Effect of COVID-19 Pandemic on Mental Health: An Under-Realized Sociological Enigma

Kunal Bhattacharya, Atanu Bhattacharjee, and Nongmaithem Randhoni Chanu

Abstract The COVID-19 pandemic has vexed fundamental mental prosperity balance in 93% of countries worldwide while the interest for emotional well-being is expanding as per the WHO overview. The investigation of 130 countries gives the essential overall data demonstrating the mind-boggling impact of COVID-19 on admittance to emotional well-being supervisions and underscores the critical requirement for increased financing. Coronavirus has intruded on basic psychological aspects of people across the globe exactly when they're required most. The Coronavirus pandemic and the resulting money related droop have conflictingly influenced different individuals' mental wellbeing and made new squares for individuals previously experiencing mental maladjustment and substance use issues. Different grown-ups are similarly pronouncing negative effects on their mental wellbeing and success, for example, instability (36%) or non-hunger (32%), increments in liquor use or sedative substance use (12%) because of pressing factors altogether over the COVID-19. As the pandemic wears on, progressing and basic general thriving evaluations open different individuals to encountering conditions related to poor mental prosperity results, for example, detachment and work setback. Poor mental status is relied upon to burnout among cutting edge workers and extended apprehension or mental shakiness among those with poor wellbeing are extra concerns. Those with mental ailment and substance use issues pre-pandemic, and those as of late affected, will most likely require passionate health and substance use organizations. This brief review investigates down word's impact on psychological status in the COVID-19 pandemic worldwide particularly with respect to India based on the data published in various electronic media. We also talk about the ramifications of social distancing rehearses and the financial downturn on psychological wellness, just as difficulties in getting too emotional well-being.

K. Bhattacharya (✉)
NETES Institute of Pharmaceutical Science, Mirza, Kamrup, Assam 781125, India

A. Bhattacharjee
Royal School of Pharmacy, The Assam Royal Global University, Guwahati, Assam 781035, India

N. R. Chanu
Faculty of Pharmaceutical Science, Assam Downtown University, Panikhaiti, Assam 781026, India

1   COVID-19 Pandemic Effect on Mental Health: Introduction

As the novel SARS-CoV-2 COVID pandemic breadths quickly across the globe, it is without a doubt having massive mental effects on human beings around the world. COVID pandemic has synchronized the world around us and confined ourselves inside the home which certainly exerts a negative effect on our mental health and raised degrees of stress or uneasiness [1]. There are authentic worries that a scourge of psychological instability could happen amidst the current COVID-19 pandemic and affect all ages from children to geriatric [2]. Preventive measures like self-isolation and physical distancing etc. may lead to an ascent in gloom, self-harm, alcoholism, drug addiction with additional negative mental outcomes [3]. Financial aberrations due to complete/partial lockdown across affects severely in occupation misfortunes and other fundamental obstructions can worsen psychological well-being issues among everyone in the midst of COVID-19 [4]. Under the above circumstances, it becomes very much essential to ensure administration access and coherence for people with existing psychological well-being conditions while securing the psychological prosperity of forefront laborers, people with COVID-19, and everyone [5, 6]. In the United States alone about 45% of the adults' population are reported to be under anxiety and stress, while in the United Kingdom and Italy approximately 33% and 37% of people respectively have experienced the agony of anxiety since the start of the pandemic [7]. In India scenario is worsening day by day where people are struggling to earn their daily bread and butter.

In India, throughout the most recent 3 months, there has been a critical ascent in the COVID-19 tainted cases and mortality because of this contamination [8]. Simultaneously, a few lay media reports are recommending an expansion in psychological wellness issues, for example, tension, misery, posttraumatic stress-like side effects, a sleeping disorder, and outrage among everybody, well-being laborers, just as individuals who are kept in detachment (because of disease with COVID or contact with tainted persons) [9, 10]. The quickly arising emotional well-being issues may destabilize people's overall prosperity and can impact the wellbeing framework; thus, they need earnest and prompt consideration and activity [11]. The people group's emotional well-being issues can be different and isolated according to the particular gathering of the populace. There are a few danger factors that trait to the improvement of mental manifestations during the COVID-19 pandemic [12]. The COVID-19 is majorly affecting psychological well-being by influencing our everyday working with expanding joblessness, isolating families, and different changes. There is an overall dread, despondency, and panic as a result of this pandemic. The regularly refreshing of the most pessimistic scenario situations by the media can fuel dread

and stress. Vulnerability and isolation can prompt trouble in maintaining concentration and may cause sleep disorders. In this manuscript, we address several issues related to mental health because of the COVID-19 pandemic in various segments of the population across India and other parts of the world [13].

2 Common Psychological Problems Post COVID-19

Starting from common people to front-line health care professionals like doctors, nurses, pharmacists, police, and government authorities structure the forefront to fight against COVID-19. Most stresses originate from getting contaminated during duty hours, suspecting themselves as a vector of deadly COVID-19, for their families, ampleness of protection, admittance to food, fluids, and rest, and partition from families. The far and wide social and financial disturbance has additionally affected most of these professionals. This has made a pattern of concern, stress, and misery. If not viably perceived and dealt with, this can change into more extreme trouble, in any event, prompting self-destructive musings and emotions. It is hence a matter of need to deliver these worries to guarantee positive emotional well-being and early meditations for the cutting-edge workforce in COVID-19 treatment settings. The effect of the COVID-19 pandemic on the mental health status of people of diverse fields is discussed briefly below.

2.1 Among General Population

Deficient information with respect to the hatching time of the infection, course of transmission, treatment, and security estimates cause dread and nervousness among ordinary citizens in India and across the globe. The locked-down phase limits inhabitants to be only at home which causes negative psychological wellness results like nervousness and frailty with respect to what's to come. The residents additionally feel tedium, frustration, and fractiousness under the above-mentioned condition. Studies already postulated extreme and wide range psychological wellness effects of the pandemic. Everybody can encounter dread and uneasiness of being wiped out orbiting the dust, vulnerability, accuse the individuals who are as of now influenced and encourage the psychological breakdown which includes burdensome issues, uneasiness issues, alarm issue, physical indications, self-fault, psychosis, and even self-destruction, etc. [14].

2.2   Among COVID-19 Patients

The suspected as well as affirmed COVID-19 people generally experience dread with respect to the high infectiousness and casualty. The COVID isolated individuals feel fatigued, dejection, outrage, sorrow, nervousness, refusal, despair, sleep deprivation, unsafe substance use, self-mischief, and suicidality. The survivors are placed at a higher risk zone with a progressive psychological illness like gloom, nervousness. Further patients may create obsessive–compulsive disorder. Additionally, antagonistic impacts of recommended medication like corticosteroids may cause more nervousness and mental trouble. A new investigation with 1500 patients from Maharashtra, India detailed that 55% had a moderate or extreme mental effect which needs to be addressed with utmost importance [15].

