Helping the Distressed Clinician by Identifying and Treating Burnout

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Abstract

The focus of this article is on clinician burnout, which is characterized by emotional exhaustion, depersonalization, and diminished personal accomplishment. One goal is to provide a comprehensive but brief overview on burnout, including its prevalence among physicians in the United States and Canada, the ways it was impacted by the COVID-19 pandemic, relevant neurobiological and neurochemical associations, its relationship to depression, the known drivers, and diagnosis. Another goal is to review specific evidence-based interventions that have the potential to attenuate chronic stress and burnout, and which may help to prevent burnout altogether. The timing is urgent for such interventions with the goal of enhancing resilience, so clinicians recover from burnout and do not become repeat burnout customers.

Introduction

Neil Young is credited with saying in one of his brilliant songs, "It's better to burn out than to fade away." Though this may have some value and cachet in the world of rock and roll, no clinician would tell anyone that their burnout was preferable over a contented and productive working experience. Burnout is a brutal psychological syndrome consisting of exhaustion, cynicism, and workplace inefficiency.[1] A state of exhaustion is characterized by feeling "overextended and depleted of one's emotional and physical resources."[1] Cynicism refers to a "negative, callous, or excessively detached response to various aspects of the job."[1] Inefficiency refers to feeling incompetent at work with an associated "lack of achievement."[1] An updated definition of burnout has since renamed the three aforementioned key dimensions to that of emotional exhaustion, depersonalization, and diminished personal accomplishment.[2]

Burnout is clinically significant due to all sorts of cascading effects that result from this uncomfortable, detached, and exhausted way of existing within one's place of work. Clinicians care deeply about their work, usually involving some combination of training and/or mentoring students and fellow professionals, and most importantly, caring for patients. When burnout makes its presence known, it becomes nearly impossible to shoulder the burdens of work and patient needs amidst the unending demands of trying to stay afloat while the ship (i.e., the burned-out clinician) is literally sinking in despair, or has unfortunately sunk.

This paper reviews the prevalence, neurobiology, neurochemistry, drivers (i.e., causes and consequences), diagnosis, and management of burnout as it relates to clinicians. Most of the burnout research cited in this paper comes from studies on physicians, and/or is related to the work that physicians do.

Prevalence

Evidence suggests that burnout is a unique clinician experience resulting from multiple influences (i.e., both positive and negative) that emanate from the workplace environment.[3] The highest rates of physician burnout in the United States (US) happen among emergency medicine physicians, with the lowest rates among physicians working in preventive medicine/occupational medicine.[3] The overall mean rate of burnout (i.e., as assessed by having 1 symptom of burnout, such as scoring high in emotional exhaustion or scoring high in depersonalization as per the 2-item Maslach Burnout Inventory/MBI) among US physicians increased from 45.5% in 2011 to 54.4% in 2014.[4] During this same timeframe, physician satisfaction from work-life balance (WLB) declined from 48.5% in 2011 to 40.9% in 2014.[4] By contrast, when burnout was assessed among employed nonphysicians in the US, the overall mean rate of burnout was 28.6% in 2011 and 28.4% in 2014.[4] WLB among employed nonphysicians in the US increased from 55.1% in 2011 to 61.3% in 2014.[4]

More recent data has shown that the mean rate of burnout among physicians (i.e., as assessed by having 1 symptom of burnout as noted earlier) decreased to 38.2% in 2020 compared to 43.9% in 2017, 54.4% in 2014, and 45.5% in 2011.[5] This same 2020 dataset showed that satisfaction from work-life integration (WLI), a reengineered term to describe WLB, was 46.1% among physicians.[5] Based on these results, the mean burnout rate among US physicians compared to the general population is markedly greater, while WLI (or WLB) is markedly lower.

In Canada, the 2018 Canadian Medical Association National Physician Health Survey aggregated data from different residency and medical specialties and different settings (e.g., hospital, private office/clinic, academic, and administrative/corporate office).[6] The same burnout assessment tool that was used to generate the US data – i.e., the

2-item MBI – was also used to assess burnout among Canadian physicians. Unlike the US data, the Canadian data did not compare physician burnout and WLI to that of employed nonphysicians in Canada. In aggregate, the overall physician burnout rate was 30%. The report showed that some 32% of females and 27% of males met criteria for burnout. Some 38% of residents met criteria for burnout compared to 29% of physicians. The highest rates of burnout were among physicians in family medicine/general practice (32%) with the lowest rates among physicians holding administrative positions (19%). Similarly, physicians working in administrative/corporate offices had the lowest rates of burnout (25%) whereas physicians working in their own private offices/clinics had the highest rates of burnout (31%).

How did the global COVID-19 pandemic influence burnout? The US data showed that in the first 6-9 months of the pandemic, the mean rate of physician burnout decreased and WLI increased compared to prior years.[5] However, physicians working in specific areas in the US that were considered geographic hot spots early in the pandemic experienced acute stress, as documented in several studies (see p.502 for the specific studies).[5] The drivers of increased occupational stress during this time period included high case volumes, working outside of one's specialty, providing care without adequate personal protective equipment, and managing patients before effective COVID-19 treatments had been established.[5] In fact, symptoms of burnout – namely, emotional exhaustion and depersonalization – among US physicians working in medical specialties directly impacted by the pandemic "did not improve…even as these measures of burnout improved for physicians as a whole."[5] In fact, the rates of burnout during the first year of the pandemic increased over time among 4 of 5 US frontline medical specialties, with the most significant increases among hospitalists and primary care respondents.[7]

In Canada, preliminary data from a survey by the Canadian Medical Association conducted in November 2021 showed that "more than half of physicians and medical learners (53%) have experienced high levels of burnout."[8] This same report noted that almost half of Canadian physicians (46%) have considered reducing their workload in the next two years, which would have considerable impacts upon the Canadian healthcare system already burdened by access to care issues. The same survey found that 59% of physicians indicated that their mental health worsened since the pandemic began due to increased workload, lack of WLI, abrupt policy/process changes, as well as other issues. The survey also noted that some 47% of physicians reported reduced levels of social wellbeing. In the Province of Ontario, a survey of physicians identified that 29% reported high levels of burnout prior to the pandemic.[9] By March 2021, the same survey noted that the rate of burnout increased to 34.6% among Ontario physicians.

For some physicians, the pandemic increased a sense of meaning and purpose in their work, which had attenuating effects on burnout during the early stages of the pandemic.[5] For other physicians, however, the pandemic not only caused burnout but also moral injury.[10] Moral injury happens when events directly infringe upon physicians' moral convictions, such as what happens when managing medical decisions in the unfamiliar territory of a pandemic. Physicians had to tell loved ones that they couldn't attend the bedside of their dying relatives or attend the births of new relatives. Physicians had to endure considerable stress by determining who would receive life-saving treatments and, for non-COVID patients, having life threatening conditions in whom care would be delayed. These types of moral injuries added considerable psychological burdens to physicians who never could have imagined facing these types of restrictions and complications in the delivery of the medical care they provide.

