Journal of Muhammad Medical College
Website: jmmc.mmc.edu.pk

Review Article

1: Researcher; Department of Life Sciences, School of Science, University of Management and Technology (UMT), Lahore, Pakistan

2. Student; Faculty of Rehabilitation and Allied Health Sciences, Riphah International University, Islamabad, Pakistan

3. LMO. Liaquat University of Medical and Health Sciences (LUMHS), University of Jamshoro, Pakistan

***=corresponding author**

tehreembushra1@gmail.com

SARS COVID-19 and neurological indicators and its consequences in healthcare provider.

Bushra Tahreem[1,*], Toba Samreen [2], Sana Mehreen [3]

Abstract:
In China, as well as other Asian and European countries, the new coronavirus sickness (COVID-19) has disseminated quickly. Patients, health experts, and the over-all community are under tremendous mental stress, which can precede to headaches, sleep disorders, depression, and anosmia, among other issues. During the COVID-19 epidemic, experts have established an agreement on the admission of individuals with serious mental disease to mental health facilities. Nonetheless, the COVID-19 has ascended as a severe warning to mental condition around the world due to its rapid spread. The impact of mental health on health practitioners is examined in this article. Review the many neurological signs of the COVID-19 disease as well.

Keywords: COVID-19, Mental health, Cerebrovascular accident, health care provider

Introduction:

Mental health ramifications are linked not only to lethal viral illnesses like Ebola[1], but also to ordinary viral contaminations such as the herpes virus.[2] Though, in reaction to contagious or prevailing of quickly scattering viruses with high rates of disease and death and a drought of diagnostics and therapeutic recourse, these consequences become severe.[3] Coronaviruses, which can root devastating infections in humans, are most suited to these properties. Aside from the bodily health risks, human coronaviruses, most notably SARS-CoV-2, can harm people's psychological health through a pandemic (COVID-19).[4] Different symptoms appears in covid-19 seropositive individual including fever, nausea, cough and diarrhea.[5] In individuals with COVID-19, cerebrovascular disease was linked to a 2.5-fold increase in disease severity.[6] In this essay, we looked at how human coronaviruses can involve a population's cognitive health during a pandemic.

Methodology:

Until March 31, 2020, we explored PUBMED and Google Scholar databases by means of the terms "Coronavirus" OR "COVID-19" and "stroke" OR "cerebrovascular disease" and "Corona virus" OR "healthcare professionals" and their numerous combinations. We next looked for other studies in high level of professional that published reports about COVID-19 disease. For this study, only articles published in English were evaluated; however, there was no restriction on the number of articles that could be found.

Results:

Incidence of SARS (severe acute respiratory syndrome)

The foremost serious and fluently contagious new ailment to ascend in the twenty-first era is severe acute respiratory syndrome. SARS cases were primarily revealed in southern China, in mid-November 2002.[7] It was a one-of-a-kind outbreak due to the velocity with which it spread and its concentration in patient care, where numerous infected healthcare workers died.[8] The SARS outbreak had a negative impact on cerebral

health, particularly among medical personnel, who were identified with despair, hopelessness, anxiety, and a sense of inadequacy in dealing with infected patients.[9]

Occurrence of MERS (Middle East respiratory syndrome)

In June 2012, the first occurrence of Middle East respiratory syndrome was documented in a person who died in a hospital in Jeddah, Saudi Arabia, after a severe respiratory condition.[10] MERS-CoV moved outside the Middle East and into a number of other countries. Globally, 2,468 cases and 851 death rate have been reported until 2020.[11] People in quarantine areas, intensive care units (ICUs), and emergency departments experienced psychological discomfort and severe mental illness as a result of the MERS outbreak's fear of infection and higher death rate.[12] Contamination of mice with low inoculant amounts of MERS produced in the virus being detected solely in the brain, not the lungs, signifying that the virus may largely influence the central nervous system (CNS). This finding may be linked to infection-related death in affected people.[13]