2.3   Among Close Relatives and Neighbors

COVID-19 patients and their family members, neighbors are continuously facing typical psychological problems like fear and agony of being infected. COVID-19 patients as a rule view themselves as liable with respect to the consequence of the infection, isolate, and shame on their relatives and companions. The relatives who lose their friends and family from the pandemic outcomes out of frustration and hatred. Then again, the kids who are confined or isolated in this time of pandemic have more opportunities to create an intense anxiety issue and sadness. It was accounted for among 30% of the kids and early loss of guardians during adolescence likewise has long haul unfriendly impacts on psychological wellness, including higher odds of creating mind-set problems, psychosis, and suicidality [16].

2.4   Among Healthcare Workers

During the COVID-19 pandemic healthcare services, demand increases sharply across the globe. Furthermore, it has been well understood that most of the nation worldwide don't possess adequate manpower, medical resources to cope with COVID-19. Consequently, with existing clinical facilities medical services providers need to commit themselves all the chance to expand the remaining burden alongside the multi-fold likelihood of being contaminated. They have been isolated as often as possible when they contact COVID-19-affirmed people. Under the above conditions, most medical services experts do feel actual depletion, dread, enthusiastic unsettling influence, and rest problems. A recent survey with 1563 health care professionals testified that around 51% were compulsive depressive symptoms, 45% stress-associated anxiety, and 36.1% insomnia. Moreover, the lack of counseling and psychiatric screening services for physicians knowingly or unknowingly

making their life more miserable. They have more possibilities of getting infected and the circumstances intensify the fear that their family members also may catch the infection [17].

2.5 Among Geriatric Patients with Co-morbidities

All over the world, the way this deadly disease is spreading rapidly, is causing an extensive level of dread, stress, and worry among some particular groups especially, in more aged individuals and individuals with basic comorbid issues. It potentially affects the current disease, and the influenced people may prompt psychiatric symptoms which conceivably identified with the transaction of mental issues and invulnerability. The indications of COVID-19 can likewise deteriorate anxiety and cognitive stress among individuals who have poor mental abilities beforehand. Patients with prior serious mental disease have been influenced by the pandemic. Those people or patients who stay in the isolated wards for long-term treatment are at higher risk of cluster disease. Due to the need of maintaining social distancing, outpatients who are having SMI are defying inconveniences to get proper treatment and care and may end finally with mental backslide and circumstances that are uncontrollable. Patients with progressing disease furthermore need customary development in facilities that become hazardous and raise the chances of deterioration [18, 19].

3 Psychological Imbalance in Home Quarantine

Due to the pandemic, most countries were under public health emergencies which mainly affected personal freedom, emotional distress, and increased the risk of mental health [20]. To prevent the spread of disease, quarantine has been implemented in the entire globe for the safety of individuals and communities [21].

Isolation and Quarantine are much-utilized terms, movement restriction and separation of those individuals infected from a contagious form of disease or who have a history of exposure to the contamination defines the term quarantine. Quarantining the infected individuals is necessary to prevent the spread of infection to healthy people [21]. As per WHO rules, all nations have forced social separation which incorporates preventing individual gatherings together, shut down public places, for example, film corridors, schools, and colleges, avoiding public occasions, and so on to stop or limit the spread of sickness.

3.1 Some Major Risk Factors of Stressor in Quarantine

- **Time period of Quarantine**: Hawryluck et al. studies has shown that increased the duration of quarantine causes an elevated risk of mental health deterioration specifically, post-traumatic stress symptoms associated with behavioral changes and anger.
- **Fear of infection:** It can be viewed as one of the genuine danger factors causing poor psychological well-being, contemplating their wellbeing, or fears of contaminating others and relatives. In the event that they encountered any comparative indications identified with contamination misdirecting them, especially stress and dread that kept on being identified with mental results [22, 23].
- **Frustration and boredom:** These two terms are interconnected to each other, a state of high boredom results in more frustration [24]. As per the standard definition frustration refers to a feeling or expressing distress and annoyance coming from an inability to change or achieve something, whereas boredom is related with an empty feeling and prevalent emotion with negative mental health consequence [21, 24]. Lack of social and physical interaction with others, a decline in routine work, home confinement, and a feeling of isolation from the rest of the world results in boredom and frustration [21].
- **Inadequate supplies:** Unavailability of adequate basic requirements for daily life mainly food and lack of getting regular medical care results in frustration, anger, and associated anxiety [25–27]. The health care worker is mostly potential to emotional distress [21], due to insufficient supplies of necessary items such personal protective equipment (PPE), mask, gloves, other necessary kits, etc. [20], longer duration of working hours, taking risk of exposure to the virus to save other's life lead to adverse physiological outcome [28].
- **Improper sources of information:** Unclear information misguides people results in excessive worry and fear [21]. Unauthorized sources of news provide false information which may confuse the purpose of quarantine and its protocol [28, 29]. Adverse mental health experienced particularly depression related to inadequate information about the pandemic.

3.2 How to Minimize the Consequence of Home Quarantine

Implementation of quarantine is among the most important measures of prevention during a pandemic. However, it affected the psychological state of people, including anger, anxiety, stress, fear, frustration, post-traumatic symptoms, boredom, depression, etc. [30]. Various tips have been provided to overcome the effect of quarantine, several associations, and organizations including WHO, UNICEF, and APA contributed to mental health improvement [31, 32]. Aware of the purpose of social distancing, visual interaction with friends, sharing responsibilities, practicing self-care, and teaching children to practice hygiene, are some of the essential activities

which can be performed during quarantine [32, 33]. Some of the major possible ways which can reduce the effect of quarantine have shown below.

(a) **Reduce the duration of quarantine:** Some studies have already shown that the longer the duration of quarantine effect on the mental wellbeing of people, so shorter the duration of quarantine reduced stressor and observed positive impact on psychological state. Limited duration of quarantine can be imposed with the idea of a known incubation period, and not extending the duration of this, would minimize the effect on people [34]. Peoples are already under home confinement, extended quarantine results in more frustration, and anxiety [34].

(b) **Provide adequate requirements:** During quarantine, peoples are worried about basic needs including food and emergency medicines [35]. Due to a shortage of basic requirements leading to stress and mental weakness, mostly occurred in backward families. Government officials and authorities need to ensure the availability of requirements in every household, health care; financial, social, psychosocial support; and the basic needs must be provided immediately [36].

(c) **Awareness about the purpose of quarantine:** It's necessary to provide awareness about the importance of implementing quarantine, officials must properly communicate to the public regarding such preventive measures to reduce panic and improve compliance [37]. It must provide updated guidelines with reliable information about the quarantine, unclear information made public excessive stress and fear about the infectious disease. Unauthorized news and false information related to pandemic should have been avoided, the purpose of quarantine must have been understood by the public under quarantine [21].

(d) **Healthy lifestyle:** Due to the pandemic peoples were under home confinement and lack of interaction with each other, these made them mentally and physically weak. Regular physical exercise with meditation is useful to improve health and social wellbeing. Prepare a new daily routine for quarantine focus on maintaining cleanliness and hygiene is necessary. Proper utilization of time with children is also important including their educate children, practicing personal hygiene, and assigning simple household tasks.

