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Mind-Body Interventions to Reduce Coronavirus Pandemic Stress and Support Long-Term Recovery

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Abstract

The COVID-19 pandemic is causing global stress, trauma and mental illness that has already outpaced current healthcare resources. Inequalities in the burden of illness, death, and economic loss are exacerbated by inequalities in the provision of mental health care. Minority populations and indigenous peoples bear the brunt of both inequities. Ancient healing systems, such as Yoga, Qigong, and tribal practices, are a rich source of group healing methods that can be studied and optimized for prevention and recovery during current and future disasters.

Modern research is shedding light on a myriad of mechanisms that underlie the healing properties of voluntarily regulated breathing practices. We selectively review the neurophysiological effects of evidence-based, breath-centered mind-body practices and use Breath-Body-Mind as an example of a program that can safely and efficiently ameliorate psychological and somatic symptoms in child and adult survivors of mass disasters.

Online virtual programs can be used to train thousands of practitioners to deliver evidence-based mind-body programs to people who are unlikely to receive individual mental health treatment for coronavirus-related anxiety, depression, and PTSD. For those who have access to individual mental health care, adjunctive mind-body therapies can hasten recovery and may reduce the need for medication.

Voluntarily regulated breathing practices shift psychophysiological states from defense mode to the feeling of safety wherein we are best able to feel connect and relate to others with empathy, compassion, and cooperation. Knowing how to regulate our physiology in this direction is essential for stress resilience, trauma recovery, and community wellness.

Keywords: Breathing practice; Coronavirus; Disasters; Mind-body; Polyvagal; Stress; Trauma

Introduction

The Coronavirus pandemic is inducing a secondary epidemic of stress, anxiety, depression, and Post-Traumatic Stress-Disorder (PTSD). The proportion of patients hospitalized with COVID-19 who subsequently develop PTSD, has been estimated at 40%. COVID-19 related PTSD symptomatology was found in 29.5% of the Italian population [1]. Considering the limited pool of mental healthcare providers, innovative treatments are needed for millions worldwide who struggle with emotional sequelae.

Stress-reducing mind-body treatments, particularly Voluntarily Regulated Breathing Practices (VRBPs) that reduce the sympathetic overactivity and increase the parasympathetic underactivity characteristic of chronic stress states, could play a major role in

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prevention, treatment, and recovery. Evidence indicates that slow, gentle breathing techniques, such as Coherent or Resonant Breathing can rapidly and safely reduce anxiety in healthy individuals and in those with stress-related anxiety, depression, or PTSD [2,3].

Breath-Body-Mind (BBM) is a breath-based, polyvagal-informed program that integrates coherent breathing (and other breath techniques) coordinated with gentle movement, visualization, attention training (meditation), and interoceptive awareness (mindfulness). Some of the components, such as Coherent Breathing, can be taught in 30 minutes or less. However, for deeper healing, BBM is taught to groups using rounds of movement, breathing and meditation for 10 to 12 hours distributed over two to three days. It can also be used to augment psychotherapy [4,5]. Over the past 15 years, BBM has been shown to rapidly reduce symptoms of stress, anxiety, insomnia, depression, anger, and trauma in disaster survivors (e.g., South Sudan, Uganda, Nigeria, Rwanda, Middle East refugees, child Rohingya refugees, 2001 New York World Trade Center attacks), as well as for healthcare providers (Mississippi Post Gulf Horizon oil spill), schoolteachers, veterans, military personnel, medically ill patients, those with mental illnesses, and children with disabilities [6]. It has been given to groups as large as 450 people and is now being taught live online [2,5,7,8].

Background, Evidence, and Discussion

Trauma in Mass Disasters

Most traumas involve both physical and psychological suffering, which become linked and must both be treated for full recovery. For example, First Responders to the 2001 World Trade Center attacks simultaneously experienced fear, horror, and difficulty breathing from toxic fumes. Many developed chronic respiratory symptoms, anxiety, and PTSD, which did not respond to standard treatments. Two

open trials of BBM found significant rapid improvement in anxiety, depression, sleep, and trauma symptoms among First Responders [7]. The following composite case vignettes illustrate the linkage between emotional trauma and respiratory symptoms.

Case #1: Joe, a 43-year-old fireman inhaled fumes while working at Ground Zero. He started visiting emergency rooms five times a week, unable to breathe, choking and falling to the floor. Despite many visits to specialty clinics for seven years, he failed to improve and was told that he would die early. In desperation, he attended a 2-day 10-hour Breath-Body-Mind workshop with Dr. Brown (co-author). On the second day, his symptoms completely and permanently remitted.