Neurobiology

There seems to be a strong association between chronic stress and burnout. Chronic stress broadly refers to "ongoing demands that threaten to exceed the resources of an individual in areas of life such as family, marriage, parenting, work, health, housing, and finances."[11] Chronic stress invokes a "pathological state that is caused by prolonged activation of the normal acute physiological stress response, which can wreak havoc on immune, metabolic, and cardiovascular systems."[12] Burnout invokes a similar pathological state characterized by dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis and immune function.[13] Burnout appears to be a consequence of chronic stress that is particular to one's job and work environment. It has been described as a "cumulative stress reaction to ongoing occupational stressors."[1]

Allostasis refers to biological adjustments that allow an individual to adapt to particular challenges.

When experiencing burnout, a person's allostatic systems would be persistently activated. Allostasis, coined by Sterling and Eyer,[14] refers to biological adjustments that allow an individual to adapt to particular challenges that happen over the lifespan. Adapting to such challenges demands the synchronous though non-linear activation of many different physiological processes, such as neural, neuroendocrine, and neuroendocrine-immune mechanisms.[15] Allostasis begins in the brain and happens or is instigated by how an individual perceives and interprets any given situation. Allostasis is about adaptation, but the physiological adaptations may not ensure survival because they can become deleterious over time and cause irreversible damage. Thus, each person's allostatic responses are unique and depend on (1) "how the individual perceives and interprets the situation" and (2) "the condition of the body itself."[15]

Allostatic load (AL) represents a state when the aforementioned physiological adaptations become deleterious, as happens from repeated allostatic responses during stressful situations.[16] This happens when an allostatic system fails to habituate to the recurrence of the same stressor, fails to shut off following overwhelming stress, and/or whose response is deficient resulting in heightened activation of other, normal counter-regulatory systems.[15,17] If, for example, an individual perceives something as chronically stressful and has not been able to habituate to it (i.e., they lack adequate proactive planning skills and

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psychological buffers), then they won't be able to shut-off their allostatic response, and this would likely accelerate brain aging and organ pathology. Additionally, if the condition of the body itself is further challenged by poor physical health and an unstable physiology, the individual would be more vulnerable to AL, which sets in motion problems such as hypertension, obesity, diabetes, atherosclerosis, inflammation, exaggerated autoimmune responses, neuronal atrophy and even neuronal death.[15] Allostatic overload (AO) is accordingly an extension of AL, and describes the result of allostatic responses that lead to irreversible damage to body organ systems (i.e., pathology), and/or mental disorders (i.e., diagnosable mental illness). Burnout ought to be considered a specific and persistent work-related state associated with AL and AO, with accompanying psychological distress signals of emotional exhaustion, depersonalization, and diminished personal accomplishment.

Neurobiologically, when an individual is faced with uncertainty arising from chronic stress and has not been able to habituate to a persistent stressor (or a persistent set of chronic stresses), specific areas of the prefrontal cortex (PFC) activate the anterior cingulate cortex (ACC).[18] The ACC "assesses the degree of uncertainty about whether future outcomes are uncertain."[18] The PFC "governs high-order reasoning, social cognition, and complex decision-making, including the integration, ceptualization, and critical evaluation of information."[19] In situations when the degree of uncertainty about future events cannot be reconciled, the PFC activation of the ACC triggers the amygdala – to initiate a stress response – followed by the release of norepinephrine.[18] This leads to a hypervigilant state, and the simultaneous activation of the sympathetic nervous system, leading to increased glucose for energy utilization due to the high metabolic demands of the brain. There is also activation of the HPA axis leading to increased cortisol output, which plays a vital role in synaptic plasticity and learning after stress.[18] The released cortisol passes through the blood-brain-barrier and binds to glucocorticoid receptors in the amygdala, hippocampus, and PFC.[18]

Activation of these neurobiological processes leads to feelings of threat and loss of control, concomitant with damaging alterations to brain architecture within the amygdala, hippocampus, and PFC. Specifically, the neuronal dendrites housed within the hippocampus and PFC shrink, become shorter and less branched, and these changes result in diminished synaptic output.[17] These changes further compromise an individual's "capabilities for nuanced cognitive function, memory and self-regulation."[17] The same type of chronic stress causes an expansion of dendrites and increased synaptic input to an area of the amygdala known as the basolateral amygdala, which results in heightened anxiety, aggressiveness, and vigilance.[17] These changes result in more bottom-up control via the ACC-amygdala complex, and compromised emotional regulation since the PFC is unable to exert effective top-down control.[18]

The neurobiology of burnout appears to be similar to the neurobiology of chronic stress. In an article on physician distress and burnout, Amsten and Shanafelt review various neurobiological implications.[19] They described how significant fatigue (e.g., from sleep deprivation) and uncontrollable stress severely impacts the functionality of the PFC, with a corresponding weakening of its higher-order functions, rendering the PFC to go "offline." They noted an association between sleep deprivation and "impairments in PFC metabolic and physiologic activity correlating with cognitive deficits." They also noted that uncontrollable stress leads to high levels of norepinephrine and dopamine being released within the brain, which diminishes PFC function, subsequently impairing cognitive functions, and causing the PFC synaptic connections to atrophy. On the other hand, the high levels of norepinephrine and dopamine that get released in situations of uncontrollable stress, strengthen (i.e., expand) the synaptic connections of the amygdala, striatum, and brain stem, which undermines emotional regulation. When there is effective top-down control, the PFC can sustain important work-related tasks by inhibiting the stress response and maintaining an optimal neurochemical environment. However, when the PFC goes offline, as suspected in burnout, the ensuing PFC dysfunction results in poor top-down control, and an increased probability for medical error and/or unprofessional (i.e., more disinhibited) behavior (Table 1).

Neurochemistry

A comprehensive 2019 narrative review was unable to show consistent HPA axis findings – i.e., involving measures such as the cortisol awakening response, morning cortisol, diurnal cortisol variation, daytime/evening cortisol, 24-hour urinary free cortisol, and others – among individuals with burnout (for further information, refer to "Table 1 Summary of HPA axis findings in clinical and non-clinical burnout," p. R151).[20] Testing that assesses how individuals with burnout respond to acute stress might eventually yield more convincing and stable neurochemical differences as opposed to measuring "resting state hormonal levels."[20] Similarly, studies that evaluated burnout and immune function were unable to find reproducible and discernable patterns of clinically relevant immune system changes among individuals with burnout.[20]

A couple of studies are worth discussing, however, since the results suggest that some neurochemical findings could be predictive of burnout, and relate to clinically significant burnout symptoms. In terms of burnout prediction, a study

Table 1. Burnout and the Consequences of Dysfunctional PFC Top-Down Control
*Adapted from: Arnsten, A., & Shanafelt, T. (2021, p.766).[19]