(e) **Interaction with friends and family members:** Social networking systems play an important role in communicating with each other. Feeling of isolation, panic and stress reduce by communicating with relatives, friends, and their loved ones through social media [37]. It's necessary to set up a clear official emergency helpline for public health care authorities [21, 38]. Official helpline support for patient counseling through a telephone call or mobiles during quarantine could be effective in terms of positive psychological effects [38].

4 Psychological Imbalance in Hospital Quarantine

During a pandemic hospital staff is more vulnerable to infectious disease, leading to psychological distress [20]. Hospital quarantine and isolation are some of the most effective preventive measures by separating peoples, to prevent the spread of infectious disease [39].

4.1 Psychological Problem During Hospital Quarantine Can Be Categories into Two-Part [22]

New-onset mental health problems:

(a) **Anxiety which is related to personal health**: This may occur in case of mild to severe, can lead to a panic attack. It can be considered as one of the frequently observed problems, mainly arise because of the unsure report, fear of getting a positive result on the test, and stigma [40–42].

(b) **Depression and anxiety related to isolation**: During hospital quarantine, patients are staying apart from their family members and their loved's ones which leads to emotional and feels helpless [21, 22]. Another perception is that thinking about the unavailability of vaccine for the respective illness cause more depression and anxiety [43]. The guilty feeling associated with careless behavior causes illness, unable to continue regular duties, fear of turning illness into a severe case. These all are related to cause anxiety and depression [44].

(c) **Insomnia, irritability, anger, frustration, boredom** [42, 45]: Maximum of the patients who are under quarantine experienced such types of mental disorder [30]. These might be a predictable or non-predictable mental disorder. Identification of those patients who are undergoing these types of problems is very essential to overcome negative psychological impact [46].

(d) **Mental problem due to withdrawal of addicted substances** [22]: This has commonly occurred in drug-addicted persons who are under hospital quarantine. Due to unavailability and the sudden stoppage of addicted substances including narcotic and psychotropic drugs leading to irritability, frustration, anger, stress was observed in drug-addicted person [47].

(e) **Acute post-traumatic stress reaction and disorder:** These two are linked with mental illness. Causes of PTSD associated with traumatic events include sexual assaults, car accidents, animal attacks, and injuries due to accidental blasts.

4.2 Exacerbation of Preexisting Psychiatric Conditions

During hospital quarantine, those patients who are having psychiatric conditions from previous can exacerbate mental problems including stress, anxiety, stress, anger, frustration, etc.

4.3 There is Three Risk Factor Related to Exacerbation of Preexisting Psychiatric Condition

(a) **Discontinuation of medications:** Sudden discontinuation of ongoing medications of mental health problem due to some reasons including the inadequate supply of medications, kept confidential about mental illness, lack of awareness about mental health care service, and drug interaction.
(b) **Disease-related:** Physical health and mental health are interrelated to each other. Persons who are suffering from chronic diseases like diabetes, disease of heart, arthritis, asthma, etc. experienced mental illness [48].
(c) **Adverse effects:** Drugs such as chloroquine, steroids, and antiretrovirals used for the treatment of COVID-19 observed some adverse effects related to psychiatric symptoms. Indications are either the rise of new manifestations or the compounding of existing side effects [22].

4.4 How to Minimize the Negative Psychological Effect of Hospital Quarantine

Appropriate facilities and adequate supplies must be provided to those who are under hospital quarantine. Inadequate facilities are one of the negative impacts that arise by patients which cause more anxiety, stress, anger, depression, etc. [21]. The following measures should be facilitated for appropriate quarantine.

(a) Area must be well ventilated with maximum cleanliness, and hygienic washroom facilities should be provided, the distance between beds should be maintained at least one meter.
(b) Must follow the steps of waste management procedure and ensure facilities of air filtration system, can maintain environment as infection control.
(c) Accommodation must be provided including hygienic food, water with proper medication, and communication facilities with family members who are outside [21].
(d) Physicians and nurses must be there for regular medical checkups, counseling, and other related procedures for the purpose of maintaining their health.
(e) Accessories items such as the internet, news, and entertainment should be provided, which can help to reduce stress, anxiety, depression, etc.

(f)   Psychosocial counselors must be available for counseling to the patients and
      sharing positive thoughts [21].

5   Psychological Approach to Assess Mental Health Post COVID-19

5.1   *Relevance of Yoga on COVID-19*

Yoga, an old method, is characterized as samatvam at both brain and body levels to be
accomplished through dominance over the brain activities (chittavrittinirodhah). The
accessible proof shows that yoga encourages the coordination among the arrangement
of homeostatic reactions including the association among the endocrine, nervous, and
immune system frameworks [49]. Since the transmission of the SARS COV-2 virus
has started at the community level, the innovation of immunizations and drugs has
been quickly started by Pharma organizations. Researchers and Scientists have been
attempting to discover substitutes for counteraction and treatment of COVID-19.
The specialists have additionally worked after demonstrating the function of Yoga
and contemplation in improving physical and psychological well-being during this
worldwide crisis. It was likewise found from an examination that individuals with
constant lungs and coronary illness are at more danger for extreme cardiovascular
and respiratory complexities from COVID-19. At the same time, doing meditation
and yoga consistently has brought about essentially improved results in the condition
of co-morbidity [50]. Various studies show that one of the major reasons for suppres-
sion in the immunity of the body is stress which may further lead to infection in the
upper respiratory tract [51]. Stress factors can be acute in nature or chronic in nature,
both can cause dysfunctioning of the Hypothalamus–pituitary–adrenal axis as well
as the sympathetic nervous system and lead to the impairment of the body's immune
response in case of any viral attack [52]. With regards to pandemics with people
encountering significant levels of mental pressure, the tweaked hypothalamus–pitu-
itary–adrenal axis hub through the act of yoga could mitigate pressure and could help
in the reinforcing of the antiviral resistant actions by boosting the immune system.
Results of a study that was randomly controlled, done on students who were healthy
and young and were part of a yoga group showed a rise in the levels of interferon-
gamma responsible for regulating immunity when compared to the students who did
not perform yoga [53]. In light of its capacity to prompt and exactly manage the
Interferon-gamma levels, yoga could alleviate the body's immune response during
the brooding and non-severe stages to kill the infection-causing virus [54]. Infec-
tions of the Respiratory tract are profoundly common in patients with diabetes when
contrasted with those who don't have diabetes [55]. One of the common comorbidi-
ties observed in COVID-19 patients is diabetes. Yang et al. reported in their study
that 22% of patients of COVID-19 who could not survive because of severe illness
had diabetes [56].

