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Chapter

The Impact of Coronavirus Disease 2019 (COVID-19) on Graduate Medical Education (GME): An Exploration of Behavioral Health Aspects

Jordan C. Holter, Christine Marchionni and James A. James III

Abstract

The Coronavirus Disease 2019, regularly referred to as “COVID-19”, has had an unprecedented impact on not only the state of graduate medical education (GME) for post-doctoral trainees, but also their well-being and welfare. Trainees comprise approximately 14% of physicians in the United States. This crucial portion of personnel in healthcare has irrefutably represented the resilience that personifies the medical community. The prevalence of physical and emotional exertion by these trainees, necessitated by the pandemic, has precipitated behavioral health ailments like mood disorders including depression and anxiety, diminished satisfaction in their corresponding specialties and impaired their ability to achieve balance between professional and personal responsibilities. This excerpt examines the pervasiveness of the adverse psychosocial implications the COVID-19 pandemic has had on this susceptible practitioner population in addition to the examination of physical and emotional exhaustion that exacerbate physician burnout including the implementation of policies and procedures to address the emergent problem of physician burnout throughout the COVID-19 pandemic by the GME. Also, this excerpt examines the adaptation of GME, including the reformation and implementation of innovative policies and procedures that has incontestably created an imprint on medical education for descendants of ACGME residency and fellowship programs in the United States.

Keywords: ACGME, behavioral health, burnout, Coronavirus Disease 2019, COVID-19, fellow, fellowship, GME, pandemic, psychiatry, public health, resident, residency, safety, vulnerability, welfare, well-being

1. Introduction

A pandemic, by definition, is an epidemic of an infectious disease that has progressed across a large region, for instance multiple continents, affecting a substantial number of people [1]. COVID-19 is caused by an infection with the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus strain, initially isolated from individuals with pneumonia and a constellation of acute respiratory

signs/symptoms signs and symptoms in Wuhan, China in December 2019 [2]. Signs and symptoms include: fever (71%), cough (80%), fatigue (62%), muscle aches (61%), headache (46%) and shortness of breath (43%) in addition to loss of taste or smell (32%) [2]. Approximately 93% of patients encountered a triad of signs/symptoms including fever, cough and shortness of breath [3].

Initially, COVID-19 was identified in the United States in January 2020 and in March 2020, the World Health Organization (WHO) affirmed COVID-19 as a pandemic [3]. About one year after the initial identification, approximately 92.7 million individuals have been diagnosed as having COVID-19 worldwide [4]. As of January 2021, approximately 2 million individuals have succumbed to COVID-19 worldwide [4]. Prior to the COVID-19 pandemic, the 2009 Influenza A (H1N1) pandemic infected approximately 1.4 billion individuals worldwide and killed approximately 575,000 of said individuals [5]. The 2014 Ebola Virus Disease (EVD) pandemic infected approximately 28,656 and killed approximately 11,325 of said individuals [6]. In contrast, these figures pertaining to previous noteworthy pandemics that were ultimately restrained, illustrate that the present pandemic is unparalleled, particularly pertaining to mortality.

The pandemic incited a considerable response regarding cautionary and counteractive measures by both state and federal administrations to address an uptick in incidence including legislation like the Coronavirus Aid, Relief and Economic Security (CARES) Act and the Coronavirus Preparedness and Response Supplemental Appropriations Act [7]. At \$2 trillion and \$8.3 billion respectively, they were to help expand assessment for COVID-19, vaccine research and PPI procurement [7]. This legislation, particularly the CARES Act, allocated monetary reimbursement to the American public and provided supplemental unemployment payments subsequent to imposed quarantines throughout the country. Aside from legislation, partnerships among constituents of the Department of Health and Human Services (HHS) including: Centers for Disease Control and Prevention (CDC), the National Institutes of Health (NIH), the Biomedical Advances Research and Development Authority (BARDA) and the Department of Defense (DoD) donned Operation Warp Speed in May 2020, in a concerted attempt to develop 300 million doses of efficacious FDA approved vaccines available by January 2021 [1]. As of January 2021, the FDA has approved two vaccines for emergency use to battle the pandemic: co-developed Pfizer-BioNTech and Moderna [8]. Additionally, Operation Warp Speed has been integral in promoting the use of alternative therapeutics against COVID-19 like FDA-approved REGN-COV2, a combination of monoclonal antibodies casirivimab and imdevimab [1].

