus vaccine | Offers a theoretical basis for large-scale clinical application of the vaccine, & also provide a basis for standardization of antigenicity of other inactivated vaccines | A novel coronavirus vaccine which is an inactivated vaccine (2 times of inactivation treatment are carried out on a vaccine strain) prove to be effective for corona virus. |
| CN112574299A | Human source antibody of novel coronavirus specific antigen peptide, preparation method and use | Use for disease diagnosis, preparing COVID 19 vaccine, preparing medicament for preventing & treating COVID 19 | An anti-SARS-CoV-2 antibody/antigen binding portion that capable of binding to the RBD domain of the novel coronavirus, block the virus-invading cells, & have important clinical significance. |
| CN112266411A | Novel coronavirus vaccine and application thereof | Use to prevent or treat a novel coronavirus infection or a related disease with it | A vaccine composition containing the polypeptide that can stimulate both production of binding antibodies to the S1 protein & to the S2 protein & simultaneously, can stimulate a T cell response. |
| EA03729781   | Pharmaceutical agent and method for use thereof for inducing specific immunity to virus of severe acute respiratory syndrome sars-cov-2 | Provides development of reactions of humoral & cellular immune response counter to SARS-CoV2, thus providing ↑ level of immune response for virus | A self-assembly ferritin-based novel antigen vaccine consisting of a fusion protein (derived from the linkage of a new coronavirus S protein) & a monomeric ferritin subunit; connected through a connecting peptide SGG. |
| CN112076315A | Nano antigen particle fused with new coronavirus S protein and ferritin subunit, new coronavirus vaccine, and preparation method and application thereof | The novel corona vaccine can initiate widely neutralizing anti-novel corona antibodies, can ↑ the immune efficacy & expand the immune range, & has the potential of becoming a universal novel corona vaccine with cross immune efficacy | Pharmaceutical agent to induce of specific immunity to fight against the virus (SARS-CoV2) |
| WO2020107610A1WIPO (PCT) | Pharmaceutical agent for inducing specific immunity against sars-cov2 | To prevent diseases caused by SARS-CoV2 | Pharmaceutical agent to induce of specific immunity to fight against the virus (SARS-CoV2) |
| EP3804751A2  | Adenovirus carrier vaccine used for preventing infection caused by sars-cov-2 hACE2 knock-out RNA interference stem cell vector new corona vaccine | Used as a recombinant viral vaccine for the prevention of SARS-CoV2 infection having better safety | It comprises an S protein-coding nucleotide sequence which is easily expressed in human cells & can produce more S proteins. Here an hACE2 gene knockout RNA interference stem cell replaces an adenovirus vector of a traditional new corona virus vaccine to formulate a personalized therapy COVID 19 vaccine. |
| CN112618708A | China                                           |                                                                             | (continued on next page)                                                                                                                   |
| Patent No.     | Title                                                                                                                           | Application                                                                                   | Details                                                                                                                                                                                                 |
|---------------|-------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CN111662389A  | SARS-CoV-2 fusion protein and vaccine composition thereof                                                                   | Prevent and/or treat novel coronavirus pneumonia effectively by inducing specific immune response aiming at SARS-CoV-2 | It is prepared from the fusion protein to overcome the defects of poor immunogenicity can be subjected to a large amount of recombinant expression by using a gene engineering technology, is fast & can have high scalability in vaccine preparation. |
| China         |                                                                                                                               |                                                                                               | SARS-CoV-2 antigen polypeptide & its recombinant adeno-associated virus is delivered & expressed in vivo to generate fusion antigen polypeptide, induces & produces serum neutralizing antibody, has neutralizing titer on SARS-CoV-2 & is expressed continuously. |
| CN112695057A  | ARS-COV-2 antigen polypeptide and its recombinant adeno-associated virus and application in preparing vaccine              | Used for immunization aiming at COVID 19 new coronavirus pneumonia on human                   | A vaccine that uses new type coronavirus spike protein 51 region. It can avoid the potential ADE risk of the full-length S protein, hold the immunogenicity of RBD, & warrant the ability to neutralize the novel coronavirus by the antibody generated after immunization. |
| China         |                                                                                                                               |                                                                                               | SARS-CoV-2 coronavirus vaccine which is characterized by utilizing the codon optimization of S gene of SARS-CoV-2 coronavirus & has high biological activity, high half-life period & immunogenicity. |