The impaired immune system, decrease in the response of T cells, decreased function of neutrophils, and dysfunctioning of humoral immunity are the major reasons for the association between COVID-19 and diabetes [55]. The pathogenic virulence can get alleviated due to the hyperglycemic state of the body in patients which can further decrease the interleukin production and can cause a decrease in the phagocytic activity [55]. As referenced above, fear, vulnerability, and demonization are factors related to stress which are seen during general wellbeing crises, for example, COVID-19 [57]. The stress incited initiation of the Hypothalamus–pituitary–adrenal axis could likewise altogether lead to hyperglycemia, [58] consequently intensifying the clinical indications. The above situation can be controlled by doing yoga which will keep the body stress level in check and will also help to maintain a proper glycemic level in the body. The act of yoga may help in diminishing the intensifications and leeway of infection in the patients of COVID-19 who are suffering from diabetes by decreasing the impact of hyperglycemia (Fig. 1).
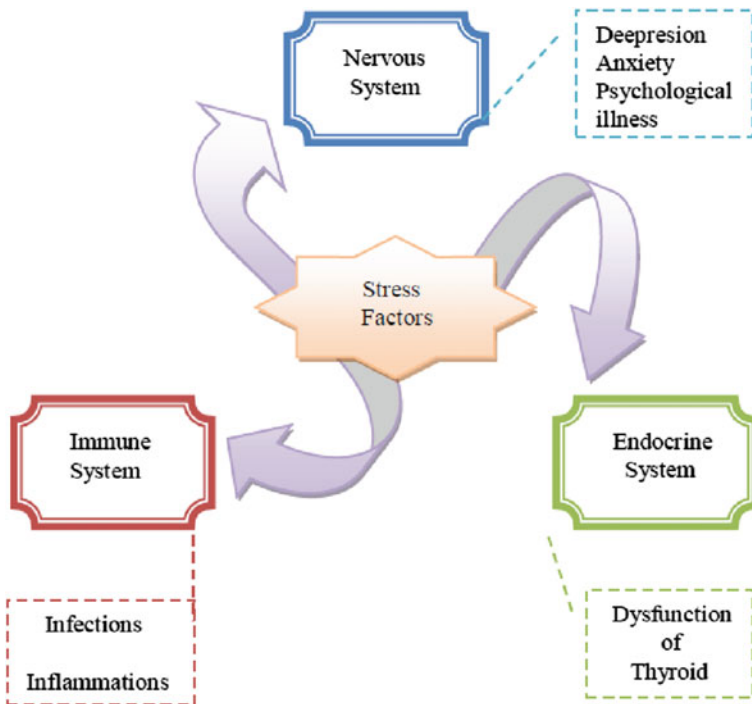

Fig. 1 Effect of stressors on different systems of body

5.2   *Use of Digital Platforms*

Different types of studies and research have shown that digital platforms and solutions can be highly effective in managing services related to health [59]. Artificial intelligence, online wellbeing networks, chatbots, Big data are among some of the digital platforms based which are being used to combat the situation aroused due to COVID-19 [60, 61]. Aggregating information from various potential sources including associated gadgets among the Internet of Things, climate observation and search engine query, data big data which is a cloud-based system was very well used in different pandemics or outbreaks of diseases during past years [62].

Utilizations of these frameworks range from the early discovery of episodes of outbreaks to encouraging worldwide collaborations in digital epidemiology. Fruitful applications incorporate checking dengue episodes utilizing information on portability from cell phones [62] or questions in different search engines [63]. Cornelia Betsch and the group assessed strategies for reconnaissance of social reactions to the pandemic [64]. These applications empower proof-based ways to confine public wellbeing reactions and screen their viability, in agreement with WHO suggestions [65]. Related applications for psychological wellness incorporate the forecast of issues, for example, sorrow, stress, and tension, utilizing openly accessible information from sites like Twitter [66]. These applications are picking up a foothold in scholarly awareness as computerized information turns out to be more universal, as illustrated by the advancement of proposals for proof-based exploration utilizing tools such as Google search to foresee mental issues [66, 67]. There are moreover approved personal-level utilization of the big data, for example, the utilization of ecological momentary assessment from versatile data of mobile phones that have been utilized to recognize and screen seriousness for a range of state of mind and behavioral issues [68]. This may lead to the possibility of getting accurate digital psychological health status with custom-fitted recommendations for the person, recently gone through mental disorders [69].

Computer-based intelligence chatbots use pre-customized substance and choice trees.

For computerized discussions utilizing strategies, for example, processing of the language. Then the static digital stores, are highly intuitive, prompting high commitment for the patients [70]. AI-based chatbot reports which have been created for psychological well-being incorporate arrangements giving guidance for well people to improve mental prosperity [71]. Others incorporate AI chatbots, for example, Wysa for advanced mental prosperity with showed adequacy in patients with stress and Woebot for psychological cognitive treatment in grown-ups with anxiety/stress indications [72]. In promoting mental health and preventive care during pandemics like COVID-19, these tools are found useful. Nonetheless, their applications should be directed given restricted clinical approval with a powerful trial plan. Given the idea of linguistic varieties and chatbots in various populaces, assimilation is expected to encourage the usage of chatbots in new populaces. This is essential to guarantee emotional help or emergency advice is seen precisely by patients [73].

Advanced services of tele-health have various exemplifications such as video-conferencing, tele-monitoring using remote devices, health applications based on mobile operating systems which are all inexorably applied in calamities. These can be utilized for conversations among patients and medical practitioners and service providers [74]. Although changes in legislation have been to do to start the use of tele-health services still there are obstructions because of which it is still yet to come into the mainstream. Effective adoption requires a dynamic arrangement with clinical necessities while conveying administrations.

5.3 Shielding Measures in Psychiatric Hospitals

Since COVID-19 is an infectious ailment, it is smarter to assume that each individual has a speculated contamination, particularly under the accompanying conditions:

- Clinical side effects of ailment (e.g. cough and fever).
- Contact history with any COVID-19 infected individual.
- History of movement to a region where the virus has spread.

Mental hospitals or healthcare facilities can be sources of COVID-19 transmission as they may have patients who might be having the COVID-19 infection and these potential people may transmit the virus to asymptomatic people. All the professionals working in a mental healthcare facility or hospital should be up to date with all the available recent data and learning on COVID-19 and these data should be referred from reliable sources like healthcare administration, or different sites of government.

Different sources of transmission of viruses may be blood, fomites, aerosols, or small respiratory droplets. Whereas in the case of the COVID-19 virus the virus transmission occurs by an individual to individual contact via small respiratory droplets or via contaminated surface.

As still, there is no solid cure for this disease all the precautionary principles should be followed strictly maintaining the social distancing effectively by staying 1 m apart from other individuals and regularly doing surface sanitization [75].

5.3.1 Out-Patient Services

While giving services to the out-patients medical healthcare professionals should consider the below points:

- Appointments of out-patients should be staggered and if possible. Seeing patients on an appointment basis will drastically reduce the overcrowding of patients.
- Only one attendant per patient should be allowed and followed strictly.
- In consultation rooms and cabins of doctors strictly social distancing should be followed.

- Using COVID-19 screening method suggested by ICMR, risk assessment of bystanders and patients should be done at the point of intake.
- In a properly ventilated room, people at high risk should be assessed exclusively.
- To symptomatic patients, face masks should be provided so that transmission of the virus through respiratory droplets can be prevented.
- A separate examination room for violent patients should be allocated to prevent them from coming in contact with other individuals.
- People like pregnant women, elderly people, and children who are more vulnerable to infections should be attended to first by the doctors [75].
- For stable patients and those who need the only represcription, telepsychiatry can be considered.
- Washing of hands as per WHO recommendations following all the eight steps should be done before touching a patient, after doing physical examination or procedure which involves coming in contact with body fluids.

