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REVIEW ARTICLE

COVID-19 PANDEMIC-INDUCED STRESS STORM IN DIFFERENT SOCIETIES.

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Abstract

The corona virus infection originated in Wuhan, China and then developed into global pandemic crisis. This crisis created stress, fear, anxiety, uncertainty which lead to a resilience testing of mankind in 21st centuries. This review aimed to highlight the scientifically determined psychological stress and biological stress that happened in various populations with different social norms. The online database was systematically searched from PubMed, Google Scholar and Elsevier COVID-19 information center. The result yield 42 citations and literature review was performed. The evidence proved that COVID-19 pandemic induced unstable psychological conditions such as anxiety, depression, post-traumatic stress disorders in patients, health care workers, the general population, and vulnerable populations like women, children, elderly, business dealers and migrant workers though the intensity of suffering was different among individuals. Apart from psychological stress, COVID-19 infection induced the biological stress by promoting oxidative stress and cortisol secretion which adversely affect the survival of patients. This review emphasized that one should be aware of the stress storm created by this pandemic situation and be prepared for further management.

Keywords: COVID-19, patient, general public, healthcare workers, woman, children, elders, economy, stress, mental health

Introduction

The corona virus disease (COVID-19) outbreak had originated from China in December 2019 as the first cluster of cases was reported in Wuhan, China.[1,2] The virus was dramatically spread around the globe and the World Health Organization (WHO) declared its outbreak as a Public Health Emergency of International Concern in January 2020 and later the global pandemic situation was announced on March 11th 2020.[3] This single-stranded RNA virus, SARS-CoV-2, transmission rate and the mortality rate is higher than the mortality caused by other corona viruses: severe acute respiratory distress syndrome (SARS) and Middle East Respiratory Syndrome corona virus (MERS-CoV).[4] The SARS-CoV-2 mutant variant of the spike protein D614G has emerged during pandemic and G614 was expressed to be more transmissible and infectious than first China origin although remaining to find out in clinical study.[5,6]

This review emphasizes on all forms of stress faced by different societies during the crisis of COVID-19 pandemic. We conducted a systemic search of the online databases of journals from PubMed, Google Scholar and Elsevier COVID-19 information center. The search words include COVID-19, health care works, mental health, psychology, stress, nurses, woman, children, economic, migrant workers, vulnerable, stress hormones and oxidative stress. This unprecedented crisis turns into a historic resilience testing for the human in 21st century. Since the outbreak started people reacted to the pandemic with varieties of fear responses such as fear of being infected, fear of losing loved ones, fear of an unstable economy due to lockdown, fear of challenges for adapting new information technologies in a very short duration and countless changeless facing with daily lives changes due to social distancing practice in this new normal situation. This article will discuss on the scientifically determined stress intensity among people with different social norms.

Psychological stress in general public during COVID-19 pandemic

The pandemic situation is impacting the psychological well-being of the general public by creating fear, anger, uncertainty, and challenges. It was revealed that psychological well-being was lower during the pandemic compared to pre-pandemic situation which was indicated by the increased use of anxious and depressive words on Weibio.[7] Among the general public of China, half of the interviewees reported moderate to severe psychological impact due to COVID-19 outbreak. Most of the interviewees were spending 20-24 hr at home per day, and one-third of them reported for facing moderate to severe anxiety while one-seventh for moderate to severe depression.[8] Taking precaution measures and up-to-date accurate health information are the factors to lower the mental health impact of the pandemic among the general public. In a study using a vicarious traumatization questionnaire mentioned that the general public had a higher traumatized score than front line nurses.[9] Among the general public, it is also important to detect psychologically vulnerable populations such as the elderly, the immunocompromised, the person with previous psychological illness, family members of COVID-19 infected patients, the residents of outbreak area, people under social rejection due to test positive or contact with the positive case. [10]

Biological stress response COVID-19 infected patients and the role of stress hormones on patients' survival