PFC Dysfunction	*Consequences*
Forgetful, limited "concrete" thinking	Increased probability for medical error
Poor concentration, disorganized	Challenges when managing complex tasks
Diminished decision-making	Poor patient care, medical errors
Limited insight, poor judgment, and impaired moral conscience	Lack of professionalism
Reduced empathy and compassion fatigue	Communication problems with patients and coworkers
Diminished optimism and drive	Cynicism and reduced work engagement
Reduced self-regulation and increased disinhibition	Greater chances of acting unprofessionally toward others

assessed hair cortisol changes among 372 adult healthcare workers from Quebec, Canada.[21] The participants completed questionnaires, such as the 2-item MBI, and other questionnaires that evaluated anxiety, depression, and PTSD symptoms. The participants were also sent validated instructions to self-collect hair samples that were used to measure cortisol. From the 6 cm samples of hair that was collected, it was possible to calculate the relative changes in cortisol 3 months before the COVID-19 pandemic and three months after the COVID-19 pandemic started. From a sample of 367 healthcare workers, 50.4% had symptoms of burnout, as defined by emotional exhaustion or depersonalization. The hair cortisol increased at the start of the pandemic (i.e., with a median relative change of 29%; p<0.0001), with 2.6 times more odds of burnout (p=0.002), and resulting in 59.6% of healthcare workers having burnout at that time. There were no associations between changes in hair cortisol and symptoms of PTSD, anxiety, and depression. The results of this study showed that changes in hair cortisol was predictive of burnout at three months among healthcare workers after the onset of the COVID-19 pandemic. With respect to clinical applicability, the results supported the use of hair cortisol as a possible screening tool to identify clinicians at high-risk for burnout when confronted with a significant stressor (or set of stressors).

Here is an important study that evaluated the relationship between brain-derived neurotrophic factor (BDNF) and burnout.[22] BDNF is an essential neurotrophic factor found in the human brain and participates in a myriad of functions, such as neuronal growth and proliferation, synaptic neurotransmission, and neuroplasticity.[23] The study compared 37 participants with burnout and 35 healthy controls.[22] Many different samples of various analytes (i.e., serum cortisol, serum BDNF, and others) were taken to assess HPA axis function between the different groups. Statistically significant differences were found between the means level of serum BDNF in both groups (p=0.005), such that the burnout group had a lower mean serum BDNF level (88.66±18.15 pg/ml) than the healthy controls (102.18±20.92 pg/ml). The results showed associations between burnout and emotional exhaustion (p=0.05), depersonalization (p=0.005), and depression p=0.025). In fact, depression (odd's ratio: 0.722; p<0.001) was the most salient factor in distinguishing the burnout participants from the healthy controls. Serum BDNF levels correlated negatively with emotional exhaustion (r=-.268; p=0.026) and depersonalization (r=-.333; p=0.005), and correlated positively with personal accomplishment (r=.293; p=0.015). Based on these results, it was proposed that stress may downregulate the production of BDNF within the hippocampus and reduce the amount produced, which would increase the vulnerability for neuronal damage to take place along with increased clinical symptoms of burnout. In other words, the "low BDNF levels in burnout might be related to the concentration-memory problems and mood symptoms often observed in burnout syndrome."[22]

Could hair cortisol measurements and serum BDNF levels be used to assess and/or predict burnout? I believe there is some utility in measuring these neurochemical biomarkers when managing patients at risk, or patients suspected of having burnout. If, for example, a patient presents with significant occupational stress, but they appear to be coping sufficiently, measuring hair cortisol and BDNF could serve as helpful baseline metrics, which then could be remeasured over time as treatment is instituted to encourage allostasis, and to safeguard against burnout. Alternatively, if a patient presents with burnout, capturing measurements of hair cortisol and serum BDNF could be helpful in determining how biologically impacted the patient is. In this situation, the hair cortisol would likely be increased and the serum BDNF likely decreased, which would be modifiable and potentially reversible with effective treatment.

Is Burnout a Specific Form of Depression?

In an editorial by Meier, the similarities between burnout and depression were described.[24] He noted that measures of burnout correlate strongly with measures of depression. An earlier cited study in this paper showed associations between burnout and emotional exhaustion, depersonalization, and depression.[22] Given the fact that there is strong overlap between burnout and depression, some researchers have put forth the argument that burnout should be redefined as occupational depression.[25] One of the main reasons for this consideration comes from data on a construct known as negative affect (NA). NA "refers to emotions experienced as unpleasant or aversive."[24] Thus, "burnout is NA situated in the workplace, experienced as a result of chronic stress."[24] In a review of studies spanning several decades, correlations between NA and burnout/depression yielded an overall effect size of 0.492, and among people that were older and had worked for longer periods of time, the effect size increased to 0.535.[26]

There are also neurobiological and neurochemical similarities between major depressive disorder (MDD) and burnout. In MDD, chronic stress leads to impairment in PFC function, an overactivated amygdala resulting in more fear-based or bottom-up control, and a concomitant downgrading of hippocampal functioning.[27] Some of the common features of MDD, such as neurocognitive impairment, withdrawing from aversive environments, and anhedonia are linked to these brain circuit issues.[27] Likewise, in burnout there is PFC dysfunction, neurocognitive impairment, and strengthened fear-based synaptic connections.[19] In MDD, chronic stress results in low levels of serum BDNF due to hippocampal alterations.[23] In burnout, chronic stress also leads to low levels of serum BDNF presumed to result from hippocampal alterations.[22] Though burnout will continue to be studied as a separate psychological syndrome from depression, it seems very likely and probable that it could be understood as a unique form of depression that happens or is situated within the work environment (Table 2).

The Drivers and Consequences of Burnout

The symptoms of burnout mentioned earlier – i.e., emotional exhaustion, ➤

Table 2. Similarities between Burnout and Depression

	Burnout	*MDD*
Personality	↑ NA	↑ NA
Neurobiology	↓ PFC Function	↓ PFC Function
	↑ Amygdala Activity	↑ Amygdala Activity
Neurochemistry	↓ Serum BDNF	↓ Serum BDNF

depersonalization, and diminished personal accomplishment – result mostly from the clinician's chronically stressful work environment, and less from the personal characteristics of the individual clinician.[28] In the subsections below, the more salient drivers and consequences of burnout are described and have also been summarized in Table 3.

Occupational Factors. Physicians that work more than 50 hours per week were noted to be at the highest risk of burnout, while working over 40 hours per week also increases the risk of burnout.[28] When physicians spend less than 20% of their time on activities that they deem most meaningful, the rate of burnout almost doubles.[28] This latter point refers to an "imbalance between time spent on satisfying and less satisfying aspects of work."[2]

Other occupational factors include a lack of control concerning work conditions and decision-making; time pressures linked to physicians' perceptions that productivity is what they are valued for; and a "chaotic and inefficient work environment" forcing physicians to be overburdened by clerical and other tedious tasks.[3] These factors result in a loss of autonomy for physicians, along with more micromanaged practices; all of which are major causes of burnout.[3]

In addition to loss of autonomy, the term "asymmetrical rewards" happens when productivity is more valued than quality of care.[3] When physicians do the work that is expected of them, they receive very little positive feedback for doing their jobs. However, when mistakes happen, even serious mistakes in which a patient is harmed, the "negative consequences are immediate, painful, and expensive."[3] As is generally known, bad outcomes become the subject of analysis at morbidity and mortality conferences.[3] In some instances, public reporting (i.e., due to regulation) may be necessary, which can result in malpractice lawsuits, obscuring and in some cases obliterating a physician's "consistent record of high-quality performance."[3]

With micromanaged practices, as noted above, every decision a physician makes has to be weighed against available limited resources (i.e., "opportunity costs").[3] This type of decision making process results in "cognitive scarcity" – which undermines cognitive performance while also increasing burnout – i.e., as happens when physicians need to place the goals of healthcare organizations over the needs of patients.[3] When the goals of the healthcare organization force physicians "to constantly consider the opportunity costs of each of the hundreds of clinical decisions made each day for their patients" this will invariably "consume their available time and lessen their ability to solve problems for their patients."[3]

Management of the electronic health record (EHR) also contributes significantly to burnout,[2] largely due to the negative impacts arising from regulatory compliance and reimbursement requirements.[28] The EHR consumes a significant proportion of a physician's time during the day (i.e., consuming 49.2% of daily time in one study,[29] and more than half of their workday in another study[30]). The EHR also consumes time outside of regular clinic hours (i.e., 1-2 hours in one study,[29] and 1.4 hours in another study[30]).