| CN112618707A  | SARS-CoV-2 coronavirus vaccine and its preparation method                                                                   | Prevention of disease by activating humoral immunity                                           | A vaccine for preventing COVID 19 infection, and preparation method and preventing disease by activating humoral immunity. |
| China         |                                                                                                                               |                                                                                               | A vaccine that uses new type coronavirus spike protein 51 region. It can avoid the potential ADE risk of the full-length S protein, hold the immunogenicity of RBD, & warrant the ability to neutralize the novel coronavirus by the antibody generated after immunization. |
| CN11256180A   | Vaccine for preventing novel coronavirus disease                                                                           | Preventing new type coronavirus disease having better immune protection effect                | A vaccine for preventing COVID 19 infection, and preparation method and preventing new type coronavirus disease having better immune protection effect compared with the currently developed live vaccine, if being used as the live vaccine. |
| China         |                                                                                                                               |                                                                                               | A vaccine that uses new type coronavirus spike protein 51 region. It can avoid the potential ADE risk of the full-length S protein, hold the immunogenicity of RBD, & warrant the ability to neutralize the novel coronavirus by the antibody generated after immunization. |
| CN112043825A  | Subunit vaccine for preventing novel coronavirus infection based on novel coronavirus spike protein 51 region               | Used for preventing novel coronavirus infection                                               | A subunit vaccine based on a novel coronavirus spike protein 51 region. It can avoid the potential ADE risk of the full-length S protein, hold the immunogenicity of RBD, & warrant the ability to neutralize the novel coronavirus by the antibody generated after immunization. |
| China         |                                                                                                                               |                                                                                               | SARS-CoV-2 coronavirus which is characterized by utilizing the codon optimization of S gene of SARS-CoV-2 coronavirus & has high biological activity, high half-life period & immunogenicity. |
| CN112553164A  | Genetically modified stem cell for treating COVID 19                                                                            | For treating COVID 19 infection                                                              | A gene modified stem cell to treat COVID 19 is characterized in that mesenchymal stem cells/amniotic fibroblasts. |
| China         |                                                                                                                               |                                                                                               | It provides an isolated or non-naturally occurring SARS-CoV-2 monoclonal antibody which includes the different steps of preparation method of an intravenous injection of COVID 19 human immunoglobulin by employing human plasma. |
| CN111978396A  | Antibody specifically binding SARS-COV-2 NP protein and its use                                                             | useful as therapeutic agents or as diagnostic tools for COVID 19 infection                   | An expression vector for expressing SARS-CoV-2 antigen using food-grade lactobacillus as an immune antigen delivery vector & constructs the genetic engineering lactobacillus oral vaccine for expressing the COVID 19 antigen. |
| China         | Preparation method of intravenous injection COVID 19 human immunoglobulin                                                   | Preparation of a human immunoglobulin against the COVID 19 virus                              | A single epitope T cell antigen peptide, that can induce T cell immunity, rebuild organism immunity function, stimulate the antiviral function, with good efficacy & safety. |
| CN111944837A  | Expression vector for expressing COVID 19 antigen and construction method of genetic engineering lactobacillus oral vaccine | Used for preventing novel coronavirus infection                                               | A single epitope T cell antigen peptide, that can induce T cell immunity, rebuild organism immunity function, stimulate the antiviral function, with good efficacy & safety. |
| China         |                                                                                                                               |                                                                                               | An expression vector for expressing SARS-CoV-2 antigen using food-grade lactobacillus as an immune antigen delivery vector & constructs the genetic engineering lactobacillus oral vaccine for expressing the COVID 19 antigen. |