The persons being infected with COVID-19 are experiencing psychological stress from death, being isolated, struggling with serious respiratory distress and delivering infection to their loved ones. Patients with COVID-19 infection were reported to have a high level of post-traumatic stress syndrome.[7] Apart from these psychological stress, it was evident for the existence of biological stress storm in those patients. Oxidative stress is a term presenting in excess of reactive oxygen and nitrogen species which can react with various molecules in the

body and alter cell signalling, regulation of cytokines, and the immune system.[11] COVID-19 infection triggers inflammation reactions by releasing pro-inflammatory mediators. The infection initiates the excessive stimulation of monocytes, and leading cytokine storm by active production of pro-inflammatory cytokines such as IL1, IL-1 β, IL-6, and interferon gamma which are responsible for acute respiratory distress syndrome. These inflammatory reactions and activation of monocytes, neutrophils were recognized as potent oxidant producers, and the reduction in antioxidant enzyme superoxide dismutase was found in the lung of elderly COVID-19 patients.[12,13] Accordingly, in COVID-19, researchers were suggested to test oxidative storm in more detail for both prevention and treatment purposes.[11] Corticosteroids are major stress hormones produced by the adrenal cortex when exposing physical, mental, and metabolic stressors, and triggering adaptive changes to stress. The cortisol stress response was evident in patients with COVID-19 recently. In London, UK, the patients with COVID-19 were proved to have a significantly higher cortisol level than patients without COVID-19. Moreover, the multivariate analysis revealed that the doubling of cortisol concentration was associated with 42% increase in mortality among COVID-19 patients. The study proposed a cut of point of serum cortisol 744 nmol/L, and the patients which exceeded this value on baseline cortisol measurement at 48 hr of admission were proved to be associated with increase mortality. The level of the stress hormone, cortisol, was suggested to be used as an independent prognostic marker for COVID-19 patients rather than C Reactive Protein (CRP), D-dimer, and neutrophil to leukocytes ratio.[14] Thus, the biological stress storm created by COVID-19 infection is impacting seriously on the survival of infected patients.

Stress and burn out in healthcare workers for facing pandemic

Burnout is exhaustion in a workplace characterized by malaise, fatigue, frustration, and inefficacy which are consequences of excessive demand for energy, strength, and resources. If burnout happens in health care workers, the consequences are not limited to physical well-being only and even it can influence decision making, malpractice, dissemination of hospital-transmitted infection, medical errors, and can even increase in patient mortality rate.[15] COVID-19 pandemic situation mainly burdened on health care workers on both prevention of virus spread and treating patients. The frontline health care workers are at the risk of not only physical illness but also mental illness while providing care of COVID-19 infected cases. Health care workers directly dealing with COVID-19 patients care were proved to be at risk of depression, anxiety, insomnia and distress.[16] Depression, Anxiety, Stress Scales-21 (DASS-21) was proved as a valid and reliable method for assessing depression, stress and anxiety among health care workers engaging in care of COVID-19 patients.[17] In a study conducted in March 2020 in Singapore revealed that a significant number of health care workers were screened positive for stress, anxiety, depression and some were in post-traumatic stress disorders based on the questionnaire of DASS-21 and Impact of Events Scale-Revised (IES-R).[18] However, the experience in the SARS outbreak was beneficial to lower the anxiety level among health care workers in Singapore as DASS-21, IES-R score and prevalence of post-traumatic stress disorders are higher among medical health care workers during the SARS outbreak than the current COVID-19 outbreak.[18] But health care workers in Saudi Arabia with the past experience of MERS-CoV expressed the anxiety level and stress on both COVID-19 and MERS-CoV pandemic situation.[19] Interestingly, non-medical health care workers were proved to be more vulnerable to psychological distress than medical health care workers in Singapore.[18] Some observed somatic stress included insomnia, anxiety, anger, decrease concentration, depression and loss of energy.[20] In Iraq, a survey has assessed the severity of sleep difficulty among medical doctors from different specialties with Athens Insomnia Scale. More than two-thirds of doctors who dealt with COVID-19 patients were proved to have insomnia with

delayed sleep, awakening during the night, woke earlier than desired and unsatisfactory quality of sleep. [21]