Another occupational factor that drives burnout is that of insufficient sleep. Close to 50% of physicians report that long working hours result in inadequate sleep.[28] This contributes to burnout by reducing energy reserves and activating the HPA axis resulting in increased amounts of stress.[28]

All of the aforementioned occupational factors lead to significant challenges with WLI noted earlier. This contributes to physicians being more unhappy compared to the general population.[2] Women physicians are more likely to be adversely impacted by WLI problems, most notably in the early stages of their career.[2]

Medical Culture. There are several salient factors, particular to the medical culture, that seem to play a role in burnout. One factor is that of presenteeism since taking any time away from work is seen as detrimental to colleagues and patients.[28] Another factor involves hiding weaknesses since any illness – whether physical or mental – are problems that physicians will often keep private though they usually "continue to work at less than their full capacity or find other ways to hide their illness."[28] Above all, maladaptive behaviors are embedded in medical culture and get reinforced during medical education, and in healthcare organizations through what has been called the "hidden curriculum."[2] This is an implicit way of modeling maladaptive behaviors – i.e., even unprofessional and unethical behaviors – that get perpetuated and passed on during the early years of medical training and beyond.[2]

Another shift in medical culture that has influenced burnout is that of evidence-based medicine (EBM). EBM is a factor in burnout among seasoned physicians whose work may be discredited by relying on "intuition and unsystematic clinical experience."[28] In fact, medical knowledge doubles every 73 days, making it very stressful for all physicians regardless of clinical experience to keep pace "with the rapidly changing medical literature and new technologies."[3] This adds considerable stress to the work that physicians do because the public demands them to "have the latest knowledge at their fingertips, to be able to reliably offer them the best treatment, and never make mistakes."[3]

Interpersonal Factors. The sheer challenges associated with gaining acceptance into medical school, then completing the rigorous education, residency training and beyond has created an emblematic "survival of the fittest" way of life.[28] This leads to competitiveness that can be subtle or inconsequential, or can evolve to outright bullying. Some 40% of physicians have reported bullying between colleagues of the same rank, or between colleagues of different ranks.[28] Regrettably, bullying has had more detrimental impacts upon female physicians and has links to burnout and suicidal thoughts (e.g., as noted in a study of female surgical residents[31]), and maybe even suicide itself. There may be associations between burnout and female suicides due to accumulated stress that results when they have been mistreated, humiliated, and intimidated.[28]

Personal Factors. Most physicians that seek out a career in medicine have perfectionistic traits, a keen sense of responsibility, and are usually altruistic.[28] Perfectionism can lead to micromanagement, inadequate delegation, and marked self-criticism, which is often associated with anxiety, depression, and burnout.[28] Altruism or a selfless "hero mentality,"[2] though noble, can become pathologic for some physicians that consistently "go beyond the call of duty."[28] This additional burden of feeling responsible can result in

negative outcomes for both patients and "even the physicians themselves."[28]

There is also something known as "second victim syndrome" that happens to physicians when an unexpected or even an expected adverse patient outcome happens.[28] Some physicians also have greater proximity to death and dying compared to other physicians, which can result in "secondary traumatization," compassion fatigue, added stress, and burnout.[2] Whether work results in "second victim syndrome" or "secondary traumatization," these experiences can lead to a myriad of symptoms, such as fatigue, sleep problems, increased heart rate, and ongoing suffering, as well as adverse personal and professional consequences.[28]

Diagnosing Burnout

To determine if a patient has burnout, a comprehensive history of their work-related stress is necessary. When asking about their work environment, perform an inventory of all the different factors (as noted earlier) that could be causing their stress levels to increase. Learning about their eating, sleep schedule, work and personal relationships, exercise type and frequency, and even bowel function are all important. Completing a mental status evaluation is essential since symptoms of anxiety and depression are often comorbid with burnout.[32-34] Inquiring about how they have been coping – what resources have been accessed (e.g., employee assistance programs), what treatments they are currently taking or have tried (e.g., prescribed medications, natural health products), and what therapeutic lifestyle choices (TLCs) they have or are engaged in (e.g., exercise, diet, and meditation) – are all important.

It is preferable that some type of validated burnout questionnaire/instrument is used to quantify burnout symptoms, including the frequency and/or severity. A simple method to use could be the 2-item MBI that was described earlier. This 2-item method addresses the domains of emotional exhaustion and depersonalization, compares very well to the full MBI, and has essentially the same ability to identify burnout.[35] For emotional exhaustion and depersonalization, the questions that are asked include "I feel burned out from my work" and "I have become more callous toward people since I took this job," respectively. Each domain-associated question is then scored on a seven-point Likert scale (0-6). If the score is greater than 3 for any of the questions, meaning that the frequency is at least once each week or more, this meets the definition of burnout.[36]

As an alternative, the Oldenburg Burnout Inventory (OLBI) could be used, as it is also psychometrically validated.[37] This scale evaluates two dimensions of burnout, i.e., exhaustion and disengagement, and can be used in any setting regardless of occupation. There is also a "Burnout Self-Test" that assesses burnout more informally. This test has not been psychometrically validated and should not be used as a diagnostic tool.[38] It may still provide useful information when working with patients that seem vulnerable to burnout.

In terms of finalizing the diagnosis, referring to the definition of burnout, as described in the 11th Revision of the International Classification of Diseases (ICD-11), may prove to be helpful.[39] Though it is not considered a medical condition, burnout is found within the chapter, "Factors influencing health status or contact with health services," and is defined as "a syndrome conceptualized as resulting from chronic workplace stress that has not been successfully managed." The ICD-11 characterizes burnout by the following three dimensions: Feelings of energy depletion or exhaustion; Increased mental distance from one's job, or feelings of negativism or cynicism; and reduced professional efficacy. It must specifically refer to "phenomena in the occupational context and should not be applied to describe experiences in other areas of life." The clinician should review all of the information gathered, including scores on any burnout questionnaire/instrument, and integrate the ICD-11 criteria, when considering a diagnosis of burnout.