Occurrence of COVID-19

In late January 2020, the COVID-19 outbreak proliferated speedily and got prevalent announcement around the world. The novel coronavirus disease (COVID-19) was formerly designated as '2019 Novel Coronavirus (2019-nCoV) Pneumonia,' and it was discovered in a wet market in Wuhan, Hubei Province, China, in early December 2019.[14] The COVID-19 epidemic will unescapably harm patients with serious mental disease. Over 40 rehabilitant at Wuhan Mental Health Center were identified with COVID-19 in early February 2020.[15] SARS-CoV-2, the causal virus, was exposed to be a novel coronavirus strain with 79 % inherited a likeness to SARS-CoV from the 2003 SARS outburst. The WHO labelled the epidemic a worldwide pandemic on March 11, 2020.[16] During and during an infectious illness outbreak, population psychological responses have a critical role in affecting both disease transmission and the occurrence of emotional suffering and social disruption. Despite this, effective services for managing or mitigating the effects of pandemics on mental health and wellbeing are rarely offered.[17]

Conveyance of corona virus

SARS-CoV-2 is dispersed mainly by means of nearby exposure or driblet diffusion from pre symptomatic, symptomless, or patients with symptoms who are infested with the virus. The communication of COVID-19 has also been related to aerial route using spray producing approaches. Vertical communication is imaginable, but only in a smaller of cases, according to a meta-analysis involving 936 neonates from COVID-19-positive mothers.[18] SARS-CoV has been originate to have an efficient receptor called angiotensin converting enzyme 2 (ACE2).[19] The spike for SARS-CoV-2 linked to ACE2 conferring to basic and efficient studies. The lung, heart, ileum, kidney, and bladder all have raised levels of ACE2. On lung epithelial cells, ACE2 was sturdily proclaimed. Further studies is required to perceive if SARS-CoV-2 attributes to alternative target.[20]

Influence of disease on mental health

Despite the fact that covid- 19 is the third foremost corona virus outburst to have had a substantial economic impact in the last 20 years, it is the first in the 21stcen tury to mark countries all over the world, excluding Antarctica.[21] Although COVID-19 is predictable as a public health issue, it is less frequently thought of as an occupational disease.[22] It has been claimed that mental problems impair immunity, making people more susceptible to diseases.[23]

Mental health in health care providers

Frontline healthcare practitioners, particularly in Wuhan, come into close contact with people with the disease. Excessive workload, loneliness, and intolerance are all common complaints, making them more sensitive to physical tiredness, fear, emotional disturbances, and sleep issues.[24] Health personnel who care for COVID -19 patients are at threat for not only infection but also mental health issues. Front-line health-care personnel are particularly vulnerable to stress reactions due to their high level of exposure to the virus and COVID-19-associated alarming events, as well as the necessity to make arduous determination.[25,26] More than half of the participants (50.7 %) of recent research of 1,563 health professionals experienced depressed problems, 44.7% anxiety, and 36.1 % sleep problems.[27] During the SARS epidemics, health care employee SARS fighters had anxiety levels equivalent to those of SARS fighters who did not work in health care; however, one year later, they had much greater stress levels, as well as inflated depression, anxiety, and post- excruciating sign scores.[28] In comparison to physicians, nursing staff are more susceptible. Forced relocation to care for impacted patients, being less practiced, working part-time, or having

increasing interaction with exaggerated patients are all work-related factors that promote psychological negative consequences. In the COVID-19 era, particular hazard features like personnel with kids at home or diseased family members, female gender, solitary or communal isolation, and concomitant physical or cognitive diseases all exacerbate HCPs' psychological health.[29]

Neurological features of COVID-19 infection

The lack of study on COVID-19 neurological involvement makes it difficult to relate an explicit nervous manifestation to the virus. When compared to mild variants of COVID-19, severe ones are more possibly to consequence in neurologic problems (45.5% vs 30%). The existence of cerebellar swelling and neuronal disintegration was discovered in an autopsy investigation of COVID-19 patients who died owing to respiratory failure.[30]