2. Methodology

Several studies have assessed the association among the COVID-19 pandemic, the pervasiveness of adverse psychosocial stressors encountered by trainees and the detrimental effects on the trainee's well-being regarding GME. Resultantly, these studies indicate that it is imperative to perpetuate the transfiguration of procedures and policies through the Accreditation Council for Graduate Medical Education (ACGME) and subsequent GME constituents of respective residency training programs, as a means to address the negative impact the COVID-19 pandemic has had on post-doctoral training. Prior to the COVID-19 pandemic, there were a plethora of studies that examined physician well-being and welfare including the prevalence of physical and emotional exhaustion that exacerbates burnout, using reliable psychological assessments like the Maslach Burnout Inventory. Nonetheless, the predominance of said studies disregard the post-doctoral trainee population,

particularly throughout a pandemic that poses personal and professional challenges to a previously susceptible practitioner population.

A website search engine was used to assist in the selection of an assortment of studies examining the negative implications the COVID-19 pandemic has had on post-doctoral training pertaining to the prevalence of physician burnout. Scholarly sources such as the National Library of Medicine, particularly the National Institutes of Health, including peer-reviewed literature catalogs like PubMed were used. Keywords used were burnout related to intern, resident, residency, fellow and COVID-19. Additionally, the keywords welfare and well-being were used in relation to the previous specifiers pertaining to post-doctoral trainees. Inclusion criteria included: studies about physician burnout including at least one of its primary symptoms (emotional exhaustion, depersonalization or decrease in personal satisfaction), studies composed using the English language, studies that illustrate empirical results using reliable instruments to measure instances of burnout like the Maslach Burnout Inventory, more specifically the Maslach Burnout Inventory – Human Services Survey for Medical Personnel (MBI-HSS MP) and studies that examined a patient population primarily comprised of post-doctoral trainees (i.e. residents and/or fellows). Exclusion criteria included: studies composed using a non-English language, studies possessing no preset criteria pertaining to physician burnout, studies that disregard the examination of burnout related to residents and/or fellows.

3. What is physician burnout?

Burnout was a term originally defined by psychologist Herbert Freudenberger in a 1974 article titled, “Staff Burnout”, essentially discussing job dissatisfaction precipitated by work-related stress [9]. Physician burnout is defined as a syndrome related to the healthcare profession involving emotional exhaustion, depersonalization or decrease in personal satisfaction [9]. In May 2019, the 11th revision of the International Classification of Diseases (ICD-11) included a more detailed definition