Case #2: Ian was the foreman of a construction crew that worked round-the-clock for months starting on day one at Ground Zero. Subsequently, he developed vocal cord dysfunction which caused him to speak in a strained high-pitched voice. After five years of unsuccessful treatments at a specialty clinic, his doctor told him that his condition was permanent, and he would have to get used to it. Unwilling to accept this advice, Ian attended a Breath-Body-Mind workshop with Dr. Brown (co-author). Late in the afternoon on the first day, he suddenly and permanently recovered his natural voice.

Cases such as these raise many questions about the effects of doing rounds of VRBPs coordinated with Qigong and other movement sequences in a group setting. It is unlikely that individuals who failed to respond to many standard treatments, including medication as well as physical and psychological therapies, could be considered “suggestible” or “placebo responders.” The authors believe that such dramatic recoveries may be attributed to the neurophysiological changes induced by the VRBPs (coordinated with movement, visualization, interoceptive awareness, and meditative attention focus) in a setting that feels safe and caring, that is the group. Interoception is the perception of feelings from inside the body that reflect the internal state. Conscious interoceptive awareness is fostered by instructions to “go inward,” “notice how your body is feeling inside,” or “notice any changes in how you feel.” As the group leader and assistant teachers work with the participants, providing a framework of caring and safety, the group becomes the holding environment, the family, the tribe. As the psychophysiological state shifts, layers of defense are let go, opening physical and psychological trauma formations to permanent transformation [6,7].

Coronavirus pandemic and the 2001 world trade center attacks

Parallels exist between Ground Zero after the 2001 World Trade Center Attacks and the 2020 coronavirus crisis, which both engendered fears about breathing, inhaling something harmful, or being unable to breathe—terrifying prospects, instinctively felt as life threatening. Similarly, some survivors of the 2017 Grenfell Tower fire have persistent fear of inhaling smoke such that they cannot take a deep breath (personal communication, Heather Mason, February 10, 2019).

Mass disasters are often sudden, unexpected events, causing physical and psychological injury to vast numbers of people, and overwhelming healthcare systems. In countries experiencing multiple mass disasters, such as earthquakes, floods, prolonged wars, genocide, political oppression, much of the population has PTSD, a condition that can be transmitted to subsequent generations, and that impairs the ability to cooperate, rebuild, reform, and progress [7,9].

Beyond causing global fear and loss, the quarantine required to control the coronavirus pandemic has deprived people of their usual means to calm and comfort themselves through close relationships with others and through the sense of safety and belonging associated with group activities. Consequently, defensive psychophysiological states, associated with mistrust, anger, and impulsive action are more likely to impair the ability to be rational, calm patient, empathic, and cooperative with others. Practices that reduce defensive states and that activate psychophysiological states of safety, calmness, and clear thinking are needed more than ever.

Neurophysiological mechanism for breath-based practices

The most common autonomic imbalance underlying anxiety disorders and PTSD is Sympathetic Nervous System (SNS) overactivity and Parasympathetic Nervous System (PNS) underactivity, associated with amygdalar overreactivity and underactivity in emotion regulatory areas, such as the prefrontal cortex [3,8].

Afferent signals from organs and internal tissues ascend to central regulatory structures and networks, informing the brain of the constantly changing internal state of the body. The brain generates physical, emotional, cognitive, and behavioral responses.

Among the millions of signals from body to brain, those from the respiratory system are thought to be particularly rapid and powerful. For, if the airway is obstructed, the brain must quickly restore oxygen flow or death occurs within minutes. Therefore, the brain listens to the lungs.

Polyvagal theory, psychophysiological states, and the social engagement system: Stephen Porges proposed the Polyvagal Theory, an evolutionary exposition of the components of the autonomic nervous system and their role in adaptive behaviors in response to perceived environmental conditions of safety, danger, and life threat. Through the Social Engagement System, mammals communicate signals and detect signs of safety or danger, for example, facial expression, tone of voice, and breathing pattern. Somatomotor special visceral efferent pathways that enervate the muscles of the face, larynx, pharynx, neck, and middle ear along with visceromotor myelinated vagal pathways integrate psychophysiological states, social engagement, and behavior [8].

Voluntary behaviors, such as breathing practices, vocalizations (sounds, singing, chanting) and physical postures are a means to regulate and exercise the active pathway of neural circuits of the Social Engagement System. Over time practicing these techniques constitutes a neural exercise of autonomic regulation, such that the autonomic nervous system becomes more resilient. Increased resilience reflects a greater capacity to reduce defensive reactions and to support more flexible, adaptive emotional states, social behaviors, and health [3,8].