5.3.2 In-Patient Services

- Wards should be clean frequently or at least once every four hours.
- One percent hypochlorite solution or at least soap water should be used and WHO recommendations should be followed while mopping of floors.
- Sixty percent of alcohol should be used while cleaning surfaces like tables, chairs, etc.
- Before and after food is served, the cleaning of the dining area should be done regularly.
- Visitors should be provided with masks and they should be restricted only to the visitor's area.
- Visitors should not be allowed on the premises if they are having symptoms of COVID-19 infection [75].

5.4 Rehabilitation of Mental Health in Times of COVID-19

The constant concerns identified with the spread of COVID-19 have executed different ways by which the contamination can be stopped from spreading further. These join social isolating, regular washing of hands with a cleaning specialist and water or using a hand sanitizer for cleaning purpose, utilization of face covers by individuals who have clear indications or are at high peril, and avoiding touching of eyes, nose, and face with hands [76].

The psychological health issues which have become apparent because of these measures are fear and nervousness in the general public. These show as wellbeing tensions over contacting any possible virus-contaminated surface, meeting an individual with a recent history of traveling including a visit to profoundly contaminated places, or building up any signs of infection in the upper respiratory tract [coughing,

sniffling, fever]. While these psychological well-being fears and tensions are probably going to be mellow and short enduring, for the individuals undergoing mental rehabilitation significantly. Because of maintaining social distancing, day boarding, and daycare habitats for people with mental illness have been shut down, for the time being. The medical services have been encouraged to provide treatment on an emergency basis, and individuals with other medical issues, including mental health issues, can stand by till the predominant COVID-19 related circumstance improves. Subsequently, people with ongoing psychological issues who need standard clinical care are denied, as they are not in a situation of emergency. As rehabilitation of mental health falls under a category that is not considered an emergency. Therefore, services related to intellectual disabilities and psychological issues may be denied for some time [76].

There should be a development of a home-based rehabilitation plan made in coordination with MHPs, family members, and friends under which the following points can be considered:

- Concerns of each individual in the family should be considered and addressed so that an effective communication process may develop.
- Give consolation—He/she may need consolation that the situation is going to be alright or need assistance to address employer or need some particular timely information about COVID-19 disease or simply have a conversation with a vocational instructor.

5.5 Coping Mental Health Issues in the Wake of COVID-19 Pandemic

While the medical services area along with government authorities from everywhere all over the world are zeroing in on the contain and control the pandemic receiving different preventive procedures, there is small consideration given to the psychological status of those in isolation, stressed, and house-quarantined individuals. Because the absence of normal social exercises and remaining at home for a long time will affect their mental wellbeing. Too much exposure to coverage of media should be avoided to prevent any stressful situation. Communication using with family members and friends on a regular basis should be done with positive thinking to maintain a good relationship. As joy increases when it is shared, similar to that in this situation of a pandemic the fear should be also shared with close friends and family members to reduce the stress to a significant extent. Yoga, regular exercise, and meditation should be practiced regularly to calm the mind. Teleconsultation for those who have lost their close and dear ones because of COVID-19 should be given by the medical practitioners to provide mental support. Regular breaks between duty hours minimized duty hours along with a rotation of duty should be given to the healthcare workers who are battling the pandemic in the frontline to boost their morale [77, 78].

The medical services professionals working for COVID patients and working in clinics and isolated wards likewise need to have their psychological wellness overseen. The pressure of the work they are doing will get to them and it will be hard for them to manage circumstances once cases heighten. Customary mental health care for these specialists, medical attendants, and staff is significant for us to have a steady medical services framework to battle COVID. There is likewise a requirement for preparing these staff in communication and building their versatility for the difficult stretches that they will look forward. Along with them their family members also should be looked after in reference to mental health and stress. On a regular basis, counseling should be given by field experts for their psychological well-being (Fig. 2).

Fig. 2 Psychological approaches for COVID-19 pandemic (adapted and modified from Sujita et al. [79])

6 Steps to Mitigate Pandemic in Future

Pandemic readiness and reaction intercessions can be grouped by their planning as for pandemic events: the pre-pandemic period, the flash time frame, and the spread time frame. The administration responsible for pandemic readiness and reaction is perplexing, with power divided across worldwide, public, and subnational establishments, just as among numerous associations with functional duty regarding explicit tasks [80].

6.1 Awareness of Situation

Awareness of the situation is a pivotal movement at all phases during a pandemic, including pre-pandemic, flash, and periods of spread. It needs the help of medical care assets, (for example, clinics, specialists, and attendants), diagnostic institutes, and communication frameworks. It likewise requires the populace to approach and trust in the medical services framework. Awareness of the situation upholds policy choices by following if and where transmission of the disease is happening, recognizing the best strategies to decrease contagiousness, and choosing where to designate assets. During a pandemic, situational awareness takes into consideration observing to comprehend the course a pandemic is taking and whether intercession measures are successful. The capacity to distinguish and handle a pandemic needs the medical services force to perceive the sickness and to have the specialized and research facility ability to recognize the microorganism and react to floods of clinical examples in an opportune way. Quickly recognizable proof lessens hazard by empowering contaminated people to be secluded and given suitable clinical consideration [81].

6.2 Eliminating Sparks of Pandemic

Most pandemic preparation practices base on lessening mortality and morbidity after the spread of a pandemic, by and large, activities, in particular, may contain and prevent pandemic shimmers before they become a more broad risk. At the focal point of the pandemic, the expectation is the possibility of One Health, a technique that considers human prosperity, animal prosperity, and the surrounding environment to be interconnected [82].

6.3 Communication of Risk

Communication regarding the risk can assume a critical part in the control of an arising scourge or pandemic by giving data that individuals can use to make a defensive and preventive move. The spread of fundamental data, (for example, how the microorganism is communicated, direction on overseeing tolerant consideration, high-hazard rehearses, and defensive conduct measures) can quickly and altogether decrease the transmission of sickness. The manner by which hazard correspondences are outlined and sent matters a lot; they should be clear, straightforward, convenient, and conveyed by believable couriers. Factors, for example, education rates, social sensitivities, knowledge of logical standards, (for example, the germ hypothesis of illness), and dependence on oral versus composed conventions all have suggestions for how messages ought to be planned and conveyed [83].

6.4 Scaling up of Potentials

The term scaling up alludes to the extension of health mediation inclusion. With regards to pandemic readiness, effectively scaling up requires health system frameworks to grow to oblige quick expansions in the number of suspected cases. Scaling up is supported by flood limits (the ability to draw on the extra clinical labor force, logisticians, and financial and various resources) similarly as past operational associations and plans interfacing government, non-administrative affiliations, and the private zone. In the end, scaling up contains having both a nearby flood limit and the absorptive capacity to recognize outside assistance [84].