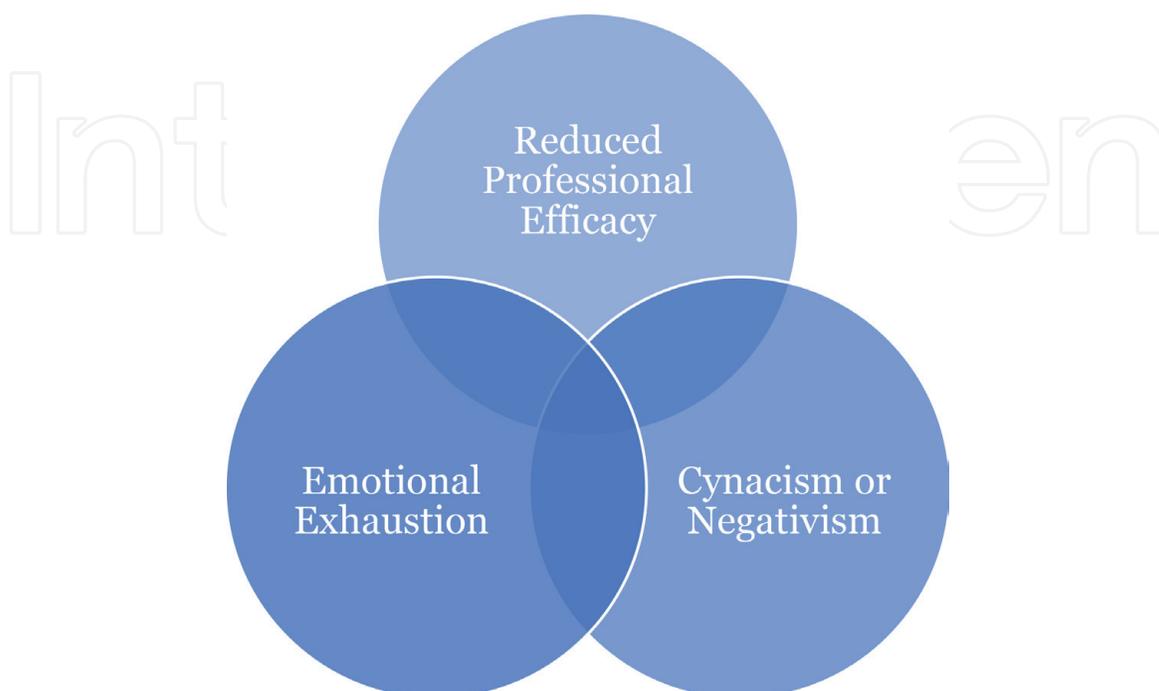


Figure 1.
The 3 domains of physician burnout as adapted from west et al. [10].

of burnout, characterizing it as a chronic work-related syndrome that can be assimilated into the healthcare profession. This definition of burnout incorporates three different domains including: feelings of energy depletion or emotional exhaustion, increased mental distance from one's job or feelings of cynicism or negativism about one's job and reduced professional efficacy [10]. Additionally, the WHO designated burnout not as disorder, rather a phenomenon. Physician burnout correlates to lower patient satisfaction, higher rates of medical errors and malpractice, higher physician turnover and predisposition to substance abuse, addiction and suicide [11]. Presently, the epidemic of physician burnout in the United States is being appreciably addressed in the setting of post-doctoral education to deter the adverse consequences that contribute to the conveyance of substandard healthcare that quite often originates as a resident/fellow and propagates into one's practice as an attending physician (**Figure 1**).

4. Physician burnout in physician trainees before COVID-19

Prior to the COVID-19 pandemic, physician burnout among post-doctoral trainees was becoming immensely problematic with an alarming increase in the prevalence and pervasiveness of this phenomenon. A 2018 excerpt in the *Journal of the American Medical Association (JAMA)* illustrated this alarming increase in physician burnout through two studies. One of the studies surveyed about 3,600 second-year residents and illustrated that approximately 45% of the residents encountered burnout whereas approximately 15% of said surveyed residents regretted practicing medicine [12]. Also, this study indicated a higher prevalence of burnout among physician trainees versus non-healthcare personnel (28.4%). Per the second study included in the 2018 *JAMA* excerpt, 182 articles spanning 1991–2018 surveyed approximately 100,000 trainees in 45 countries in regard to burnout. The prevalence of burnout varied from 0%–81% including emotional exhaustion, depersonalization or negativism, reduced professional efficacy or a combination of all three domains [12]. In contrast, Monsalve-Reyes et al. (2018) demonstrated that a lower prevalence of burnout existed among about 1110 primary care nurses versus their resident trainee counterparts [13]. These examinations exemplify that although burnout is a phenomenon that is able to be encountered by any laboring individual, it is evident that the physician trainees suffer from a higher prevalence of burnout, even in comparison to other individuals involved in healthcare.

Analogous to the COVID-19 pandemic, previous pandemics including the 2009 Influenza A (H1N1) pandemic and the 2014 Ebola Virus Disease (EVD) pandemic, exemplify that an emotional burden exists pertaining to not merely alterations in an individual's behavior, rather predilection to mood disorders. This is consequential of medically managing symptomatic patients infected by a deadly disease and encountering deceased individuals of said deadly disease including the bereavement of deceased individuals in your support system. A 2017 excerpt that examined observers of the Ebola pandemic illustrated that 39% experienced difficulty concentrating on errands, 33% experienced difficulty sleeping subsequent to worry and 5–10% experienced feelings of worthlessness, diminished decisiveness or loss of confidence in one's self [14].