Among health care workers responding mental health assessment scale, the findings suggested that more nurses than physicians, were suffered from mental health issues during the crisis. Moreover, females were more vulnerable to have stress-related disorders than males.[16] Frontline nurses in Wuhan were reported to have high level of fear, moderate and high level of burnout, emotional exhaustion and depersonalization.[9,22] Moreover, a team of nurses caring COVID-19 positive patients in Philippine also presented with a high level of fear, psychological distress which had an impact on staff turnover.[23] A survey on 1375 physician trainees in the United States of America revealed that the trainees exposed to patients being tested for COVID-19 had a higher prevalence of stress and burnout. Besides, female and unmarried trainees are more likely to be stressed and depressed.[24]

Besides mental stress, both contracting of virus and the consequence of protective measures are included as initiators of burn out syndrome. Studies from China revealed that risk factors for physical health impact were working at high-risk exposure area such as infectious disease and chest units, family member being infected, inadequate hand hygiene, inappropriate hand hygiene before and after handling patients, increase frequency of contact with patients, prolong contact time with patients, unprotected exposure and inappropriate Personal Protective Equipment (PPE) usage.[16] As PPE becomes essential to wear for a prolonged period by the health care workers for prevention of being infected, the risk of PPE related cutaneous manifestation become increased. These manifestations such as skin damage particularly in the nasal bridge, skin dryness, skin allergy, skin indentation mark and desquamation were associated with prolonged PPE wearing (more than 6 hr per day) and increased number of hand washing (more than 10 times/ day).[25] Moreover, the poor mental health outcome was directly related to the extent of skin manifestation but inversely related to resilience and social support.[22] Healthcare workers were facing fear of infection inoculation, possibility of spreading the infection to the family, friends and colleagues leading to their isolation from the social support networks.[19,20] Health care workers aged 31-40 years expressed worrisome of about infecting their family, but aged above 50 years expressed more stress on increasing patient death. But the age group between 41 and 50 expressing the concern of their own safety was also important. [26, 27] It was proved that social support for medical staff takes a huge role to improve self-efficacy, and to reduce anxiety and stress levels.[28] Accordingly, in this pandemic situation, defining the vulnerable population for psychological distress and monitoring of mental health is extremely important especially among front liners.[10,20]

Stress storm and fear venerable population: woman, children and elderly

COVID-19 pandemic has created immense stress for those who are vulnerable especially women, children and the elderly. It is no longer just a medical crisis but is surfacing as a social malady that affects these groups of populations, putting them at even greater risk for mental illness and anxiety. Increased levels of stress and anxiety can be associated with several factors such as fears of getting the infection, social isolation due to lockdown or socioeconomic impact of the pandemic. Depression, anxiety and perceived stress are already common during pregnancy and this additional substantial stressor due to COVID-19 pandemic could eventuate the psychological distress in pregnant women. A recent cross-sectional study conducted in China aimed to examine the relationship between COVID-19 pandemic and maternal mental health has shown an increased rate of depressive and anxiety symptoms in pregnant women after the declaration of COVID-19 epidemic compared to before the epidemic declaration. The prevalence of symptoms was also increased as the number of death and newly diagnosed cases of COVID-19 increased. [29] In another similar study conducted in Italy showed that the COVID-19 pandemic had a moderate to severe psychological impact on pregnant women especially those in the first trimester of pregnancy. Most of the women also

reported higher than normal anxiety due to the concern for vertical mother-to-foetus-transmission of the disease. Increased in anxiety was also found to be due to many other factors such as stopping face-to-face prenatal visits and changing birth plan away from delivering in a hospital, as well as fear of food running out.[30] A high level of anxiety during pregnancy, has been reported to have an adverse effect on mother and baby which were associated with increased risk of preterm birth as well as altered foetus and child emotional and behavioural development.[31, 32] What even worrying, during this pandemic, a higher percentage of women were having thoughts of self-harm to respond to psychological pain which could potentially result in death and injury.[29] Looking at these emerging evidences, effective psychological interventions should be developed specifically to improve perinatal mental health and psychological resilience during this outbreak.

