

Will the recent emergence of coronavirus mutations precipitate an increase in the incidence of stress disorders among health care professionals?

Abstract

The pandemic caused by SARS-CoV-2 (COVID-19) and the recent emergence of the B.1.1.7 and other variant mutations including the recently discovered SARS-CoV-2 VUI 202012/01 in the USA have wreaked intense anxiety and apprehension among the general population and the healthcare professionals who are tasked with the care and well-being of their patients. Health care professionals often have limited availability of essential personal protective equipment resources, and few reliable or time-proven treatments and protocols readily available. As the COVID-19 pandemic rapidly approaches the one-year mark, lockdowns and travel restrictions continue, reports of domestic abuse and other human failures are reportedly on the rise in the general population, and cases of posttraumatic stress related disorders are increasing within the healthcare professionals workforce, particularly among the more junior and less experienced members of the medical staff. Thus, these observations indicate a need for increasing emphasis on pre-stress and preventive post traumatic stress disorder training and teamwork education and support at all levels of medical education involving patient care, including first responders, nursing, allied healthcare professionals, and medical student and residency training. Historically pandemics have occurred about three times each century, so the time to address the situation is now critically close at hand; not only is it essential to enhance the preparedness of our current medical workforce, but it is also the time to begin preparing for the next generation of healthcare professionals such that the next generation of healthcare professionals may have a grasp on the next pandemic in advance of its appearance. SARS-CoV-2 and most recent offspring in the USA, the B.1.1.7 variant (SARS-CoV-2 VUI 202012/01) arrived without warning: this is not a dress rehearsal and is likely here to stay at least until a vaccine and/or herd immunity becomes effective in the population. While the morbidity and mortality of SARS-CoV-2 VUI 202012/01 is predicted to be of similar magnitude to that of its parent virus at around 0.14%, the variant mutation is believed to be more highly contagious than SARS-CoV-2 and may be responsible at least in part for the recent spike in positive cases in the US, UK and elsewhere. Introduction of additional stress prevention training such as facial recognition signs among co-workers may hold the cue to address this concern and reduce the incidence of stress-related morbidity among medical staff. Now as never before, an ounce of prevention in the way of pre-stress and environmental stress preparedness may be worth a pound of cure.

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Introduction

Coronaviruses represent a family of highly contagious genetically related RNA dependent RNA polymerase viruses originally of likely zoonotic origin that are known to cause respiratory, neurologic, psychological and gastrointestinal illness in man and animals.¹⁻³ The SARS-CoV-2 has been identified as the causative viral agent in the development of the infectious and highly contagious COVID-19 viral illness, from its initial discovery in a previously naïve population in December 2019 in Wuhan Province, China.⁴⁻⁷ Recent epidemiologic observations indicate that the infective and highly contagious nature of the virus has led to the declaration of a world-wide dissemination of the virus and mandating classification as a pandemic by the World Health Organization (WHO) within only 3 months of its original reported discovery.⁵

By January 2020 the virus had begun to spread to other countries, with the first documented case in the USA in January 2020 and in several European nations soon thereafter.^{6,7} The symptoms, pathobiology, and relative incidence of morbidity and mortality were unknown in the early months, but it was soon recognized that

older populations, particularly those with complicating illnesses and comorbidities were generally at the greatest risk.^{8,9}

For healthcare providers and others in the healthcare chain, exposure to traumatic events can be an immediate cause of PTSD and is essential to address in diagnosing this disorder.¹⁰ A study conducted by Lasalvia et al.¹¹ found that medical workers often manifest the symptoms of their patients after experiencing a traumatic event, but such symptoms were often ignored by their colleagues and coworkers.¹¹ Research has established that those people who were repeatedly exposed to traumatic events were more prone to suffering all kinds of psychological problems than individuals who were seldom or never exposed.^{12,13}

Thus, burnout becomes a logical outcome for those who are heavily committed to their roles but find that the challenges may become mounting over a prolonged duration, even under what might otherwise be considered normal circumstances for the occupational role of the individual healthcare provider. The rapid evolution of the SARS-CoV-2 [COVID-19] pandemic in 2020, which occurred as a previously unknown virus with unknown symptoms, demographics

and etiologic factors of morbidity and mortality when it first emerged generated considerable stress and anxiety among both the general populace and among healthcare workers public health officials at the highest levels were seemingly at a loss to provide meaningful information, often releasing contradictory information that at times bordered on being incomplete or inaccurate at best.¹⁴ Simply stated, there were no textbooks on the topic and limited published information on the particular strain of coronavirus implicated in the pandemic thru March of 2019. Even the WHO and the CDC, who generally keep abreast of emerging illnesses worldwide appeared to have had little information on the new virus, which ultimately added to the anxiety of the healthcare professionals and all concerned.⁵