Conversely, this excerpt emphasized the significance of a sensation coined "post-traumatic growth", commonly referred to as PTG. This is defined as a positive change in one's behavior as a result of struggle regarding a major life crisis or trauma [14]. PTG is described as an augmentation in different domains including an increase in appreciation for one's existence and others in addition to an improved sense of closeness and cohesion in interpersonal relationships that is conducive to an individual's ability to contest adversity [15]. This is in opposition to remaining in a disparaging

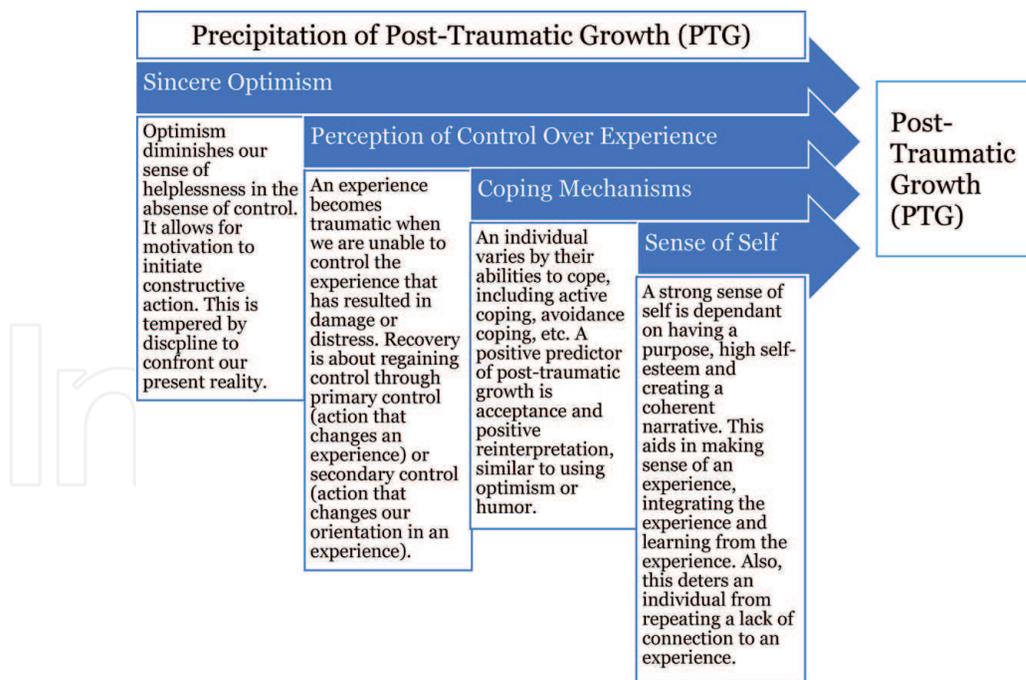


Figure 2.
 The 4 precipitating factors of post-traumatic growth (PTG) as adapted from Godbold et al. [16].