Encephalopathy

The risk of encephalopathy is increased by electrolyte imbalance, calcium level disturbance, low or high blood glucose level, renal or hepatic disorder, and other metabolic or endocrine diseases. septicemia and the ensuing inflammatory and "cytokine storm" may also play a part in encephalopathy, as IL-6, IL-8, IL-10, and tumour necrosis factor (TNF) have all been associated with states of misperception.[31] Noxious and metabolic causes, as well as medication complicacy or hypoxia, can produce COVID-19-connected encephalopathy.[32] Despite compulsive conclusions showing cerebral edema without inflammatory signs, an electroencephalography (EEG) report on a patient with change mental level who was incapable to track oral instructions as the allowing indication of COVID-19 revealed scatter slow waves, predominantly in the left temporal area. Fever control, hypoxia treatment, and antiepileptic medications are all options for symptomatic treatment in these patients.[30,33]

Encephalitis

Viruses such as Herpes simplex virus (HSV), Varicella-zoster virus (VZV), cytomegalovirus (CMV), and influenza virus are the most prevalent causes of encephalitis, or acute inflammation of the brain. Because many COVID-19 patients report neurologic signs in addition to respiratory symptoms, SARS-CoV-2 may have neurotropic possessions.[34] Furthermore, in a patient with medically confirmed meningoencephalitis in Japan, genome sequencing designated the existence of SARS-CoV-2 RNA in the cerebral fluid.[35]

Anosmia

Patients with COVID-19 frequently describe anosmia and, secondly, taste abnormalities, which can arise unexpectedly.[36] The most prevalent neurologic indication of SARS-CoV-2 is anosmia, which has been seen principally in people in their prior twenties who are apart from symptomless and in good state of health. After assessing the literature, we can achieve that, especially in current epidemic, every patient with quarantined anosmia should be tested for SARS-CoV-2. More research is needed to determine the exact mechanism by which SARS-CoV-2 induces anosmia.[34]

Headache

COVID-All 19 sufferers, on the whole, have headaches. In previous studies, headache was reported by 13.6 percent of a group of over 1000 patients, with 15 percent of those with severe forms reporting it. Despite the fact that the study did not specify whether there was a prior history of headache or any meningeal sign, the headache was considered as mild.[32] According to a recent research, headaches were the most common symptom, followed by fever, cough, sore throat, and shortness of breath.[37] Meningitis, encephalitis, intracranial hypertension, cerebrovascular disorders, and vasculitis all include headache as a clinical characteristic, although there is little pathophysiological evidence linking it to COVID-19. In rare situations, macrophage-released cytokines and chemokines may stimulate sensory neurons by an inflammatory mechanism analogous to that of pain.[38]

Conclusion:

The occurrence of the COVID-19 has triggered implausible mental difficulties all over the globe. Headache, anosmia, and Encephalitis were the most common neural complaints. Headache, anosmia, and tiredness may last longer than the acute phase of the illness. The COVID-19 occurrence will finally end, but it will have occasioned in thousands of expiries and millions of people suffering from severe mental sickness. The edifice of a large system of clinical psychologists and psychiatrists to aid the public, doctors, allied health professionals, techs, and care staff at the front line should be at the top of the management's plan in dealing properly with this crucial disaster.

Financial disclosure statement:

This research did not receive any grant.

Conflict of interest: The authors declare none.