7 Conclusion

Psychological presentations post-COVID-19 are normal. Identification of basic indications is useful to guarantee that early mediation is given. Mental issues following the pandemic are likely going to be typical. Most impacted will require simply short assessments and snappy assistance. This will require all front-line faculty to be gifted in the clear mental assessment of the impact locally and treatment settings of COVID-19. Separation and social removing in the hours of an irate pandemic can be intellectually disturbing for certain people. Regardless, there are clear and convincing moves that you can make as a medical services provider. The key among them is giving information. As a medical services provider, you would be seen as a strong and trustworthy wellspring of information. Explain the thinking of segregating and socially isolating. Advance strong wellsprings of information. Educate patients on what manifestations to keep an eye out for and what side effects not to stress over. Urge individuals to stay in contact with one another over virtual methods.

Understanding the psychological well-being requirements of individuals in clinical isolation is significant as it's presumably that many are probably going to create mental issues that need early mediation. Practically all forefront staff in pandemics like COVID-19 are probably going to encounter pressure in a specific way. Steps should be taken proactively to guarantee that it stays in charge. Personnel should rehearse 'self-care'. Group pioneers should utilize steps to limit psychological wellness challenges. Directors should know that the emotional well-being backing of staff is a significant piece of the COVID-19 reaction. Above all, personnel needing support should be distinguished and offered proper mediation to forestall negative results. Social disgrace increments during irresistible sickness flare-ups and is frequently not given the accentuation required. Steps should be taken at all levels to guarantee that disparaging practices are unequivocally debilitated. The mental methods portrayed can be utilized to determine some genuine circumstances experienced in numerous settings following COVID-19. The means are straightforward and can be utilized by cutting-edge staff to determine these circumstances. Conveying, preparing, and uphold through innovation has numerous advantages. The patient/guardian can utilize refreshed electronic verifiable data to follow best practices. Subsequently, the innovation can be an extraordinary empowering influence in this COVID-19 pandemic. Telepsychiatry counsels should be mainstreamed to guarantee sufficient consideration of patients with psychological well-being issues during the current COVID-19 pandemic. It is the ideal opportunity for us to be ingenious and guarantee the process of rehabilitation is on the track. We need to pause and look regarding when services of rehabilitation can be restarted. It is darkest before sunrise and better days anticipate.

References

1. Sun, Y., Bao, Y., Lu, L.: Addressing mental health care for the bereaved during the COVID-19 pandemic. Psychiatr. Clin. Neurosci. **74**, 406407 (2020)
2. Ornell, F., Schuch, J.B., Sordi, A.O., Kessler, F.H.P., Ornell, F., Schuch, J.B, et al.: Pandemic fear and COVID-19: mental health burden and strategies. Braz. J. Psychiatr. **42**, 232235 (2020)
3. Kawohl, W., Nordt, C.: COVID-19, unemployment, and suicide. Lancet Psychiatr. **7**, 389390 (2020)
4. Khosravi, M.: Perceived risk of COVID-19 pandemic: the role of public worry and trust. Electron. J. Gen. Med. **17**, em203 (2020)
5. Madhav, N., Oppenheim, B., Gallivan, M., Mulembakani, P., Rubin, E., Wolfe, N.: Pandemics: risks, impacts, and mitigation. In: Jamison, D.T., Gelband, H., Horton, S., et al. (eds.) Improving Health And Reducing Poverty, Vol. 9. Disease Control Priorities, 3rd ed. World Bank, Washington, DC (2018)
6. Gupta, R., Grover, S., Basu, A., Krishnan, V., Tripathi, A., Subramanyam, A., et al.: Changes in sleep pattern and sleep quality during COVID-19 lockdown. Indian J. Psychiatr. **62**, 370 (2020)
7. Banerjee, D., Rao, T.S.: Sexuality, sexual well being, and intimacy during COVID-19 pandemic: an advocacy perspective. Indian J. Psychiatr. **62**, 418 (2020)
8. Goyal, K., Chauhan, P., Chhikara, K., Gupta, P., Singh, M.P.: Fear of COVID-2019: first suicidal case in India!. Asian J. Psychiatr. **49**, 101989 (2020). https://doi.org/10.1016/j.ajp.2020.101989

9. Mamun, M.A., Griffiths, M.D.: First COVID-19 suicide case in Bangladesh due to fear of COVID-19 and xenophobia: possible suicide prevention strategies. Asian J. Psychiatr. **51**, 102073 (2020). https://doi.org/10.1016/j.ajp.2020.102073

10. Ren, S.Y., Gao, R.D., Chen, Y.L.: Fear can be more harmful than the severe acute respiratory syndrome coronavirus 2 in controlling the corona virus disease 2019 epidemic. World J. Clin. Cases **8**, 652657 (2020)

11. Kumar, A., Somani, A.: Dealing with corona virus anxiety and OCD. Asian J. Psychiatr. **51**, 102053 (2020)

12. Kar, S.K., Arafat, S.M.Y., Sharma, P., Dixit, A., Marthoenis, M., Kabir, R.: COVID-19 pandemic and addiction: current problems and future concerns. Asian J. Psychiatr. **51**, 102064 (2020). https://doi.org/10.1016/j.ajp.2020.102064

13. Zandifar, A., Badrfam, R.: Iranian mental health during the COVID-19 epidemic. Asian J. Psychiatr. **51**, 101990 (2020). https://doi.org/10.1016/j.ajp.2020.101990

14. Dixit, A., Marthoenis, M., Arafat, S.M.Y., Sharma, P., Kar, S.K.: Binge watching behavior during COVID-19 pandemic: a cross-sectional, cross-national online survey. Psychiatr. Res. **289**, 113089 (2020). https://doi.org/10.1016/j.psychres.2020.113089

15. Zhai, Y., Du, X.: Mental health care for international Chinese students affected by the COVID-19 outbreak. Lancet Psychiatr. **7**, e22 (2020)

16. Montemurro, N.: The emotional impact of COVID-19: from medical staff to common people. Brain Behav. Immun. **87**, 2324 (2020)

17. Grover, S., Mehra, A., Sahoo, S., Avasthi, A., Tripathi, A., D'Souza, A., et al.: State of mental health services in various training centers in India during the lockdown and COVID-19 pandemic. Indian J. Psychiatr. **62**, 363 (2020)

18. Armitage, R., Nellums, L.B.: COVID-19 and the consequences of isolating the elderly. Lancet Public Health **5**, e256 (2020)

19. Kavoor, A.R., Chakravarthy, K., John, T.: Remote consultations in the era of COVID-19 pandemic: preliminary experience in a regional Australian public acute mental health care setting. Asian J. Psychiatr. **51**, 102074 (2020). https://doi.org/10.1016/j.ajp.2020.102074

20. Pfefferbaum, B., North, C.S.: Mental health and the COVID-19 pandemic. N. Engl. J. Med. **383**, 510–512 (2020)

21. Brooks, S.K., Webster, R.K., Smith, L.E., Woodland, L., Wessely, S., Greenberg, N., et al.: The psychological impact of quarantine and how to reduce it: rapid review of the evidence. Lancet **395**(10227), 912–920 (2020)

22. Bai, Y.M., Lin, C.C., Lin, C.Y., Chen, J.Y., Chue, C.M., Chou, P.: Survey of stress reactions among health care workers involved with the SARS outbreak. Psychiatr. Serv. **55**, 1055–1057 (2004)