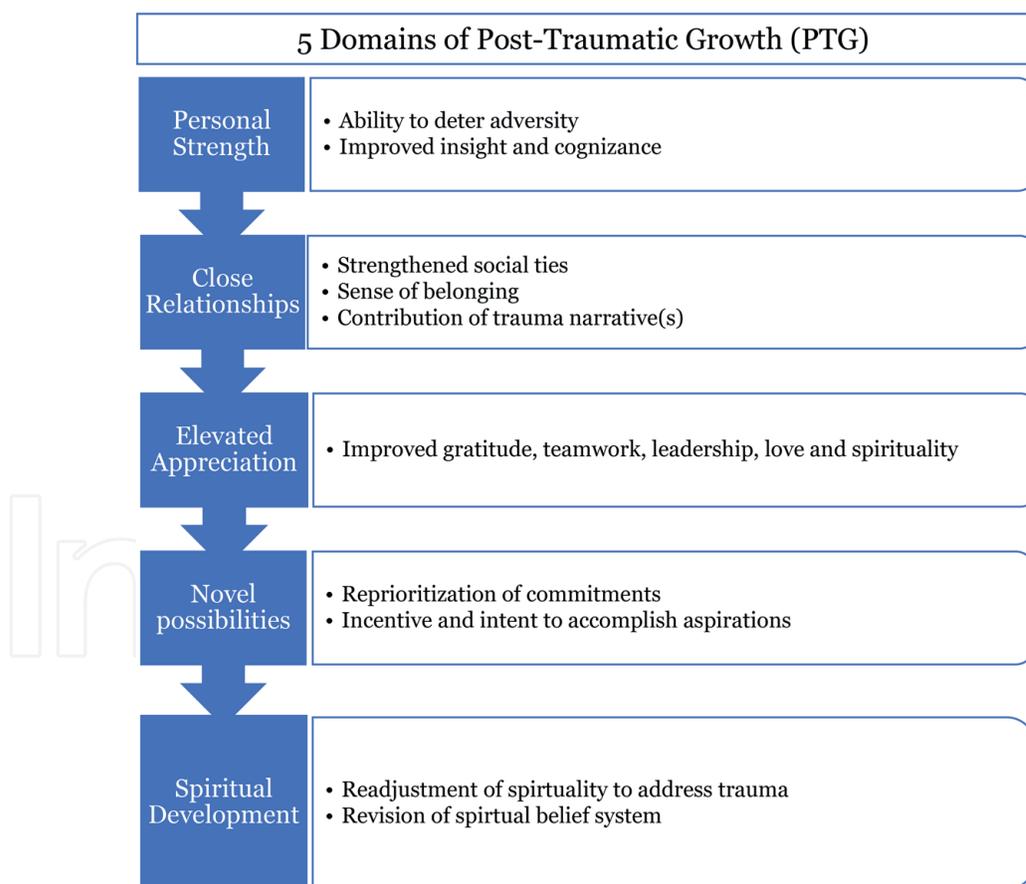


Figure 3.
 The 5 domains of post-traumatic growth (PTG) as adapted from CT et al. [17].

rotation of maladaptive behavior that is common in mood disorders including post-traumatic stress disorder (PTSD). Also, encountering trauma or substantial distress promotes reprioritization of an individual's commitments through incorporating a revision in their spirituality or sense of self [15]. Therefore, additional studies are merited to examine physician burnout and post-traumatic growth pertaining to

adaptive behaviors as opposed to maladaptive behaviors that are routinely recognized in traumatic experiences, particularly amidst a pandemic (**Figures 2 and 3**).

5. Physician burnout in physician trainees after COVID-19

Presumably, the COVID-19 pandemic has presented inimitable challenges to the delivery of healthcare, particularly by post-doctoral trainees in residency and fellowship programs. Post-doctoral trainees are predominantly on the forefront of healthcare to acquire an unmediated, practical proficiency in the practice of medicine in addition to addressing the increasing demand for appropriate healthcare. The COVID-19 pandemic has certainly stimulated an increase in the demand of healthcare as substantiated by the cumulative COVID-19-associated hospitalization rate of 364 hospitalization per 100,000 population through January 2021 in contrast to the hospitalization rate of 4.6 per 100,000 population at the beginning of March 2020, prior to the pandemic [18]. The COVID-19 pandemic has undoubtedly exacerbated the preexisting problem of physician burnout, particularly pertaining to post-doctoral trainees. Several studies have examined the presence of behavioral health ailments like mood disorders including depression, anxiety or stress and diminished satisfaction in their corresponding specialties, corresponding to their particular exposure to COVID-19 versus non-COVID-19 patients. Physician trainees exposed to COVID-19 patients encountered higher prevalence rates of mood disorders like depression (28%), anxiety (22%) and overall stress (29%) compared to their non-COVID-19 exposed peers (26%, 15% and 19% correspondingly) and the ordinary populace (12%, 11% and 11% correspondingly), as illustrated by comparable scoring using the Beck Depression Inventory, Beck Anxiety Inventory and the State-Trait Anxiety Inventory [18]. Exposure to COVID-19 patients increased the prevalence of burnout in physician trainees (46%) compared to 33% in non-COVID-19 patient exposure, as illustrated by examination of physical/emotional exhaustion, interpersonal disengagement (depersonalization) and professional satisfaction, using the Stanford Professional Fulfillment Index (PFI) [19]. Exposure to COVID-19 patients did not contribute to the low professional satisfaction scores pertaining to clinical concerns (25.2% vs. 25.9%) [19].