References:

1. Cénat JM, Felix N, Blais-Rochette C, Rousseau C, Bukaka J, Derivois D, et al. Prevalence of mental health problems in populations affected by the Ebola virus disease: A systematic review and meta-analysis. Psychiatry Res. 2020;289:113033.
2. Bharucha T, Houlihan CF, Breuer J. Herpesvirus infections of the central nervous system. In: Seminars in neurology. Thieme Medical Publishers; 2019. p. 369–82.
3. Machhi J, Herskovitz J, Senan AM, Dutta D, Nath B, Oleynikov MD, et al. The natural history, pathobiology, and clinical manifestations of SARS-CoV-2 infections. J Neuroimmune Pharmacol. 2020;1–28.
4. Shaukat N, Ali DM, Razzak J. Physical and mental health impacts of COVID-19 on healthcare workers: a scoping review. Int J Emerg Med. 2020;13(1):1–8.
5. Larsen JR, Martin MR, Martin JD, Kuhn P, Hicks JB. Modeling the onset of symptoms of COVID-19. Front public Heal. 2020;8:473.
6. Aggarwal G, Lippi G, Michael Henry B. Cerebrovascular disease is associated with an increased disease severity in patients with coronavirus disease 2019 (COVID-19): a pooled analysis of published literature. Int J Stroke. 2020;15(4):385–9.
7. La Montagne JR, Simonsen L, Taylor RJ, Turnbull J, Co-Chairs SRWG. Severe acute respiratory syndrome: developing a research response. J Infect Dis. 2004;189 (4):634–41.
8. Jayaweera M, Perera H, Gunawardana B, Manatunge J. Transmission of COVID-19 virus by droplets and aerosols: A critical review on the unresolved dichotomy. Environ Res. 2020;188:109819.
9. Sirois FM, Owens J. Factors associated with psychological distress in health-care workers during an infectious disease outbreak: A rapid systematic review of the evidence. Front psychiatry. 2021;11:1591.
10. Mobaraki K, Ahmadzadeh J. Current epidemiological status of Middle East respiratory syndrome coronavirus in the world from 1.1. 2017 to 17.1. 2018: a cross-sectional study. BMC Infect Dis. 2019;19(1):1–5.
11. Sheahan TP, Sims AC, Leist SR, Schäfer A, Won J, Brown AJ, et al. Comparative therapeutic efficacy of remdesivir and combination lopinavir, ritonavir, and interferon beta against MERS-CoV. Nat Commun. 2020;11(1):1–14.
12. Spoorthy MS, Pratapa SK, Mahant S. Mental health problems faced by healthcare workers due to the COVID-19 pandemic–A review. Asian J Psychiatr. 2020;51:102119.
13. Li Z, He W, Lan Y, Zhao K, Lv X, Lu H, et al. The evidence of porcine hemagglutinating encephalomyelitis virus induced nonsuppurative encephalitis as the cause of death in piglets. PeerJ. 2016;4:e2443.
14. Lu H, Stratton CW, Tang Y. Outbreak of pneumonia of unknown etiology in Wuhan, China: The mystery and the miracle. J Med Virol. 2020;92(4):401.
15. Li W, Yang Y, Liu Z-H, Zhao Y-J, Zhang Q, Zhang L, et al. Progression of mental health services during the COVID -19 outbreak in China. Int J Biol Sci. 2020;16(10):1732.
16. Anand KB, Karade S, Sen S, Gupta RM. SARS-CoV-2: camazotz's curse. Med J armed forces india. 2020;76 (2):136–41.
17. Cullen W, Gulati G, Kelly BD. Mental health in the COVID-19 pandemic. QJM An Int J Med. 2020;113 (5):311–2.
18. Kotlyar AM, Grechukhina O, Chen A, Popkhadze S, Grimshaw A, Tal O, et al. Vertical transmission of coronavirus disease 2019: a systematic review and meta-analysis. Am J Obstet Gynecol. 2021;224(1):35–53.
19. Li W, Moore MJ, Vasilieva N, Sui J, Wong SK, Berne MA, et al. Angiotensin-converting enzyme 2 is a functional receptor for the SARS coronavirus. Nature. 2003;426 (6965):450–4.
20. Yuki K, Fujiogi M, Koutsogiannaki S. COVID-19 pathophysiology: A review. Clin Immunol. 2020;215:108427.
21. Docea AO, Tsatsakis A, Albulescu D, Cristea O, Zlatian O, Vinceti M, et al. A new threat from an old enemy: Re□emergence of coronavirus. Int J Mol Med. 2020;45 (6):1631–43.
22. Koh D, Goh HP. Occupational health responses to COVID-19: What lessons can we learn from SARS? J Occup Health. 2020;62(1):e12128.
23. Chiang JJ, Cole SW, Bower JE, Irwin MR, Taylor SE, Arevalo J, et al. Depressive symptoms and immune transcriptional profiles in late adolescents. Brain Behav Immun. 2019;80:163–9.
24. Kang L, Li Y, Hu S, Chen M, Yang C, Yang BX, et al. The mental health of medical workers in Wuhan, China dealing with the 2019 novel coronavirus. The Lancet Psychiatry. 2020;
25. Greenberg N, Docherty M, Gnanapragasam S, Wessely S. Managing mental health challenges faced by healthcare workers during covid-19 pandemic. bmj. 2020;368.
26. Li Z, Ge J, Yang M, Feng J, Qiao M, Jiang R, et al. Vicarious traumatization in the general public, members, and non-members of medical teams aiding in COVID-19 control. Brain Behav Immun. 2020;88:916–9.
27. Liu S, Yang LL, Zhang CX, Xiang YT, Liu Z, Hu S. novel coronavirus: Online mental health services. Lancet Psychiatry. 2019;7(4):E17–8.