Management of Burnout

There is much that healthcare organizations can do to lessen the triggers of burnout and reduce its overall incidence. The reader is recommended to review these specific references for more information on what can be done from a macro, or systems-wide level to mitigate and manage burnout.[3,28,40,41] My own experience has unfortunately revealed that most organizations do very little to mitigate burnout other than offering help through employee assistance programs, perhaps free weekly meditation (or free access to meditation apps), or other services. I can certainly appreciate the complexity, costs, and challenges required to restructure healthcare organizations to realistically attenuate burnout. I suspect that the short-term challenges and associated costs would be high, but the long-term organizational gains would be potentially tremendous. As such, the focus of this section will be on what individual clinicians can tangibly do to help themselves when confronted with a chronically stressful work environment. It is rather obvious that to assist with chronic work stress, eating well, getting plenty of exercise, taking sufficient breaks, proper WLI, and sufficient sleep would be necessary. All clinicians are fully aware that these work modifications and TLCs are essential when moderating stress and mitigating burnout. Less well known are specific treatments that have been shown in clinical studies to attenuate chronic stress (i.e., a known precursor to burnout) and to even target some specific symptoms of burnout.

Micronutrient Treatment Options

Chronic stress adversely impacts micronutrient concentrations, leading to micronutrient depletion, for the following reasons:

1. Redistribution of micronutrients from tissues and organs to blood, or vice versa;

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Table 3. Drivers and Consequences of Burnout

Factors	*Consequences*
Occupational	• Time pressures • Less satisfying work • Asymmetrical rewards • Cognitive scarcity • EHR demands • Insufficient sleep
Medical Culture	• Presenteeism • Hiding weaknesses • Maladaptive behaviors • EBM demands • Expectations of knowing/keeping up with the latest information
Interpersonal	• Survival of the fittest way of life • Competitiveness • Bullying
Personal	• Perfectionism • Selfless hero mentality • Second victim syndrome • Secondary traumatization

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2. Increased oxidative stress and inflammation;
3. Increased urination and sweating;
4. Increased cortisol output via its impact on aldosterone levels leading to changes in the urinary excretion of electrolytes and minerals; and
5. Appetite changes due to reduced intake.[42]

According to the "Triage Theory," when there is moderate shortage of micronutrients (i.e., as described above from chronic stress), the body will conserve the vitamin/mineral-dependent "proteins/enzymes that are essential for survival and reproduction."[43] As a result, the proteins/enzymes that are required to ensure long-term health are essentially rendered insufficient, which results in vulnerability toward disease, stress-related problems and brain dysfunction.

To lessen these adverse effects, at-risk clinicians or clinicians experiencing burnout, ought to consider taking B-complex vitamins with additional micronutrients (i.e., 500 mg of vitamin C, 100 mg of calcium, 100 mg of magnesium, and 10 mg of zinc) based on positive findings from several clinical studies.[44-48] Some of the known brain mechanisms of B-complex vitamins include improved brain energy metabolism, increased production of monoamine neurotransmitters (i.e., serotonin, dopamine, and norepinephrine), increased production of gamma aminobutyric acid (GABA) and acetylcholine, and reductions in the rate of brain atrophy.[49,50] Some of the known brain mechanisms of calcium, magnesium, and zinc include the release of neurotransmitters, augmented chemical signaling between cells, the production of adenosine triphosphate, active transport of ions across cell membranes, regulation of gene expression, and maintenance of normal neuronal cell function.[49] Some of the relevant brain mechanisms of vitamin C (ascorbic acid) include the reduction of oxygen free radicals, and modulation of glutamatergic function.[51]

The actual doses of the B-complex vitamins with additional micronutrients was very modest (i.e., low by therapeutic standards) in all these studies.[44-48] The formulation that was used in two of the cited studies consisted of the following: B1 (15 mg); B2 (15 mg); niacinamide (50 mg); pantothenic acid (23 mg); B6 (10 mg); biotin (150 µg); folic acid (400 µg); B12 (10 µg); C (500 mg); calcium (100 mg); magnesium (100 mg); and zinc (10 mg).[44,46] Another cited study used the same formulation, but without zinc, and with double the amount of vitamin C (1000 mg).[45] One of the formulations studied was more unique since it included B-complex vitamins, vitamins E and C, choline, inositol, lecithin, and modest doses of herbal medicines (i.e., 250 mg of *Avena sativa* and 100 mg of *Passiflora incarnata*).[47] Overall, the evidence from these clinical studies showed that the oral use of B-complex vitamins – i.e., with additional micronutrients as specified above, and with the addition of herbal medicines in one cited study – lower symptoms of anxiety, depression, and perceived stress (or related parameters) while also increasing general wellbeing (or related parameters).[44-48] None of the trials noted any worrisome or concerning adverse effects associated with these B-complex formulations.

Therapeutic doses of vitamin C, ranging from 1-3 grams daily, may also attenuate some of the effects of chronic stress. One randomized clinical trial on healthy adults allocated 3 grams of sustained-release vitamin C or placebo over the course of 14 days.[52] As would be expected, the plasma level of vitamin C increased among the subjects taking the vitamin and not the subjects taking placebo. The plasma vitamin C level at the end of the trial, "but not pre-trial was associated with reduced stress reactivity of systolic blood pressure, diastolic blood pressure, and subjective stress, and with greater salivary cortisol recovery." Another randomized placebo-controlled trial administered 1000 mg of vitamin C or placebo to 142 female graduate students.[51] The study showed that vitamin C possessed acute anxiolytic effects. In both of the cited studies, no adverse effects were attributed to the use of vitamin C.

Broad spectrum minerals and vitamins (BSMV), in daily doses much higher than a one-a-day multiple vitamin and mineral supplement, have been shown in a couple of clinical studies to attenuate the effects of chronic stress resulting from natural disasters.[53,54] Though the psychological effects of burnout may not be fully comparable to the psychological effects resulting from natural disasters, it would seem probable that treatment shown to benefit people affected by natural disasters would also benefit those affected by burnout. In one study people having been through the trauma and stress following an earthquake were given one capsule/day of B-complex vitamins plus additional micronutrients, or four capsules/day of BSMV, or eight capsules/day of BSMV for 28 days.[53] All the treatment groups showed favorable effects upon a broad array of symptoms when compared to changes from baseline to four weeks. The BSMV group (4 capsules/day) had the most notable clinical benefits on the various clinical rating scales compared to the other groups. Specifically, people taking four capsules/day of BSMV experienced the greatest reductions in symptoms of depression, anxiety, and stress. Comparatively, people taking four capsules/day of BSMV also experienced less perceived stress, and greater reductions in avoidant and arousal symptoms. Some 5% of all people given treatment experienced adverse effects. The BSMV group that took eight capsules/day had the largest number of adverse effects, such as constipation, sleep disruption, and gastrointestinal disturbances. None of the adverse effects were considered serious and the compliance was extremely high (i.e., 92% or higher) during the trial.

In the second study, a similar design was used to assess psychological distress following a natural disaster, but the duration was six weeks.[54] Unlike the other study, the groups evaluated included people taking four capsules/day of BSMV, 1000 IU of vitamin D3, and one capsule daily of a B-complex vitamins plus additional micronutrients (as described earlier). The B-complex vitamins plus additional micronutrients and the vitamin D3 groups lowered a broad array of symptoms when comparing changes from baseline to six months. People taking B-complex vitamins plus additional micronutrients had more notable clinical effects compared to those just taking vitamin D3. Similar to the findings noted in the other study, people taking four capsules/day of BSMV experienced greater reductions in symptoms of depression, anxiety, and stress. They also experienced more marked reductions in intrusive and arousal symptoms. The average compliance among all the treatment groups was 93%. With respect to treatment-emergent adverse effects,

no differences were found across all the treatment groups, and none were considered serious.