Aside from an increased prevalence of behavioral health ailments like depression, anxiety or stress and diminished satisfaction in their corresponding specialties, the COVID-19 pandemic has impaired the trainee's ability to achieve a balance between professional and personal responsibilities. Physician trainees were queried about common psychosocial stressors, if applicable, including monetary concerns, childcare and eldercare. Additional queries included ability to take time off and interference regarding a trainee's personal responsibilities. Exposure to COVID-19 patients increased the prevalence of stress related to childcare (62%) versus trainees not exposed to COVID-19 patients (39%), an increased prevalence of inability to take time off (74%) versus trainees not exposed to COVID-19 patients (48%) and interference in personal responsibilities (68%) versus 55% in non-exposed trainees [20]. In comparison, exposure to COVID-19 patients did not contribute to an increase in prevalence of monetary concerns (67% for each cohort) or eldercare (82% for each cohort) [20].

6. Negative impact of COVID-19 pertaining to GME training

Considerable reformation of ACGME/GME policies and procedures pertaining the adverse clinical settings created by the COVID-19 pandemic and physician burnout

have been implemented to mitigate the disadvantages and detriments of physician burnout. The ACGME assigned six core competencies to assure competency-based assessment and specialty-specified milestones include: patient care, practice-based learning and improvement, interpersonal and communication skills, professionalism, systems-based practice and medical knowledge [21]. Historically, these competencies were created to assist not merely in ACGME accreditation of 12,500 corresponding residency and fellowship programs to assure appropriate training of approximately 140,000 trainees, rather to assure that trainees are prepared to address the increasing demands imposed on the healthcare system [21]. This has become increasingly imperative as a result of the COVID-19 pandemic.

Consequential of the increase in demand of healthcare propagated by the COVID-19 pandemic, the ACGME has reiterated the importance of prioritizing the response to the COVID-19 pandemic versus previous GME protocols except appropriate work-hour restraints and resident oversight by attending physicians [22]. This has adversely affected the compulsory volume of patients evaluated by trainees in the inpatient and outpatient settings, including the cancelation of elective procedures. Unfortunately, this has adversely affected proficiency in the practice of medicine derived from pragmatic experience, particularly in specialties that are constructed around procedures. Additionally, trainees have encountered instances of reassignment to assist in the delivery of COVID-19 related medical management, often outside the realm of one's specialty of study and concurrently in the pervasive presence of a shortage of personal protective equipment (PPE) [22]. Although this allows for diverseness in experiential education, the uncertainty of resident rotations including electives and reassignment to the forefront of the pandemic lessens experiences in a trainee's respective specialties. The archetypical medical lectures and symposiums have undeniably been susceptible to the COVID-19 pandemic because of the present CDC's suggestions to abandon in-person instruction. Therefore, transitioning post-doctoral training to adhere to the requirements for distance learning has required innovative implementation to diminish the disruption to medical education delivery and sense of comradery that comes from socialization.

7. GME implementations pertaining to the COVID-19 pandemic

The response of the ACGME and related GME programs has been rapid and robust to avoid an abrupt deterioration in the educational experiences of post-doctoral training that is of the utmost importance to develop adept practitioners. This response has been aimed at numerous stages of medical education, extending from forgoing ACGME activities regarding accreditation of training programs to the preferment of telemedicine and virtual video conferencing to continue instructive endeavors [21]. Regardless of the stage of response, the commonality among said responses subsists in adequately addressing the preservation of the trainee's educational experience derived from the appropriate medical management of patients using an attentive albeit cautious approach. Remarkably, this approach has had the inherent ability to be altered in relation to the uncertainty to the COVID-19 pandemic.

In an attempt to assure proper patient care and mitigate institutional challenges imposed by the COVID-19 pandemic, the ACGME delayed the direct surveyal of sites including accreditation and clinical learning environment review (CLER) [22]. The ACGME has deferred the assessment of a post-doctoral trainee's proficiency to the program director and Clinical Competency Committee (CCC) because of the adversely affected compulsory volume of patients evaluated in inpatient and

outpatient settings in addition to the reassignment of trainees to assist in the medical management of COVID-19 patients [21]. Likewise, the ACGME deferred the determination of a trainee's capability to practice medicine unsupervised, indicated through completion of their residency training program, because of rotation resignation [21]. The ACGME and corresponding GME programs have increasingly implemented telemedicine including the redefining of "direct supervision" as the supervising physician and/or patient not being physically present with the trainee, consequential of concurrent patient care by the supervising physician and trainee through telecommunication [23]. The transition of post-doctoral training from in-person education to telecommunication for educational instruction has required innovative implementation to diminish the disruption to medical education delivery and sense of comradery that comes from socialization. Irrespective of the integral role of telecommunication in patient encounters or in-person conferences, adherence to 80 hours of clinical and education work per week, the maximum of every third day call and the minimum of one day per seven days free of clinical duties approximated over four weeks, including the reception of appropriate training regarding PPE, is compulsory to preserve proper work-hour restraints and oversight [23].