Clinical observations of health care providers subjected to prolonged shifts and extended workweeks during the COVID-19 pandemic may lead to development of symptoms of anxiety, fear, and other clinical assessments of strong emotions that may predispose those providers to significant potential for mental health diagnosis including Post Traumatic Stress Disorder (PTSD).¹¹⁻¹³ In a metaanalysis Mealer et al.¹⁵ and others reported that how one copes with these emotions and stressful conditions over time may affect the quality of healthcare provided to others, and the well-being of the people they care about both within and outside of their work environment, often with a perception of limited availability to adequate supplies of essential PPE.^{16,17} Thus, the recent emergence of a mutation of SARS-CoV-2 [COVID-19], identified as SARS-CoV-2 VUI 202012/01 in the USA (Colorado)¹⁸ with a reportedly greater potential for contagion than the novel strain has sparked great concern throughout Europe and the United Kingdom,¹⁹ resulting in International travel restrictions in an attempt to slow the continued spread of the virus in the most recent chapter in the development and progression of the 2019 coronavirus pandemic, and poses therefore an additional unknown level of stress among healthcare professionals.

In the past, these stressors have been observed to be the most significant among the more junior and less experienced members of the medical workforce, especially junior level nursing staff typically under 30 years of age.^{12,13} PTSD may develop in such individuals following exposure to a traumatic event or ongoing circumstance as has occurred among healthcare workers in the current pandemic and may be a precipitating cause of PTSD among healthcare professionals of any age. This factor may contribute to their symptoms following prolonged exposure to their seemingly unending and highly stressful patient responsibilities, and which symptoms may escape observation by others also engaged in the treatment chain and who may also be experiencing similar symptoms. The results of this metaanalysis study indicate that according to¹³ healthcare providers that were exposed to the Avian Influenza virus (H7N9) patients were significantly prone ($p < 0.05$) to developing severe anxiety, PTSD stress and burnout symptoms, indicating a need for greater pre-exposure training in traumatic illness stress management situations to better prepare them for early-stage career management. The recent emergence of SARS-CoV-2 VUI 202012/01, a potentially more contagious strain of SARS-CoV-2 with an as yet unknown risk for morbidity, mortality and unknown complications may pose such a threat among the general population and the healthcare professionals who may be tasked for their care and wellbeing. Additional variant mutations continue to be discovered at the time of this writing.²⁰

The recent emergence of reliable programs for facial recognition typology characteristics may be a useful and cost-effective approach if applied to diagnostic criterion for stress related disorders, as it has been for some other disorders such as fetal alcohol syndrome

and others.²¹ Small Island populations as in BWI and BVI may be at particular risk due to limited resources and their relative long distances from major medical resources. Anuasvili has established a computer assisted program utilizing precise dimensional facial characteristics that can be applied to assessment of a broad variety of psychologic conditions.²²⁻²⁴ The program has been recently applied to neuropsychologic therapeutic approaches to monitor improvement in psychotherapeutic management of selected patients with high reliability and success in our laboratory.^{25,26} This computer-assisted program could easily be incorporated into clinical training and preparation of medical professionals and may be applied to train medical professionals to recognize stress related facial features among coworkers and patients that may predispose to progressive comorbidity of stress-related disorders of patients and medical staff. Early recognition of imminent stress disorders via facial recognition typology or other diagnostic methods is predicted to ease the toll on the medical workforce, with corresponding benefits to the patients whose lives depend on them.

Discussion

The development of PTSD following prolonged exposure to stressful environments may occur to susceptible individuals at any age from childhood onwards^{19,27} through adulthood.²⁸ Indeed, PTSD currently ranks among the most prevalent combat related disability in the military, particularly among those soldiers aged 20-35 years of age range who have served multiple tours in combat areas during the recent conflicts where the risks of suicide among returning combat veterans have also reached alarming levels.²⁹⁻³¹

Relatively small Island populations pose a particular concern due to their limited staff and preventive resources and their virtual isolation from staff reinforcements from mainland support systems. The unanticipated onset of the 2019 coronavirus pandemic to an unprepared civilian population and its attendant healthcare team and its overwhelming impact on the healthcare system in addition to the many hardships that resulted from it also impacted unprecedented stresses on the population.

This appears to be especially evident within the first responder and nursing element of the healthcare system where it most severely affects the younger, less experienced staff that experiences the closest patient contact on a day to day basis while attempting to care for patients for which contrary to their training, there has been no clear cure immediately available, nor any consistent, time-proven treatment plan, resulting in an unprecedented number of unpreventable patient deaths particularly among the older and most vulnerable patients placed in their care on a daily basis.^{3,8,12}

The recent emergence of an even more contagious strain of the corona virus may now impose an even greater psychological strain on the most vulnerable sector of the healthcare professionals that despite the best of precautions, may or may not be able to effectively contain the spread of the contagion.^{18,19} Thus, the need for additional training in selfcare, stress prevention and stress management and in public health and infectious diseases has never been greater, especially among those members of the health care team that risk the greatest exposure to those patients assigned to their care. Incorporation of facial recognition typology²²⁻²⁶ can be easily incorporated in the training of medical professionals in a cost-effective manner and is likely to result in improved retention of skilled medical staff during this and future pandemics. There is an ever-present need for dissemination of accurate evidence-based information from both media and reliable scientific

sources, and honesty in reporting at all levels of communication from the classroom to the public sector.

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Conflicts of interest

The author declares no conflict of interest exists.

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