28. Lee AM, Wong JGWS, McAlonan GM, Cheung V, Cheung C, Sham PC, et al. Stress and psychological distress among SARS survivors 1 year after the outbreak. Can J Psychiatry. 2007;52(4):233–40.
29. Kisely S, Warren N, McMahon L, Dalais C, Henry I, Siskind D. Occurrence, prevention, and management of the psychological effects of emerging virus outbreaks on healthcare workers: rapid review and meta-analysis. bmj. 2020;369.
30. Xu Z, Shi L, Wang Y, Zhang J, Huang L, Zhang C, et al. Pathological findings of COVID-19 associated with acute respiratory distress syndrome. Lancet Respir Med. 2020;8(4):420–2.
31. Krishnan V, Leung LY, Caplan LR. A neurologist's approach to delirium: Diagnosis and management of toxic metabolic encephalopathies. Eur J Intern Med. 2014;25 (2):112–6.
32. Guan W, Ni Z, Hu Y, Liang W, Ou C, He J, et al. Clinical characteristics of coronavirus disease 2019 in China. N Engl J Med. 2020;382(18):1708–20.
33. Filatov A, Sharma P, Hindi F, Espinosa PS. Neurological complications of coronavirus disease (COVID-19): encephalopathy. Cureus. 2020;12(3).
34. Ahmed MU, Hanif M, Ali MJ, Haider MA, Kherani D, Memon GM, et al. Neurological manifestations of COVID-19 (SARS-CoV-2): a review. Front Neurol. 2020;11:518.
35. Moriguchi T, Harii N, Goto J, Harada D, Sugawara H, Takamino J, et al. A first case of meningitis/encephalitis associated with SARS-Coronavirus-2. Int J Infect Dis. 2020;94:55–8.
36. Giacomelli A, Pezzati L, Conti F, Bernacchia D, Siano M, Oreni L, et al. Self-reported olfactory and taste disorders in patients with severe acute respiratory coronavirus 2 infection: a cross-sectional study. Clin Infect Dis. 2020;71(15):889–90.
37. Gupta N, Agrawal S, Ish P, Mishra S, Gaind R, Usha G, et al. Clinical and epidemiologic profile of the initial COVID -19 patients at a tertiary care centre in India. Monaldi Arch chest Dis. 2020;90(1).
38. Pennisi M, Lanza G, Falzone L, Fisicaro F, Ferri R, Bella R. SARS-CoV-2 and the nervous system: from clinical features to molecular mechanisms. Int J Mol Sci. 2020;21 (15):5475.