23. Alice, D., Dioumel, B., Albert, G., Ndioneb, K.S.: Social. Sci. Med. **178**, 38–45 (2017)

24. Edwin, A. J., Van, H., Madelon, L. M.: The state of boredom: frustrating or depressing? Motiv. Emot. **42**, 931–946 (2018)

25. Blendon, R.J., Benson, J.M., Des, C.M., Raleigh, E., Taylor-Clark, K.: The public's response to severe acute respiratory syndrome in Toronto and the United States. Clin. Infect. Dis. **38**, 925–931 (2004)

26. Jeong, H., Yim, H.W., Song, Y.J., et al.: Mental health status of people isolated due to middle east respiratory syndrome. Epidemiol. Health **38**, e2016048 (2016)

27. Wilken, J.A., Pordell, P., Goode, B., et al.: Knowledge, attitudes, and practices among members of households actively monitored or quarantined to prevent transmission of Ebola virus disease—Margibi county, Liberia: February–March 2015. Prehosp. Disaster. Med. **32**, 673–678 (2017)

28. Cava, M.A., Fay, K.E., Beanlands, H.J., McCay, E.A., Wignall, R.: The experience of quarantine for individuals affected by SARS in Toronto. Public Health Nurs. **22**, 398–406 (2005)

29. Caleo, G., Duncombe, J., Jephcott, F., et al.: The factors affecting household transmission dynamics and community compliance with Ebola control measures: a mixed-methods study in a rural village in Sierra Leone. BMC Public Health **18**, 248 (2020)

30. Liu, S., Yang, L., Zhang, C., Xiang, Y., Liu, Z., Hu, S., et al.: Online mental health services in China during the COVID-19 outbreak. Lancet Psychiatry **7**(4), e17-18 (2020)
31. Saba, F., Md, A.: How to minimize the consequences of quarantine during COVID-19 pandemic? Middle east. J. Rehabil. Health Stud. **7**(3), e104986 (2020)
32. American Psychological Association: parenting during the COVID-19 pandemic (2020). https://www.apa.org/topics/covid19/parenting-during-pandemic
33. Imran, N., Zeshan, M., Pervaiz, Z.: Mental health considerations for children and adolescents in COVID-19 pandemic. Pak. J. Med. Sci. **36** (2020)
34. Rona, R.J., Fear, N.T., Hull, L., et al.: Mental health consequences of overstretch in the UK armed forces: first phase of a cohort study. B.M.J. **335**, 603 (2007)
35. Zhenga, S., Yanga, L., Zhoua, P., et al.: Recommendations and guidance for providing pharmaceutical care services during COVID-19 pandemic: a China perspective. Res. Social Adm. Pharm. **17**(2021), 1819–1824 (2020)
36. Manuell, M.E., Cukor, J.: Mother nature versus human nature: public compliance with evacuation and quarantine. Disasters **35**, 417–442 (2011)
37. Rubin, G.J., Harper, S., Williams, P.D., et al.: How to support staff deploying on overseas humanitarian work: a qualitative analysis of responder views about the 2014/15 West African Ebola outbreak. Eur. J. Psychotraumatol. **7**, 30933 (2016)
38. Maunder, R., Hunter, J., Vincent, L., et al.: The immediate psychological and occupational impact of the 2003 SARS outbreak in a teaching hospital. CMAJ **168**, 1245–1251 (2003)
39. Centers for Disease Control and Prevention: quarantine and isolation 2017. https://www.cdc.gov/quarantine/index.html (Accessed Jan 30, 2020)
40. Desclaux, A., Badji, D., Ndione, A.G., Sow, K.: Accepted monitoring or endured quarantine? Ebola contacts' perceptions in Senegal. Soc. Sci. Med. **178**, 38–45 (2017)
41. DiGiovanni, C., Conley, J., Chiu, D., Zaborski, J.: Factors influencing compliance with quarantine in Toronto during the 2003 SARS outbreak. Biosecur. Bioterror. **2**, 265–272 (2004)
42. Lee, S., Chan, L.Y., Chau, A.M., Kwok, K.P., Kleinman, A.: The experience of SARS-related stigma at Amoy gardens. Soc. Sci. Med. **61**, 2038–2046 (2005)
43. Hawryluck, L., Gold, W.L., Robinson, S., Pogorski, S., Galea, S., Styra, R.: SARS control and psychological effects of quarantine, Toronto Canada. Emerg. Infect. Dis. **10**, 1206–1212 (2004)
44. Yoon, M.K., Kim, S.Y., Ko, H.S., Lee, M.S.: System effectiveness of detection, brief intervention and refer to treatment for the people with post-traumatic emotional distress by MERS: a case report of community-based proactive intervention in South Korea. Int. J. Ment. Health Syst. **10**, 51 (2016)
45. Mihashi, M., Otsubo, Y., Yinjuan, X., Nagatomi, K., Hoshiko, M., Ishitake, T.: Predictive factors of psychological disorder development during recovery following SARS outbreak. Health Psychol. **28**, 91–100 (2009)
46. Holt, R., Peveler, R.: Obesity, serious mental illness and antipsychotic drugs. Diabetes. Obes. Metab. **11**, 665–679 (2009)
47. Wu, P., Liu, X., Fang, Y., et al.: Alcohol abuse/dependence symptoms among hospital employees exposed to a SARS outbreak. Alcohol Alcohol. **43**, 706–712 (2008)
48. Sprang, G., Silman, M.: Posttraumatic stress disorder in parents and youth after health-related disasters. Disaster Med. Public Health Prep. **7**, 105–110 (2013)
49. Gard, T., Noggle, J.J., Park, C.L., Vago, D.R., Wilson, A.: Potential self-regulatory mechanisms of yoga for psychological health. Front. Hum. Neurosci. **8**, 770 (2014)
50. Thakar, V., Joshi, V., Patadiya, A., Wagh, K.: Role of Yoga in improving respiratory distress and anxiety during COVID-19 pandemic—an evidence based review (2019). https://www.researchgate.net/publication/342814764
51. Marsland, A.L., Bachen, E.A., Cohen, S., Rabin, B., Manuck, S.B.: Stress, immune reactivity and susceptibility to infectious disease. Physiol. Behav. **77**, 711–716 (2002)
52. Falkenberg, R.I., Eising, C., Peters, M.L.: Yoga and immune system functioning: a systematic review of randomized controlled trials. J. Behav. Med. **41**, 467–482 (2018)