| CN11130255A   | COVID 19-S-RBD virus-like particle, vaccine and preparation method thereof                                                    | Used for preventing novel coronavirus infection                                               | A recombinant SARS-CoV-2 vaccine composition that can induce high-titer neutralizing antibodies, excellent immunogenicity & remarkably high immune response. |
| China         |                                                                                                                               |                                                                                               | A recombinant SARS-CoV-2 vaccine composition that can induce high-titer neutralizing antibodies, excellent immunogenicity & remarkably high immune response. |
| CN112220920A  | Recombinant novel coronavirus vaccine composition                                                                            | Used for preventing novel coronavirus infection                                              | A recombinant SARS-CoV-2 vaccine composition that can induce high-titer neutralizing antibodies, excellent immunogenicity & remarkably high immune response. |
| China         |                                                                                                                               |                                                                                               | A recombinant SARS-CoV-2 vaccine composition that can induce high-titer neutralizing antibodies, excellent immunogenicity & remarkably high immune response. |
| CN111978376A  | Pharmaceutical composition for preventing and/or treating coronavirus infection, and preparation method and application thereof | Preventing and/or treating diseases related to coronavirus infection, and have extensive clinical application | A recombinant SARS-CoV-2 vaccine composition that can induce high-titer neutralizing antibodies, excellent immunogenicity & remarkably high immune response. |
| China         |                                                                                                                               |                                                                                               | A recombinant SARS-CoV-2 vaccine composition that can induce high-titer neutralizing antibodies, excellent immunogenicity & remarkably high immune response. |
| US51097329B1  | Combination therapy for coronavirus infections including the novel coronavirus (COVID 19)                               | Treating SARS-CoV2 viral infections                                                           | Therapeutic combinations of 5-aminolevulinic acid, with at least one out of: Vitamin C, zinc, methylene blue & curcumin to fight with coronavirus infections (including the SARS-CoV-2 virus, and/or rhinoviruses). |
| United States |                                                                                                                               |                                                                                               | Therapeutic combinations of 5-aminolevulinic acid, with at least one out of: Vitamin C, zinc, methylene blue & curcumin to fight with coronavirus infections (including the SARS-CoV-2 virus, and/or rhinoviruses). |
Table 8
List of clinical trials related to physical and mental health during COVID 19 (ClinicalTrials.gov, 2021).

| Study Title                                                                 | NCT No          | Type of Study | No. of Patients | Status       | Clinical Trial Sponsor                                                                 | Country                | Classification on the basis of health condition |
|----------------------------------------------------------------------------|-----------------|---------------|-----------------|--------------|----------------------------------------------------------------------------------------|------------------------|-----------------------------------------------|
| “Prevalence Of Anxiety And Depression During COVID 19”                      | NCT04369300     | Observational | 1000            | Recruiting   | Max Healthcare Institute Limited, New Delhi, Delhi, India, 110,017                      | India                  | Mental                                        |
| “Impact of COVID 19 Pandemic on the Psychological Wellbeing of Healthcare” | NCT04469660     | Observational | 1300            | Recruiting   | Max Super Speciality Hospital Delhi, India, 110,017                                  | India                  | Mental                                        |
| “Nation-wide Cross-sectional Survey on Current Pharmacological Practices in Severe COVID 19” | NCT04691921     | Observational | 1055            | Completed    | NMC Specialty Hospital                                                              | India                  | Physical                                      |
| “Protecting Health Care Workers During the COVID 19 Outbreak:Qualitative Study of AYUSH initiative” | NCT04387643     | Observational | 52              | Completed    | Aarogyam UK                                                                             | India                  | Physical                                      |
| “An Event-Driven, Phase 3, Randomized, Double-blind, Placebo-controlled, Multicenter Study to Evaluate Efficacy, Safety, Immunogenicity, Lot-to-Lot Consistency of BBV152, a Whole-Virion Inactivated SARS-CoV-2 Vaccine in Adults ≥ 18 Yrs of Age” | NCT04641481     | Randomized     | 25,800         | Active, not recruiting   | Bharat Biotech International Limited                                                 | India                  | Physical                                      |