The use of BSMV to treat neuropsychiatric disorders, including chronic stress, has evolved considerably since the early 2000s. Several key review articles have documented the brain mechanisms positively impacted by the broad spectrum micronutrient (or "multinutrient") approach.[55,56] In a 2013 review article, the following brain mechanisms were highlighted as viable explanations for the observed positive effects on brain function: (1) providing sufficient micronutrients to assist enzymes "with drastically reduced activity" to become "so supersaturated with the necessary cofactors that near-normal function is restored;" (2) maintaining optimal homocysteine levels to ensure proper cellular function; (3) improved energy metabolism of neuronal and glial cells via the production of ATP and augmented mitochondrial function; and (4) moderating the effects of gastrointestinal inflammation and/or gut sensitivities.[55] In a more recent 2021 review, similar brain mechanisms were noted as the reasons for beneficial clinical outcomes when using BSMV, but with the addition of offering protection from environmental toxins, especially those that adversely impact brain health.[56]

Table 4 lists the different micronutrient options to moderate the adverse effects of chronic stress. These treatments would presumably help to prevent and/or treat burnout since burnout is an adverse outcome when chronic occupational stress becomes unmanageable.

Herbal Medicine Treatment Options

There are only a couple of well-studied herbal medicines that I believe have been shown to attenuate many of the negative impacts of chronic stress. This will not be an exhaustive review, but rather a few notable studies will be highlighted as a way in which to demonstrate the clinical plausibility of the chosen herbal medicines. It could also be argued that the chosen herbal medicines, including the cited studies, are too sparse and represent just a tiny sample of other clinically plausible herbal medicines to manage chronic stress and burnout. Given the paucity of available evidence, I maintain that only two herbal medicines currently possess sufficient evidence as treatment options for chronic stress and burnout.

Rhodiola rosea extract (RRE) ought to be considered since it normalizes the release of stress hormones (i.e., cortisol) while augmenting the production of ATP synthesis in mitochondria.[57] It also possesses monoamine oxidase-A (MAO-A) and MAO-B inhibition, which suggests a mechanism underlying its antidepressant, anxiolytic, and activating properties.[58] It has been the subject of an open-label trial involving patients with symptoms of burnout (400 mg/day; 12 weeks),[59] and a randomized clinical trial assessing patients with stress-related fatigue (576 mg/day; 28 days).[60] Though RRE has been safely combined with selective serotonin reuptake inhibitors (SSRIs) and serotonin and norepinephrine reuptake inhibitors (SNRIs),[61]and more recently in combination with sertraline,[62] there are case reports of patients experiencing concerning cardiovascular adverse effects when combined with paroxetine,[63] and escitalopram.[64]

In the burnout study, RRE was able to lower specific burnout symptoms of depersonalization and emotional exhaustion (all with p values <0.001) despite the fact that the actual amount of symptom lowering does not seem to be clinically meaningful.[59] However, the more clinically meaningful and statistically significant improvements (all with p values <0.001) over the 12 weeks involved sub-scores of the Perceived Stress Questionnaire (PSQ) related to fatigue, harassment, irritability, lack of joy, overload, tension, and worries. Similarly, in the Multidimensional Mood State Questionnaire (MDMQ), there were clinically meaningful and statistically significant improvements (all with p values <0.001) over the 12 weeks in sub-scores of alertness, tiredness, calmness, restlessness, good mood, and bad mood. Some noted adverse effects possibly related to RRE during the study included head pressure, lightheadedness, nausea, feeling irritated, and eye swelling. The actual calculated overall incidence of adverse effects per observation day, however, was extremely low at 0.015.

In the stress-related fatigue study, RRE attenuated the cortisol awakening response, improved symptoms of burnout (as per the Pines' Burnout Scale; p=0.047), physical health (as per the 36-Item Short Form Survey Instrument; p=0.056), and various aspects of mental performance (i.e., involving attention and stable work pace; some measures were statistically significant).[60] No serious or concerning adverse effects were attributed to the use of RRE in this study. Based on the results of these two studies, RRE represents an herbal medicine that could help assuage numerous psychological symptoms associated with burnout, as well as the physical and emotional exhaustion that often accompanies this psychological syndrome.

The next herbal medicine to consider is Ashwagandha (AG). Mechanistically, AG has a high affinity for GABA receptors and possesses GABA mimetic properties.[65,66] It also modulates cortisol (i.e., lowers serum cortisol).[67-69] It has been the subject of clinical studies involving stressed healthy adults taking the following daily doses: 600 mg for 60 days (5% withanolides, 30 mg);[67] 250 mg and 600 mg for 8 weeks (5% withanolides, 12.5 mg and 30 mg, respectively);[68] and 240 mg for 60 days (35% withanolides, 84 mg).[69] AG can be combined with all classes of psychiatric medications, but caution is warranted when combined with benzodiazepines, and/or insomnia medications ("Z-drugs") such as eszopiclone, zaleplon, and zolpidem.

In terms of how AG impacts biochemistry, physiology, and organ function several important publications are worth discussing. In a safety study, 600 mg/day of AG was given to healthy ➤

Table 4. Micronutrient Options

Treatment Options	*Suggested Daily Dose*
B-complex 50 or 100 (with 100 mg of calcium, 100 mg of magnesium, and 10 mg of zinc)	1 pill (Note: any B-complex 50 or 100 supplement would exceed the majority of the B-vitamin doses used in the cited clinical studies)
Vitamin C	500-3000 mg (Note: timed-release formulation recommended)
BSMV	4 pills (Note: the recommended product should approximate the doses and ingredients that were used in the cited clinical studies)

➤

volunteers for eight weeks.[70] No adverse effects were noted in the AG and placebo groups. Hematological and chemistry parameters remained within the acceptable range at baseline and after the eight weeks of AG. No significant changes were noted for the hematological and other parameters (including thyroid hormones) when comparing the AG and placebo groups. No adverse effects were also reported during this study.

A study evaluated the impact of AG upon subclinical hypothyroid adult patients (n=50).[71] Twenty-five patients received AG (600 mg/day), and 25 received placebo over the course of eight weeks. The efficacy variables were serum thyroid stimulating hormone (TSH), serum triiodothyronine (T3), and thyroxine (T4) levels. Eight weeks of AG treatment improved serum TSH ($p < 0.001$), T3 ($p = 0.0031$), and T4 ($p = 0.0096$) levels significantly compared to placebo. AG treatment effectively normalized the serum thyroid indices during the treatment period in a significant manner (time-effects: TSH [$p < 0.001$], T3 [$p < 0.001$], and T4 [$p < 0.001$]). One patient in the AG group reported adverse effects that were mild and temporary. I have given AG to several patients taking thyroid replacement therapy, and none of them experienced adverse effects or changes in their thyroid status even with the addition of AG to L-thyroxine treatment.