53. Lim, S.A., Cheong, K.J.: Regular yoga practice improves antioxidant status, immune function, and stress hormone releases in young healthy people: a randomized, double-blind, controlled pilot study. J. Altern. Complement. Med. **21**, 530–538 (2015)
54. Shi, Y., Wang, Y., Shao, C., Huang, J., Gan, J., Huang, X., et al.: COVID-19 infection: the perspectives on immune responses. Cell Death Differ. **27**, 1451–1454 (2020)
55. Casqueiro, J., Alves, C.: Infections in patients with diabetes mellitus: a review of pathogenesis. Indian J. Endocrinol. Metab. **16**, S27–S36 (2012)
56. Yang, X., Yu, Y., Xu, J., Shu, H., Xia, J., Liu, H., et al.: Clinical course and outcomes of critically ill patients with SARS-CoV-2 pneumonia in Wuhan, China: a single-centered, retrospective, observational study. Lancet Respir. Med. **8**, e26 (2020)
57. Xiang, Y.T., Yang, Y., Li, W., Zhang, L., Zhang, Q., Cheung, T., et al.: Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. Lancet Psychiatry. **7**, 228–229 (2020)
58. Raveendran, A.V., Deshpandae, A., Joshi, S.R.: Therapeutic role of yoga in type 2 diabetes. Endocrinol. Metab. **33**, 307–317 (2018)
59. Figueroa, C.A., Aguilera, A.: The need for a mental health technology revolution in the COVID-19 pandemic. Front. Psychiatry. **11**, 523 (2020). https://doi.org/10.3389/fpsyt.2020.00523
60. Mann, D.M., Chen, J., Chunara, R., Testa, P.A., Nov, O.: COVID-19 transforms health care through telemedicine: evidence from the field. J. Am. Med. Inform. Assoc. **27**(7), 1132–1135 (2020). https://doi.org/10.1093/jamia/ocaa072
61. Mittal, M., Balas, V. E., Goyal, L. M., Kumar, R. (Eds.): Big Data Processing Using Spark in Cloud. Springer (2019)
62. Wesolowski, A., Qureshi, T., Boni, M.F., Sundsoy, P.R., Johansson, M.A., Rasheed, S.B., et al.: Impact of human mobility on the emergence of dengue epidemics in Pakistan. Proc. Natl. Acad. Sci. U. S. A. **112**(38), 11887–11892 (2015). https://doi.org/10.1073/pnas.1504964112
63. Liu, K., Wang, T., Yang, Z., Huang, X., Milinovich, G.J., Lu, Y., et al.: Using baidu search index to predict dengue outbreak in China. Sci. Rep. **6**, 38040 (2016). https://doi.org/10.1038/srep38040
64. Betsch, C., Wieler, L.H., Habersaat, K.: COSMO group monitoring behavioural insights related to COVID-19. Lancet **395**(10232), 1255–1256 (2020). https://doi.org/10.1016/S0140-6736(20)30729-7
65. World Health Organisation (WHO): COVID-2019 operational planning guidelines for countries. https://www.who.int/docs/defaultsource/coronaviruse/covid-19-sprp-unctguidelines.pdf
66. Chancellor, S., Choudhury, M.: Methods in predictive techniques for mental health status on social media: a critical review. NPJ. Digit. Med. **3**, 43 (2020). https://doi.org/10.1038/s41746-020-0233-725
67. Mavragani, A., Ochoa, G.: Google trends in infodemiology and infoveillance: methodology framework. JMIR Public Health Surveill. **5**(2), e13439 (2019). https://doi.org/10.2196/13439
68. Russell, M.A., Gajos, J.M.: Annual research review: ecological momentary assessment studies in child psychology and psychiatry. J. Child. Psychol. Psychiatry. **61**(3), 376–394 (2020). https://doi.org/10.1111/jcpp.13204
69. Robinaugh, D.J., Brown, M.L., Losiewicz, O.M., Jones, P.J., Marques, L., Baker, A.W.: Towards a precision psychiatry approach to anxiety disorders with ecological momentary assessment: the example of panic disorder. Gen. Psychiatr. **33**(1), e100161 (2020). https://doi.org/10.1136/gpsych-2019-100161
70. Garrido, S., Millington, C., Cheers, D., Boydell, K., Schubert, E., Meade, T., et al.: What works and what doesn't work? A systematic review of digital mental health interventions for depression and anxiety in young people. Front. Psychiatry **10**, 759 (2019). https://doi.org/10.3389/fpsyt.2019.0075931
71. Ly, K.H., Ly, A.M., Andersson, G.: A fully automated conversational agent for promoting mental well-being: a pilot RCT using mixed methods. Internet Interv. **10**, 39–46 (2017). https://doi.org/10.1016/j.invent.2017.10.002
72. Fitzpatrick, K.K., Darcy, A., Vierhile, M.: Delivering cognitive behavior therapy to young adults with symptoms of depression and anxiety using a fully automated conversational agent

(woebot): a randomized controlled trial. JMIR Ment. Health **4**(2), e19 (2017). https://doi.org/
10.2196/mental.7785

73. Gunasekeran, D.V.: Technology and chronic disease management. Lancet Diabetes Endocrinol.
6(2), 91 (2018). https://doi.org/10.1016/S2213-8587(17)30441-2

74. Ting, D.S., Gunasekeran, D.V., Wickham, L., Wong, T.Y.: Next generation telemedicine plat-
forms to screen and triage. Br. J. Ophthalmol. **104**(3), 299–300 (2019). https://doi.org/10.1136/
bjophthalmol-2019-315066

75. Indian Psychiatric Society: COVID-19 General-Advisory | Indian Psychiatric Society. https://
indianpsychiatricsociety.org/indian-psychiatric-society-COVID-19-general-advisory

76. Chaturvedi, S.K.: COVID-19, coronavirus and mental health rehabilitation at times of crisis.
J. Psychosoc. Rehabil. Ment. Health. **7**, 1–2 (2020). https://doi.org/10.1007/s40737-020-001
62-z

77. Ho, C.S., Chee, C.Y., Ho, R.C.: Mental health strategies to combat the psychological impact
of COVID-19 beyond paranoia and panic. Ann. Acad. Med. Singap. **49**(1), 1 (2020)

78. Chhetri, B. et al.: Estimating the prevalence of stress among Indian students during the COVID-
19 pandemic: a cross-sectional study from India. J. Taibah Univ. Med. Sci. (2021). https://doi.
org/10.1016/j.jtumed.2020.12.012

79. Sujita, K.K., Yasir, S.M., Russell, K., Pawan, S., Shailendra, K.S.: Coping with mental health
challenges during COVID-19. Shailendra, K.S. (Ed.) Coronavirus Disease 2019 (COVID-19).
pp. 199–213 (2020)

80. Hooghe, L., Marks, G.: Unraveling the central state, but how? Types of multi-level governance.
Amer. Political Sci. Rev. **97**(2), 233–243 (2003)

81. Wallinga, J., Teunis, P.: Different epidemic curves for severe acute respiratory syndrome reveal
similar impacts of control measures. Am. J. Epidemiol. **160**(6), 509–516 (2004)

82. Zinsstag, J., Schelling, E., Wyss, K., Mahamat, M.B.: Potential of cooperation between human
and animal health to strengthen health systems. Lancet **366**(9503), 2142–2145 (2005)

83. Bedrosian, S.R., Young, C.E., Smith, L.A., et al.: Lessons of risk communication and health
promotion—West Africa and United States. Morbidity Mortality Weekly R. (MMWR) Suppl.
65(3), 68–74 (2016)

84. Yehualashet, Y.G., Mkanda, P., Gasasira, A., et al.: Strategic engagement of technical surge
capacity for intensified polio eradication initiative in Nigeria, 2012–2015. J. Infect. Dis. **213**(3),
S116–S123 (2016)