| “Effect of Tele-Yoga Therapy on Patients With Chronic Musculoskeletal Pain During COVID 19 Lockdown: Randomized Clinical Trial” | NCT04466605     | Randomized     | 64              | Completed    | Aarogyam UK                                                                             | India                  | Physical                                      |
| “An Adaptive Phase 1, Followed by Phase 2 Randomized, Double-blind, Multicenter Study to Evaluate the Safety, Reactogenicity, Tolerability, and Immunogenicity of BBV152 in Healthy Volunteers” | NCT04471519     | Intervention   | 755             | Active, not recruiting   | Bharat Biotech International Limited                                                 | India                  | Physical                                      |
| “An Observational Study of Neurologic Function After COVID 19 Infection”     | NCT04564287     | Observational | 100             | Enrolling    | National Institute of Neurological Disorders and Stroke (NINDS)                       | United States          | Physical                                      |
| “Dynamic Changes in Cytokine and Eicosanoid Mediators Among Hospitalized Patients With Coronavirus Infectious Disease 2019 (COVID 19)” | NCT04452942     | Observational | 30              | Ongoing      | EicOsis Human Health Inc.                                                              | United States          | Physical                                      |
| “Psychosocial Impact of COVID 19 Pandemic on MD Anderson Workforce”         | NCT04491292     | Observational | 20,000          | Recruiting   | M.D. Anderson Cancer Center                                                            | United States          | Mental                                        |
| “Breathing Techniques and Meditation for Health Care Workers During COVID 19” | NCT04482647     | Intervention   | 50              | Recruiting   | M.D. Anderson Cancer Center                                                            | United States          | Physical                                      |
| “Mind Body Intervention for COVID 19 Long Haul Syndrome”                    | NCT04854772     | Intervention   | 22              | Not yet recruiting | Beth Israel Deaconas Medical Center Northeastern University                          | United States          | Mental and Physical                           |
| “Mental Health Outcomes Among US Healthcare Workers Exposed to COVID 19”    | NCT04407195     | Observational | 2000            | Active, not recruiting | Thomas Jefferson University                                                              | United States          | Physical                                      |
| “COVID 19 in Pregnancy: Utilizing Immunology Through Epidemiology to Improve Perinatal/Neonatal Outcomes” | NCT04659759     | Observational | 300             | Recruiting   | Thomas Jefferson University                                                              | United States          | Physical                                      |
| “A Prospective Clinical Study of Hydroxychloroquine in the Prevention of SARS-CoV-2 (COVID 19) Infection in Healthcare Workers After High-risk Exposures” | NCT04333225     | Interventional | 228             | Completed    | Baylor Research Institute                                                              | United States          | Physical                                      |
| “A Phase 2 Randomized, Double Blinded, Placebo Controlled Study of Oral Favipiravir Compared to Standard Supportive Care in Subjects With Mild or Asymptomatic COVID 19” | NCT04346628     | Interventional | 149             | Completed    | Stanford University                                                                   | United States          | Physical                                      |
| “COVID 19 and Its Implications on Social Activity, Loneliness and Stigma”  | NCT04734171     | Interventional | 1200            | Completed    | Columbia University University of Colorado, Denver 4YouandMe                        | United States          | Mental                                        |
| “Surgical Telemedicine in the COVID 19 Pandemic Era”                        | NCT04376710     | Observational | 180             | Completed    | Columbia University University of Colorado, Denver 4YouandMe                        | United States          | Physical                                      |
| “Stress and Recovery in Frontline Healthcare COVID 19 Workers: A Feasibility Study Using Wearable and Smartphone Devices” | NCT04713111     | Interventional | 383             | Completed    | David Grant U.S. Air Force Medical Center                                            | United States          | Mental                                        |
| “Psychological Health, Coping Strategies and Preferences of David Grant USAF Medical Center COVID 19 Deployers: A Critical Needs Assessment” | NCT04646642     | Observational | 21              | Completed    | David Grant U.S. Air Force Medical Center                                            | United States          | Mental                                        |
| “Convalescent Plasma in the Treatment of COVID 19”                          | NCT04343261     | Interventional | 48              | Completed    | Saint Francis Care                                                                  | United States          | Physical                                      |