The transfiguration of GME policies and procedures in the setting of adverse clinical conditions imposed by the present pandemic has concentrated on trainee well-being to contest physician burnout. The ACGME has created coalitions with the National Academy of Medicine (NAM) to create the 'Action Collaborative on Clinician Well-Being and Resilience' in addition to promotion of their 'AWARE' program to promote well-being, mitigate the adverse effects of psychosocial stressors encountered in training and prevent burnout by-and-large [21]. Particular to the COVID-19 pandemic, the 'Well-Being in the Time of COVID-19' guidebook contains responses to illness and death due to COVID-19 by incorporating six strategies to promote well-being including: optimizing a challenging working and learning environment, promoting connectedness, building skills and mindsets, providing virtual resources for well-being support, identifying and assisting residents and fellows in distress and delivering coordinated crisis planning and management [24].

Numerous institutions have implemented Stanford's WellMD Initiative to disseminate positive transformations at the GME level. Created in 2015, this initiative discusses a culture of wellness including behaviors, attitudes and values that promote self-care, organizational responsibility regarding value of time and energy in clinical practice and personal resilience regarding behaviors and attitudes that contribute to personal well-being [25]. Initiatives like the aforementioned have advocated for added examinations of different interventions to diminish the extensiveness of burnout in the healthcare setting. A 2017 study by Busireddy et al. illustrated that a reasonable decrease in ACGME duty hours improved emotional exhaustion and burnout, evident by 42% lower odds of the percentage of residents reporting high levels of emotional exhaustion (OR = 0.59; 95% confidence interval 0.45–0.79; $P < 0.001$) [26]. A 2019 study by Spinelli et al. illustrated that interventions predicated on mindfulness possessed moderate effect on anxiety (Hedge's $g = 0.47$), depression (0.41), psychological distress (0.46) and stress (0.52) [27]. Small to moderate effects were present for burnout (0.26) and well-being (0.32) [27]. Therefore, there is substantiating evidence that cognitive and behavioral interventions on personal and institutional levels ideally lessen the severity of trainee burnout. An abundance of GME programs have adopted the application of wellness interventions into their curricula like St. Luke's University Health Network lifestyle medicine. Lifestyle medicine integrates positive transformation in an individual's nutrition, physical activity and coping mechanisms to lessen the precipitating and perpetuating factors that worsen physician burnout (**Figure 4**).



Figure 4.
The Stanford wellness framework as adapted from Stanford medicine et al. [28].

8. Conclusion

The ACGME and corresponding GME programs have afforded analogous post-doctoral trainees an ability to retreat from the pervasiveness of adverse psychosocial implications the COVID-19 pandemic has inflicted on this susceptible practitioner population. Through policies that promote enhanced well-being and an increased emphasis on behavioral interventions that endorse resilience, precipitated behavioral health ailments including depression and anxiety, diminished satisfaction and an impaired ability to achieve balance between professional and personal responsibilities have been dissuaded. Likewise, cautionary and counteractive measures have been endorsed by both state and federal administrations through enacted legislation, assuring that there has been a dynamic response to deter inconducive clinical settings regarding medical education. Additional examinations are essential to assess the advancement and application of present ACGME/GME approaches that address post-doctoral trainee burnout, irrespective of the avail present-day approaches have had on administrative and clinical levels. Notably, added examinations are essential to assess the awareness and implementation of resiliency training targeting the medical school and medical student population prior to their progression into post-doctoral trainees. Seeing as the consequences of the COVID-19 pandemic are continuous and noticeably apparent through the lapse of time, supplementary study is necessary in the presence of an unresolved pandemic.

Conflict of interest

The authors declare no conflict of interest.

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