The fear and uncertainty increased by the COVID-19 crisis require many countries to implement disease containment measures such as school closures, social distancing and home quarantine. Everyone was not allowed to leave home except for important work or health reasons, or other urgent matters. Work-from-home was activated and students shifted from face-to-face to online learning. Prolonged state of physical isolation from peers, teachers, extended family and community networks may have negative psychological effects on children's physical and mental health.[33] Additional stressors such as fears of infections, lack of personal space at home and family financial loss could further intensify these adverse psychological reactions.[34] Sprang and Silman in 2013 has reported that children who have been quarantined have higher stress level compared to those who were not.[35] This is confirmed by a rapid systematic review of 63 studies of 51576 participants, showed a significant correlation between social isolation and loneliness; and mental health problems such as depression, and possibly anxiety in children and adolescents. In a recent study conducted in China during COVID-19 pandemic, children aged 3 to 18 years were showing psychological and behavioural manifestations of anxiety including: clinginess, inattention, and irritability.[36] Paediatricians in China had suggested for parents and family members to frequently communicate with the children regarding their fears and concern and to constantly engage with physical activities as measures to support the children to reduce the worry, fear and stress; and to get through this difficult time.[36]

The risk for severe illness and mortality from COVID-19 increases with age, with older adults at the highest risk. This leads to a scare among the elderly about the eminent death and added to the stressor of being home quarantine. Elderly with pre-existing mental illness, who are at higher risk of experiencing anxiety and depression are more likely to develop relapse due to fear of contracting COVID-19 and having no one to care for during the time of infection.[37] These elderly with cognitive decline would require specific attention to accommodate their special needs as they can become much more anxious, agitated, and socially withdrawn especially during this tough time.[38]

Socioeconomic crisis-induced stress during the pandemic

The outbreak of COVID-19 has a huge socioeconomic impact in most parts of the world due to business interruptions and shutdowns from social-distancing measures. There are many uncertainties on how severe the impact on the economy, and the duration of the economic crisis. The consequences of this global economic downturn include increased workload or work reorganization, and reduced staff and salary, as well as a dramatic rise in unemployment and poverty rate.[39,40] Underprivileged and vulnerable populations will be severely affected by the economic insecurity, fear of losing a job and reduced income, falling in debts and insufficient supply of foods. These give pressure on many families, which might give rise to unhealthy conflict, family breakdown, depression, anxiety, post-traumatic stress disorder (PTSD), substance abuse and suicidal ideation. [40-42] In a recent study conducted in Bangladesh, increased cases of suicide due to COVID-19 - induced economic

instability has been reported which reflects the extreme psychological impacts faced by the poor and unprivileged populations.[43]

Of all the populations that are suffering from the economic burden due to COVID-19 pandemic, the migrant labourers are no exception. They are more vulnerable to discrimination, work-rights exploitation and job insecurity. The ongoing COVID-19 pandemic has surely increased the possibility of psychological stress and anxiety in this group of populations especially those with low education, doing seasonal work, and staying at unauthorized colonies. The fear of being abandoned by their employers and the worry of being stranded with no income have a significant negative effect on their mental health. During the lockdown period, lack of work led to no financial means to take care of daily food expenses. They were also more prone to coronavirus infection due to overcrowded and unhygienic workers' quarters that made it impossible to maintain the social distance required to contain the spread of disease.

All these multidimensional factors contribute to the development of psychological illness among this occupational community that requires support and attention from the policy-makers. [44, 45]

Conclusion:

The unprecedented COVID-19 pandemic in the world has been creating a struggling and stressful environment for all mankind with different social norms. This review has emphasized that biological stress management and mental well-being management is an important issue to be aware and prepare before, during, and after this pandemic situation.

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