| “Mindfulness During COVID 19 - Remote Mindfulness Sessions”                | NCT04319445     | Interventional | 233             | Completed    | Wake Forest University Health Sciences                                                 | United States          | Mental                                        |
| “COVID 19 Health Messaging Efficacy and Its Impact on Public Perception, Anxiety, and Behavior” | NCT04377581     | Observational | 18,251          | Completed    | Milton S. Hershey Medical Center                                                      | United States          | Mental                                        |
## Table 8 (continued)

| Study Title                                                                                                                                  | NCT No       | Type of Study | No. of Patients | Status         | Clinical Trial Sponsor | Country                              | Classification on the basis of health condition |
|---------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------|-----------------|-----------------|------------------------|---------------------------------------|-----------------------------------------------|
| “Isolated During COVID 19: Effects of COVID 19’s Social Restrictions on Loneliness and Psychosocial Symptomatology”                          | NCT04440998  | Observational | 1008            | Completed       | University of Miami    | United States                        | Mental                                         |
| “A Randomized Controlled Feasibility Study of Emotional Well-being of Adolescents Undergoing a Mindfulness Training During the COVID 19 Pandemic” | NCT04548544  | Interventional | 21              | Completed       | University of California, San Francisco, Cedars-Sinai Medical Center | United States                        | Mental                                         |
| “The Impact of Positive Reinforcement on Teamwork Climate, Resilience, and Burnout During the COVID 19 Pandemic: the TEAM-ICU Study”         | NCT04441632  | Interventional | 24              | Completed       | Groupe Hospitalier Paris Saint Joseph University of Liege           | Belgium                              | Mental                                         |
| “Mindfulness Training for Older Adults During the COVID 19 Pandemic”                                                                          | NCT04378803  | Interventional | 53              | Completed       | University of Miami    | United States                        | Mental                                         |
| “A Phase 3 Randomized Study to Evaluate the Safety and Antiviral Activity of Remdesivir (GS-5734TM) in Participants With Severe COVID 19” | NCT04292899  | Interventional | 4891            | Completed       | Gilead Sciences        | United States                        | Physical                                       |
| “A Smartphone Intervention for Relational and Mental Well Being”                                                                           | NCT04629575  | Interventional | 1765            | Completed       | University of Washington Pregeny                                   | United States                        | Mental                                         |
| “Health and Wellbeing of Pregnant and Post-Partum Women During the COVID 19 Pandemic”                                                        | NCT04385238  | Observational  | 6894            | Completed       | University of Liege                                             | United States                        | Physical                                       |
| “Estimating the Prevalence of Postpartum Anxiety and Depression in the Context of the COVID 19 Pandemic”                                   | NCT04852757  | Observation    | 2725            | Not yet recruiting| Groupe Hospitalier Paris Saint Joseph University of Liege           | France                              | Mental                                         |
| “Psychosocial Outcomes in Families of Patients Admitted in ICU for COVID 19 During the Pandemic in Belgium”                                | NCT04498507  | Interventional | 39              | Completed       | Tjin Wiguna            | Indonesia                           | Mental                                         |
| “Mental Health Assessment Among Community Member During the COVID 19 Pandemic in Indonesia”                                                 | NCT04343664  | Observation    | 10,000          | Not yet recruiting| Fundaci Institut de Recerca de l'Hospital de la Santa Creu i Sant Pau, Universidade de Granada | Spain                              | Mental                                         |
| “Evaluation of the Psychosocial Impact on Health Professionals Exposed During the COVID 19 Coronavirus Pandemic”                          | NCT04752839  | Observation    | 300             | Not yet recruiting| Fundaci Institut de Recerca de l'Hospital de la Santa Creu i Sant Pau, Universidade de Granada | Spain                              | Mental                                         |
| “Testing the Effects of Two Mindfulness-based Programs on Well Being and Academic Performance of Undergraduate Students of Translation and Interpreting: An Interventional Study” | NCT04392869  | Interventional | 75              | Completed       | Szeged University                                               | Hungary                              | Mental                                         |
| “Psychological Effects of the COVID 19 Pandemic on the Hungarian Adult Population”                                                          | NCT04426526  | Observation    | 441             | Completed       | University of Liege                                             | United States                        | Mental                                         |