Unfortunately, rare liver abnormalities have been attributed to the use of AG. In a report, five cases of liver injury were connected to the use of AG.[72] The mean age of the patients was 43 years with a range of 21-62 years of age. Three of the patients were male. All five patients developed liver-related symptoms 2-12 weeks into AG treatment that consisted of jaundice, nausea, lethargy, pruritus, and abdominal discomfort. The liver injury was determined to be cholestatic or mixed, and the pruritus and hyperbilirubinemia was prolonged (i.e., lasting 5-20 weeks). None of the patients succumbed to hepatic failure, and the liver tests normalized "within 1-5 months in four patients." One patient was lost to follow-up.

In my own clinical practice, I have had one case in which a patient developed elevated levels of aspartate aminotransferase, alanine transaminase, and alkaline phosphatase, and also some hematological abnormalities (i.e., decreased platelets, lymphocytes, and monocytes). None of the liver function elevations or hematological decreases were serious, and the patient did not develop any liver-related symptoms. All of the lab abnormalities normalized within one month of stopping the AG. I do provide this information, as part of informed consent, when recommending AG to patients. I offer monitoring of liver function as an option, but most patients feel fine without such clinical vigilance once they understand that instances of liver injury are extremely rare.

Therapeutically, the results of several trials have established efficacy when using AG to lessen the psychological impacts of chronic stress. In all the studies, adverse effects were insignificant, or were very mild and clinically indistinguishable from those attributed to placebo.[67-69] In the 2012 study, healthy subjects with chronic stress demonstrated the following clinical improvements when taking AG for 60 days over placebo (all with p values<0.0001):

- Perceived Stress Scale (PSS) reduced by a mean of -9.1 points compared to a mean of -1.4 points among subjects in the placebo group;
- General Health Questionnaire reduced by a mean of -24.6 points compared to a mean of -0.7 points among subjects in the placebo group; and
- Depression Anxiety Stress Scales (DASS) reduced by a mean of -39.3 points compared to a mean of -2.8 points among subjects in the placebo group.[67]

In the 2019 study, the results were also very favorable. Over the course of eight weeks, the stressed healthy subjects taking the higher daily dose of AG (600 mg) demonstrated the following clinical improvements (i.e., all with p values <0.001):

- PSS - the AG group went from a mean (standard deviation) of 22.95 (1.57) at baseline to a mean of 14.15 (2.62) compared to the placebo group that went from a mean of 22.70 (2.17) at baseline to a mean of 16.63 (3.13); and
- Hamilton Anxiety Rating Scale (HAMA) – the AG group went from a mean of 24.10 (3.21) at baseline to a mean of 20.15 (3.66) compared to the placebo group that went from a mean of 23.32 (3.09) at baseline to a mean of 21.42 (3.27).[68]

In another 2019 study, the results were once again clinically favorable toward AG over placebo (i.e., between group comparisons) but did not reach the same statistical significance as the other noted studies. Over the course of 60 days, the stressed healthy subjects taking AG demonstrated the following clinical improvements in the HAMA and DASS rating scales (i.e., p values of 0.40 and 0.96, respectively):

- HAMA - the 240 mg/day AG group went from a mean (standard deviation) of 10.27 (0.59) at baseline to a mean of 6.07 (0.38) compared to the placebo group that went from mean of 9.73 (0.54) at baseline to a mean of 7.37 (0.41); and
- DASS - the 240 mg/day AG group went from mean of 16.83 (1.00) at baseline to mean of 11.77 (0.86) compared to placebo group that went from mean of 16.40 (1.06) at baseline to mean of 14.73.[69]

The mean serum cortisol measurements from all three studies showed clinically meaningful changes (i.e., decreases) from baseline as a result of AG administration (Table 5). The reduction in cortisol in all these studies suggest that AG possesses a moderating effect on HPA axis activity in stressed healthy adults. Even though multiple mechanisms have been purported to account for AG's therapeutic effects,[69] I believe its affinity for GABA receptors and having GABA mimetic properties (as noted earlier) may be one of the key ways in which AG moderates HPA axis activity in response to ongoing stressors.

Table 6 lists the different herbal medicine options to moderate the adverse effects of chronic stress, and to prevent and/or treat burnout.

TLCs

My own clinical work has taught me that recovery from burnout is much like recovery from depression: It will take time and patience for the burned-out clinician, which may mean months or even a couple years, to return to an acceptable baseline. The danger for the recovered clinician is returning to the same job and the same circumstances that were largely responsible for causing burnout to happen in the first place. Most recovered clinicians have to be willing to change how they work and to seriously moderate their work-related triggers, if they want to protect themselves from becoming a repeat burnout customer.

First, foundational supports are needed to bring balance to an overactive and depleted nervous system. This involves some combination of a healthy diet, good sleep, regular exercise, meditation, psychotherapy, and social support.[73,74] All of these foundational supports (i.e., in combination) moderate cortisol and inflammatory cytokines, lessen HPA axis activity, increase PFC functioning, increase serum levels of BDNF, and encourage synaptic plasticity. All of these treatments aim to improve self-care. Workshops dedicated to improving self-care have been shown to lower depersonalization, one of burnout's main symptoms.[75] Clinicians ought to consider adding cognitive behavioral therapy (CBT), as part of their ongoing psychotherapy treatment. CBT can improve emotional exhaustion, another one of burnout's key symptoms.[76]

Second, since self-blame and shame tend to coexist with burnout, it is recommended that some form of mindfulness self-compassion (MSC) be used to augment emotional flexibility and regulation. Many studies and systematic reviews have been done on this approach to help with burnout and related problems. For example, the results of a study on MSC and mindfulness-based stress reduction given to health professionals (i.e., mostly physicians) working at six different Spanish National Health Systems teaching units showed improvements in both mindfulness and self-compassion, with the positive effects being sustained when measured three months after the intervention.[77] In a systematic review on MSC for nurses, the results showed "medium-to-large effect sizes for self-compassion, traumatic stress, burnout, stress and compassion satisfaction," and "high intervention adherence (mean=86%) in the included studies."[78]

To augment MSC, I typically review its three components with clinicians based on the work of Drs. Neff and Germer.[79] The three components include: (A) Self-kindness (i.e., talking to ourselves as a good friend would); (B) Common humanity (i.e., that all of us are flawed, works in progress, and that suffering is normal and part of one's daily experience of living); and (C) Mindfulness (i.e., acknowledging feelings in the moment without over-identifying with them, and without letting them embody or engulf who we are). There are many ways of encouraging this approach when feeling the ill-effects of chronic stress and burnout, but in its most elemental form, clinicians could practice in the manner described below:

> Jonathan, right now you are feeling overwhelmed and exhausted. It is OK to feel this way, as we all experience moments or times when things are just too much to manage. I want you to know that despite the challenges you face at this moment, you can get through this, and I am here to support you.

To improve the positive benefits of this brief MSC exercise, clinicians can then give their arm a gentle squeeze, place a hand on their heart, or provide some other type of reassuring touch. By giving ourselves physical support, we are "tapping into the mammalian caregiving system" and "triggering the release of oxytocin."[80] This will "increase feelings of trust, calm, safety, generosity, and connectedness and also facilitate the ability to feel warmth and compassion for ourselves."[80] This needs to be practiced several times each day – i.e., whenever emotions feel overwhelming – for it to have durable therapeutic effects over time.