Voluntarily regulated breathing practices

Changing the pattern of breathing, changes messages sent to the brain that have widespread, effects on thoughts, emotions, perceptions, and behaviors. Slow gentle breathing (4-6 bpm), such as Coherent (Resonant) Breathing restores autonomic balance, reducing defensive reactions (fear, anger, mistrust) and supporting activation of the social engagement network, necessary for healthy communication, cooperation, compassion, and empathy. Supporting evidence, including randomized controlled studies in traumatized populations, has been published previously (Gerbarg and Brown, 2017; Gerbarg et al., 2019; Porges 2001, 2011; Porges and Carter, 2017; Zaccaro et al. 2918) [3,7,8,10-12].

Many brain regulatory and information processing centers are “locked” or “entrained” by respiratory patterns. Using intra-cranial Electroencephalogram (iEEG), strong respiration locking was found, particularly in the insula, amygdala, premotor, olfactory, caudal-medial frontal (executive function), and temporal cortices [13]. Volitional pacing of the breath (as opposed to automatic breathing) further increased iEEG-breath coherence (locking) in the frontotemporal-insular network. In addition, focusing the attention (awareness) on breathing further increased iEEG-breath coherence (locking) in the anterior cingulate, premotor, insular, and hippocampal cortices [13]. Magnetoencephalography study in humans demonstrated that the conscious mental regulation of voluntary slow-paced breathing modulated cortical alpha activity in a well-structured pattern over wide areas of the cerebral cortex [14].

Human studies support additional mechanisms involved in the profound effects of breathing on brain function: Increased vagal parasympathetic activity, central inhibitory transmission in GABA-ergic pathways, heart rate variability, attention, cognitive function, long-term potentiation, emotion self-regulation, and compassion [15-17].

Mind-body practices for mass disaster response

Innumerable cultures have developed beneficial sacred, secular, and modern mind-body programs, for example, Yoga, Tai Chi, Qigong, Zen, Mindfulness, Meditation, Mindfulness-Based Stress Reduction, and Somatic Experiencing [18]. All have value, but they vary in the length of training needed for meaningful change, the ease with which they can be learned, and the presence of religious or culture-specific elements that are unacceptable cross-culturally. They also include a mixture of techniques, some that reduce hyperarousal states and others that can exacerbate such states. Chanting and singing are VRBPs, which have been used for millennia throughout the world to heal, to strengthen warriors before and during battle, to enhance group identity and cohesion, and to enable warriors to transition out of combat state when they return from war.

Breath-Body-Mind (BBM) exemplifies a brief secular program of carefully selected breath-based movement and attention training techniques that are safe for most people, regardless of age, health, or trauma. It is relatively inexpensive, requires no equipment or electricity, and rapidly reduces symptoms of stress, anxiety, insomnia, depression, suicidality, anger, and trauma. In addition, BBM practices improve energy, mental focus, and feelings of connectedness, trust, and safety, which are essential for individuals, families, and communities to better endure prolonged stressors as well as to better plan, repair, rebuild, and cooperate during recovery [2,6-8].

Can people teach themselves coherent breathing?

Many people can teach themselves Coherent Breathing using a breath pacing app. However, those affected by stress or trauma usually need a teacher to help them relax into the rhythm of gently inhaling and gently exhaling at a respiratory rate between 4 and 6 breaths per minute [2]. Teachers can be trained in a few weeks to teach those who have emotional or physical issues.

Internet platforms enable global teaching of mind-body practices, including train-the-trainer programs, in relatively short periods of time to thousands of providers who could extend stress- and trauma-relief programs to the vast populations affected by the COVID-19 disaster [9].

Conclusion

Conventional healthcare delivery systems fall short of people's needs during and after mass disasters. Although Western medicine offers various therapies (psychotherapy, Cognitive Behavioral Therapy, exposure, EMDR, and short-term medication (e.g., anxiolytics or antidepressants), there are too few trained professionals to treat more than a fraction of those affected. Moreover, these treatments tend to be costly, time intensive, inaccessible, intolerable, or ineffective for many survivors.

We propose evidence-based polyvagal-informed breath-centered mind-body practices to rapidly relieve symptoms of physical and psychological trauma in large groups during and after mass disasters. Such practices have been used throughout history to support individuals and communities affected by natural and man-made disasters. Now that these practices can be taught to large groups live online, they can be more widely available and accessible than ever before. Furthermore, voluntarily regulated breathing practices shift psychophysiological states from defense mode to the feeling of safety wherein we are best able to feel connect and relate to others with empathy, compassion, and cooperation. Knowing how to regulate our physiology in this direction is essential for stress resilience, trauma recovery, and community wellness.

As we borrow methods from ancient and indigenous peoples and as we modify these based on our current needs and scientific understanding, we can pause to acknowledge and appreciate the global origins of mind-body healing.

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