| “Consequences of the QUARANTINE Relating to the COVID 19 Epidemic on the Mental Health of the Patients Followed in Psychiatry”           | NCT04405362  | Observation    | 753             | Not yet recruiting| University of Liege                                             | –                                   | Mental                                         |
| “Effect of COVID 19 Pandemic on Perceived Stress, Anxiety, Mood, and Training Quality in Elite Athletes”                                  | NCT04453566  | Observation    | 208             | Completed       | University Hospital Lille                                        | Turkey                              | Mental                                         |
| “Stress Induced by the COVID 19 Pandemic and Nonconfinement. Study of Anxiety Factors and Potential Effects on Immunity”                | NCT04491071  | Observation    | 405             | Recruiting      | Universite de Saint Etienne                                      | UK                                  | Mental                                         |
| “Burnout, Anxiety, Depression, Stress (BADS) and Post-Trauma Stress Disorder (PTSD) in Healthcare Workers Exposed to COVID 19 Patients” | NCT04473118  | Observation    | 25,000          | Recruiting      | Hamad Medical Corporation                                       | Qatar                              | Mental                                         |
| “Assessment of Stress, Depression and Anxiety in Healthcare Caring for Patients With COVID 19”                                            | NCT04631497  | Observation    | 100             | Recruiting      | Jagiellonian University                                           | Poland                              | Mental                                         |
| “Effects of a Mobile Meditation App on Stress During COVID 19 Pandemic in Outpatient Obstetrics and Gynecology Patients; a Randomized Controlled Trial” | NCT04329533  | Interventional | 101             | Completed       | University of Arizona                                           | United States                        | Mental                                         |
| “Parenting in a Pandemic: Parental Stress During the COVID 19 and Its Association With Depression and Anxiety”                          | NCT04377074  | Observation    | 2880            | Completed       | University of Oslo                                              | Norway                              | Mental                                         |
| “Impact of COVID 19 Pandemic and Social Distancing on Mental Health of Chronic Inflammatory Rheumatism Affected Patients”            | NCT04798053  | Interventional | 318             | Recruiting      | University Hospital Bordeaux                                     | France                              | Mental                                         |
| “Relieving the Burden of Psychological Symptoms Among Families of Critically Ill Patients With COVID 19”                               | NCT04501445  | Interventional | 100             | Recruiting      | Rush University Medical Center                                    | United States                        | Mental                                         |
| “Psychological Impact of COVID 19 Outbreak on Caregivers Involved in Intensive Care Unit Patient Management: Impact on the Occurrence of Post-traumatic Stress Disorder, Anxiety, Depression and Burn Out Syndrome” | NCT04511770  | Observation    | 5000            | Not yet recruiting| Rush University Medical Center                                    | United States                        | Mental                                         |
| “Mindfulness-SOS: Stress Reduction for Refugees”                                                                                         | NCT04761510  | Interventional | 60              | Completed       | University of Haifa                                             | Israel                               | Mental                                         |
| “Exploring the Psychological Impact of the COVID 19 Outbreak on COVID 19 Survivors and Their Families”                                 | NCT04365348  | Observation    | 300             | Recruiting      | The University of Hong Kong                                       | Hong Kong                           | Mental                                         |
| “Exploring the Psychological Impact of the COVID 19 on Higher Education Students”                                                        | NCT04365361  | Observation    | 300             | Recruiting      | The University of Hong Kong                                       | Hong Kong                           | Mental                                         |
3.6. COVID 19 patients

COVID 19 being a highly infectious and contagious ailment with increased incidence of death rate and absence of appropriate treatment gives sufficient reasons to affect patients' mental health. Additionally, socio-emotional and socio-economic factors accentuate the condition. Mental issues in patients may be the sum of both pandemic stress and the physical effects of the disease. Anxiety and depression are the most prevalent symptoms in this population. Furthermore, post-traumatic stress symptoms were surprisingly common after discharge from the hospital (Han et al., 2020; Muruganandam et al., 2020). Nearly 20 % of patients developed a mental health issue while suffering from COVID 19 (Ries, n.d.).