Third, it is essential for clinicians to not only remember, but to relearn and reclaim the meaning they once derived from the work they do. Burnout is antithetical to meaning, since meaning from work cannot happen when burnout happens. The most influential scholar on the subject of meaning was that of Viktor E. Frankl, MD, PhD.[81,82] Even though the experience of burnout is not proximate to having survived the Holocaust, his seminal work on meaning and suffering can be generalized to all circumstances a person faces, including that of burnout. Meaning is embedded in our biology, and so finding meaning (or reclaiming) meaning demands the simple but essential self-reflective remembrance that work was once fulfilling and life affirming.[82] Doing so is not easy and may require help from a qualified psychotherapist, but there are apparently three main avenues by which suffering clinicians can arrive at meaning once again. The first and most obvious is by "doing a deed."[82] When clinicians feel the satisfaction of helping someone again, even with all of its complexity and nuance, they can begin to feel the positive momentum and fulfillment of being in the service of others.

Another way in which to encourage meaning is by "experiencing something or encountering someone; in other words, meaning can be found not only in work but also in love."[82] There is nothing short-sighted or pedantic about experiencing love and having love in one's life. Much too often, I am saddened by the sacrifices most clinicians make by forsaking love for the important clinical work they do. Burned-out clinicians both cause and experience resentment by weakening the integrity of relationships with the people they love. Work, especially when burnout happens, becomes a one-sided affair anchored to the external world ➤

Table 5. Changes in Mean Serum Cortisol Levels

	2012 Study (60 days; p=0.002) - 600 mg/day[67]	*2019 Study (8 weeks; p<0.0001) - 600 mg/day[68]*	*2019 Study (60 days; p<0.001) - 240 mg/day[69]*
AG - Baseline; ug/dL (standard deviation)	15.7 (3.2)	16.12 (3.97)	14.15 (0.94)
AG - End of Study; ug/dL (standard deviation)	11.3 (3.7)	10.86 (3.80)	10.84 (1.04)
Placebo - Baseline; ug/dL (standard deviation)	15.6 (3.3)	16.15 (4.80)	14.00 (0.94)
Placebo - End of Study; ug/dL (standard deviation)	14.4 (3.2)	15.52 (4.57)	14.07 (1.04)

Table 6. Herbal Medicine Options

Treatment Options	*Suggested Daily Dose*
RRE	400-600 mg (minimum of 3% total rosavins and 1% salidroside per pill)
AG	600 mg (the daily amount of withanolides should be 30 mg; dose of withanolides could be increased to approximately 84 mg if necessary)

➤

of achievement at the expense of love, which is the "ultimate and the highest goal to which man can aspire."[82] When we feel bereft of everything (i.e., as happens in burnout), it is ultimately the experience of love that provides much needed sustenance. Just as clinicians must recommit to finding work meaningful and satisfying once again, they must recommit even more to strengthening the intimate connections they have with the people they love. The security and strength derived from renewed commitments to salient love relationships provide essential buffering and resilience against burnout. Clinicians need meaningful work, but more importantly they need supportive and meaningful relationships to return home to each and every day.

As we finalize the discussion on meaning, it is important to recognize that if the external circumstances of a clinician's work may not change (i.e., like "the helpless victim of a hopeless situation"), then it is possible for the clinician to rise above themself, grow beyond themself, and by so doing can change themself.[82] All clinicians can "turn a personal tragedy into a triumph."[82] This may be the most complicated and counterintuitive way in which to help the burned-out clinician. This shift in attitude does not suggest or make the contention that "suffering is indispensable to the discovery of meaning;" rather, it simply means that meaning is available in spite of unavoidable suffering.[82] If the suffering that caused the burnout to happen in the first place is avoidable, then the right thing to do would be to remove the cause since unnecessary suffering in such a case would be "masochistic rather then heroic."[82] However, in situations when suffering is not avoidable (i.e., as in many work circumstances), clinicians can choose their attitude towards such unchangeable situations, and turn their suffering (and burnout) into an achievement. When all else fails, sometimes it is a consistent shift in attitude that will help the most.

In addition to MSC and building meaning, the final component to helping burnout is simply time, and allowing sufficient time to heal. Regrettably, most clinicians do not have the luxury of taking some type of short-term leave when burnout happens. If they did, they would likely want to attend a specialized facility that focuses on treating burnout. A six-week inpatient program on a "burnout ward" provided individual CBT, group therapies, activating body therapies (e.g., yoga and physical exercise), regenerative individual therapies (e.g., massage and ear acupuncture), resources activating therapies (e.g., music and art), and job coaching (if necessary).[83] There was a reduction in symptoms and also increases in BDNF following the inpatient program. Since this type of approach is unavailable to most clinicians, they can maximize the time they do have by improving the odds of a better outcome. They can do this by creating their own comprehensive weekly program to combat burnout. Therapeutic change and recovery won't happen fast but can be significantly improved by securing the right support and regularly engaging in several of the healing modalities (as noted above), or other healing modalities, such as dance, martial arts, theater, and drumming – activities that enhance joy, meaning, and purpose in life.

Conclusion

Burnout is an "epidemic phenomenon" that is real and difficult to avoid for most clinicians.[28] There is a high prevalence of burnout among physicians (and likely, most clinicians) with correspondingly reduced amounts of WLI. Burnout results from chronic work-related stress that overwhelms allostatic systems, causing heightened HPA axis activity and damage arising from AL/AO. These effects change neurobiology, resulting in an underfunctioning PFC and an overfunctioning (i.e., over responsive) amygdala. These changes are associated with low levels of serum BDNF and increased NA. The unfortunate outcome of burnout involves more medical errors and/or behavioral consequences resulting from disinhibition. Since organizations seldom do more than provide a few helpful services/resources to lessen the impacts of chronic work-related stress, the onus is on individual clinicians to find a way forward whether they are heading towards burnout, or have been diagnosed with it.

Micronutrient and/or herbal (botanical) treatment options can assuage some of the devastating effects of chronic stress and may reduce symptoms of burnout. These treatments may even delay the onset of burnout or prevent burnout if they are started well in advance of work-related stress. TLCs are also vital in preventing and recovering from burnout, which involve foundational support, MSC, finding (or reclaiming) the meaning of work, and taking the time needed to implement a comprehensive anti-burnout strategy involving several healing modalities.

Even though our current understanding of burnout has increased considerably, including its prevalence and diagnosis, for medicine and all of healthcare to fulfill its mission, clinicians need to be better supported so they can effectively treat patients and do their important work without being demoralized in the process. All stakeholders in healthcare ought to be very concerned about the current state of affairs and should continuously find opportunities to develop and implement effective strategies, such as those identified in this paper, to better support clinicians and minimize burnout.

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Burnout Assessment Links

1. **Burnout Self-Test (informal assessment tool; free):** https://www.mindtools.com/pages/article/newTCS_08.htm
2. **Maslach Burnout Inventory (MBI; license required):** https://www.mindgarden.com/117-maslach-burnout-inventory-mbi
3. **Oldenburg Burnout Inventory (OLBI; free):** https://www.mdapp.co/oldenburg-burnout-inventory-olbi-calculator-606/

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References are available online at www.townsendletter.com.