There are few studies found in the literature relating to the psychological experience of COVID 19 affected individuals during their hospital stay. According to a survey, anxiety and depression were found to be prevalent in 34.72 percent and 28.47 percent in hospitalized covid patients, respectively (Kong et al., 2020). Another study demonstrated that COVID 19 patients suffer from both physical and mental distress. Further, COVID 19 patients with general pneumonia commonly showed anxiety and depression (Yang et al., 2020). Other investigations conclude that post-traumatic stress symptoms associated with the COVID 19 were observed in the maximum number of clinically stable COVID 19 patients before and after discharge (Bo et al., 2020; Mazza et al., 2020). One meta-analysis report specified that the collective prevalence of post-traumatic stress symptoms linked with COVID 19 was found to be 23.88% (Cooke et al., 2020). Further, incidences of confusion and agitation are also reported in ICUs admitted patients having severe COVID 19 infection (N. Chen et al., 2020; Helms et al., 2020).

3.6.1. Management

Reliable and up-to-date information about the current situation; support, guidance and advice from physician particularly with regards to the prophylaxis and treatment; support and care provided by the family and health care professionals, proper counseling about the potential for severe disease and virtual support; social connectivity; personal hygiene, walking, yoga or exercise are effective methods to deal with this problem. It is imperative to brainstorm and then reach clinical decisions for using approved COVID 19 medicines in expectant mother as the safety of both mother and the foetus is of paramount importance and should ideally be a combined decision between the patient and the clinical team (Gynecologists, n.d.; Centers for Disease Control and Prevention, n.d.; Society for Maternal-Fetal Medicine, n.d.; Rasmussen et al., 2020).

Table 8 (continued)

| Study Title                                                                 | NCT No.    | Type of Study | No. of Patients | Status              | Clinical Trial Sponsor | Country                | Classification on the basis of health condition |
|----------------------------------------------------------------------------|------------|---------------|-----------------|----------------------|------------------------|------------------------|-----------------------------------------------|
| “Determination of Stress and Anxiety Levels of Mothers Lying in the Newborn Intensive Care Unit During Coronavirus Disease Pandemic Period” | NCT04386798 | Interventional | 60              | Recruiting           | Eskisehir Osmangazi University | Turkey                | Mental                                        |
| “Breath Regulation and Yogic Exercise An Online Therapy for Calm and Happiness (BREATHT): an RCT for Frontline Hospital and Long-term Care Home Staff Managing the COVID 19 Pandemic” | NCT04368676 | Interventional | 60              | Active, not recruiting | Lawson Health Research Institute | Canada                | Physical                                      |
| “Stayhealthy - Monitoring and Maintenance of Mental Health Under Conditions of Social Isolation During the Corona Crisis” | NCT04871386 | Interventional | 138             | Completed            | University Hospital Tuebingen | Germany               | Mental                                        |
| “The Effect of Aerobic Training Versus Cognitive Behavioral Therapy in Management of Anxiety, Depression and Stress-related to Covid 19 Pandemics Among University Students: a Comparative Study” | NCT04662021 | Interventional | 40              | Enrolling by invitation | Cairo University       | Egypt                  | Mental                                        |
| “Prevalence of Mental Health Problems Among Undergraduate Students at the Universidad de Los Andes” | NCT04447690 | Observational | 5553            | Completed            | Universidad de los Andes, Chile | Chile                | Mental                                        |
| “Efficacy of Pulmonary Physiotherapy on Hospitalized Patients With Novel Coronavirus 2019 Pneumonia” | NCT04357340 | Interventional | 40              | Completed            | Tehran University of Medical Sciences | Iran                  | Physical                                      |
| “The Regimen of Favipiravir Plus Hydroxychloroquine Can Accelerate Recovery of the COVID 19 Patients With Moderate Severity in Comparison to Lopinavir/ Ritonavir Plus Hydroxychloroquine Regimen: an Open-label, Non-randomized Clinical Trial Study” | NCT04376814 | Interventional | 40              | Completed            | Baqiyatallah Medical Sciences University | Iran                  | Physical                                      |
| “COVID 19 Vaccines Safety Tracking: Global Consortium Study” | NCT04834869 | Observational | 30,000          | Recruiting           | Masaryk University | Across different countries | Physical                                      |
proved to be more relevant for dealing mental health particularly during COVID 19 pandemics (Aminoff et al., 2021). It is a modern tool which is emerged with recent technology evolutions and is effective across almost all the geographical area involving several cultures and languages. This is a promising approach to reduce the psychological stress with increased access and better outcomes, in cost effective manner. It has been scientifically proven to be effective in children and adolescents to treat symptoms of depression and anxiety and can be useful for all the above populations to deal with the COVID 19 related psychological agony. (Carpenter et al., 2018; Kumar et al., 2017; Ho et al., 2020; Zhang and Ho, 2017; Z. Liu et al., 2021; Ying et al., 2021).

4. Investigational research

The COVID 19 outbreak has brought about a wide-reaching unprecedented investigation across all countries. Research during a pandemic helps to collect important information that can help to improve outbreak control measures, and catalyses the concerted research efforts in both the clinical settings as well as vaccine development and its trials. Additionally, research into optimizing tools for evaluating health and disease through innovative approaches and technologies could finally lead to improved access to care. It shall also forge ties with the public and pour benefits to health and disease management organizations. Table 6 enlists several vaccines that are being investigated as well as approved for vaccination against this illness that help to obtain information and comparison among diverse vaccines. Further, it includes some recent patents (collected out of approximately 2,014 published patents) coupled with the prevention and treatment of COVID 19 (“Patent,” n.d.) in Table 7. Additionally, this section enlists (Table 8) some clinical trials from all across the world highlighting the ongoing investigations relating to the health (both physical and mental) in relation to COVID 19. A recee of the repository reveals the impetus with which such research endeavors are initiated and executed. It is worth noting that research organizations in developed and developing nations are equally keen to utilize this colossal calamity as an opportunity to unravel their research understanding, which could come in handy in these testing times. It is also evident from the efforts taken by the scientists that they are working towards generating an affordable, accessible and sustainable remedy for this devastating disease.

5. Conclusion

In the extant global panorama of COVID 19, it is imperative to identify the seriousness of our community’s public health challenges and preparedness. Natural descent of such diseases and a poor response by the health systems is a recipe enough for insurmountable societal destruction leading to stunted evolution of a healthy and happy society. Therefore, the need of the hour is to pay attention to the health and well-being of different populations with suggested solutions through particular emphasis on psychological health. The current review compiles the overall physical and mental-health-related issues, including the symptoms, risk and protecting factors, available medications, vaccines, and some recent patents and clinical trials in this area. Looking after our well-being in time like this can help to reduce stress and enable us to stay calm and joyful. In this context, the present topic provides a resource for the management of stress and anxiety in several communities and may act as a clinical update on health during COVID 19. The authors draw a conclusive category that the youth and health professionals need special care amidst this pandemic as they have comparatively higher psychological sufferings. Students should take special care as they are the main stakeholders in society. The authors emphasize the fortification of positive coping skill of the individual, which can help transform the negative experiences of getting diseased into positive upshots. Additionally, they suggest inclusion of physical exercise, yoga and counselling as an indispensable part of therapy. Most definitely an awareness about the disease, its early diagnosis and treatment will help to overcome this COVID 19 pandemic challenge smoothly. Further, unchecked chronic conditions and a massive backlog of surgeries due to social isolation and loss of jobs may be waiting to unfold another potential disaster in the society. It is imminent that the political willingness along with a commitment of health leaders and policymakers to devise innovative policies that would enable the public to overcome this pandemic-driven adversity is the need of the hour. These cogent steps would not only bail us out in the present situation but would also enhance the public preparedness for any similar prospective disasters.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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